

THE MISUNDERSTOOD MIRACLE

POLITICS AND THE DEVELOPMENT OF A HYBRID ECONOMY IN JAPAN

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by

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ABSTRACT

Two competing explanations for Japanese economic success were tested through an analysis of the development of the Japanese machine tool industry. First, the conventional view that a centralized Japanese bureaucracy had fostered economies of scale in manufacturing that provided domestic firms with low cost advantages over other international competitors--that Japan was a super-efficient variant of a uniform industrial model--was examined. A comprehensive study of both prewar and postwar machinery development and bureaucratic efforts in each period failed to confirm the conventional view. Bureaucratic influence was shown to be ineffective; centralization and comparatively advanced economies of scale did not result. Further, considerable evidence of decentralization in the Japanese economy as compared to America was uncovered. Building on these findings, a second explanation stressing the role of unique, convergent developments--the relationships between large and small firms, market trends, government small business support and regionalism--in producing a "hybrid" mix of both mass producers and flexible manufacturers was tested. The method was to examine the history of small and large firm interaction, to study the way the government provided startup loan support to machinery users, and to perform a case study of one outstanding manufacturing hamlet in Central Japan. The results disconfirmed the usual view of small firms in Japan as technically inferior and limited to providing an economic buffer for large firms. Instead, evidence of a much more extensive growth of independent, flexible firms in Japan as compared to the U.S. was developed. These findings called into question most of the arguments commonly associated with studies of Japanese political economy. First, there was little support for the idea that Japanese regulation is dominated by a strong centralized state. Next, the findings suggested that Japan cannot be understood as a more efficient version of manufacturing practices basically identical to other

countries but rather must be seen as a divergent case affected by unique political factors. Finally, the study redirected the effort to build adjustment strategies based on the Japanese case away from the fixation on continually strengthening centralized authority and instead pointed toward the necessity of encouraging decentralized flexible producers in addition to mass producers in the economy.

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Chapter One

Two Views of the Japanese Economy

This essay is about the expansion of an important, but overlooked part of Japanese manufacturing, the growth of flexible, smaller factories, and the reasons that these firms achieved their remarkable economic influence. Its focus is on the numerical control (NC) machine tool industry. Our argument will challenge prevailing explanations of postwar Japanese success and economic regulation, and the larger theoretical perspectives about the history of industrial development that initially made these views plausible.

The contemporary wisdom is that Japanese development was facilitated by authoritative, centralized institutions that induced the adoption of more advanced, efficient mass production techniques than in other nations. By virtue of this guidance, Japan was able to create a national economy that could produce goods more cheaply than elsewhere and achieve spectacular market successes. We shall argue instead that both public and private attempts to consolidate the Japanese economy, to authoritatively bring about the ultimate perfection of mass production as envisioned by bureaucrats or powerful capitalists, failed. Convergent industrial and political transformations instead led to the internal fragmentation of large firms, the intended leaders of the drive towards volume production, and the technological revitalization of smaller manufacturers, the main target of the state's industrial policies. The cumulative effect of these diverse developments was to move Japan away from the mass production model many industrialists and bureaucrats

thought they were implementing. Instead, a hybrid manufacturing system, in which mass producers coexisted with highly flexible, small scale factories making low volume speciality goods emerged in Japan. Thus, we will argue that current studies of Japanese industrial expansion are mistaken in their description of the economy and that the reasons for this failure point to fundamental problems in the basic historical assumptions that have informed contemporary research.

Economic recovery in the United States has somewhat dampened enthusiasm for Japanese industrial studies. Yet the same problems that initially prompted interest in comparative economic research remain today. Analysis of Japanese economic practices flowered with the economic crises of the 1970s as faltering growth in the U.S. and Europe reopened debate about what kinds of institutions or policies could, or should be undertaken to ensure growth. Subsequent recovery in America in the 1980s, however brief, appeared to validate resurgent neo-classical economic and political thought and interest once again turned away from 'lessons from abroad.'

But buried in the reports of modest economic growth is evidence of a continuing crisis in American manufacturing. By September, 1985, even as the US was held up as an example of successful *laissez faire* policies, 110,000 jobs a month were draining from manufacturing sectors, prompting one national industrial analyst to laconically note, "All is not well in goods producing America."¹ Firms in industries once thought to be invulnerable such as computers were crying for protection from foreign competition, while those in weaker but no less crucial industries like automobiles or machinery quietly made plans to withdraw from production or move into other fields. No one knows whether American growth has been due to fundamentally sound free-market principles or to temporary trade

restraints, foreign capital influx in the face of high interest rates, military Keynesianism, deficit pump-priming, or fortuitous energy price stability. The problems of the 1970s are far from solved, and the effects of various policies on economic behavior extremely unclear. Developing industrial options and studying the differential effects of various political strategies through comparative analysis remains an important field of endeavor.

Understanding the reasons for Japanese economic development is one of the most serious challenges in comparative political economy. No theory of development or strategy for producing growth can ignore that country's postwar advance, and if an argument is broadly confirmed by Japan's experiences it gains an immeasurable degree of support. Further, cases of success are used as examples with which other nations judge themselves; one way to critique established beliefs, or to validate new ideas is to link them with instances of spectacular economic achievement. Japan is an important prize to be "captured" by rival interpretations of and prescriptions for economic growth. By critiquing rival accounts of Japanese development we can gain an insight into what assumptions unify apparently competing hypotheses and then evaluate these basic beliefs on their own. Thus, in clarifying arguments about Japan, we in fact bring to light ideas about ourselves.

Conventional Wisdom and Japanese Economic Growth

Despite the fact that studies of Japanese economic resurgence have been produced from a wide variety of ideologies or theoretical perspectives, they tend to employ a similar logic. The unifying principle of even those arguments that are thought to be antithetical--for instance, those which

see an important historical role for the Japanese state, and others which argue in favor of a *laissez-faire* interpretation--is that Japan achieved a way of squeezing more output per unit input in mass production, and therefore could produce goods more cheaply than other national manufacturers. Debate has focused on the exact nature of the political, social, cultural or economic factors that permitted the Japanese to "leap ahead" in this manner. The overwhelmingly dominant perspective is that authoritative state intervention was responsible for rapid mass production advances in the post World War Two era. A much less popular notion, advanced primarily by conservative economists is that it was the *lack* of an interventionist bureaucracy that permitted "natural" advances in production efficiency to take place in Japan. But both of these arguments unquestioningly adopt the notion that improvements in volume manufacturing lay at the core of Japanese successes; politics could only affect the relative speed which these advances might be made. As we shall all see see these beliefs obscure many important features of the Japanese economy and have proven to be problematic in more general research on the history of worldwide economic development as well. But before we can suggest the limits and problems of conventional analysis, we must examine the arguments in more detail.

Let us begin with the dominant view, which we shall call the "statist" perspective of Japanese expansion. In this argument, a centralized bureaucracy enjoying considerable economic authority managed the successive enhancement of Japanese mass production efficiency. The most refined and carefully researched version of this theme is provided by Chalmers Johnson in **MITI and the Japanese Miracle**.² His contention is that the Ministry of International Trade and Industry (MITI) was able to

direct the Japanese economy towards promising new sectors and to foster advanced, "rationalized" manufacturing techniques because it could accurately anticipate the next step in the perfection of mass production, and then authoritatively induce private industrialists to implement its policies. But what guaranteed MITI's industrial judgement was Japan's timing of development: "behind" the rest of the world, the bureaucrats could rationally pick and choose the components of a super-efficient industrial system. Then, armed with effective centralized power, they could put their plan in action.

The starting point of Johnson's analysis is the idea of a developmental state. "In states that were late to industrialize," he writes, "the state itself led the industrialization drive, that is, it took on *developmental* functions."³ For early developers, the problem of powerful international competitors did not exist and so the state merely policed economic activity; it regulated the economy without concerning itself with substantive questions of what *ought* to be done. Indeed, in most early development cases, the government was formally barred from acting on substantive grounds. In contrast, argues Johnson, for later developers the task of catching up to the established powers forces the state to be explicitly concerned with substantive questions of what the economy ought to look like, or what industries it should focus on.

Johnson expands on the difference between early and late developers by distinguishing between two basic systems of economic authority, "market rationality" and "plan rationality."⁴ Market rationality characterizes the system of early developers; it derives its name from the fact that it is the market that decides substantive issues. In contrast, late developers are concerned with the substance of the economy itself, its structure or

efficiency; their economy is one where "plan rationality" prevails since it is the developmental state that sets the objectives for industry as a whole.

Johnson argues that Japan is a case of a developmental state managing a plan rational economy.⁵ He claims that there were several distinct stages in the growth of the Japanese economic bureaucracy. The first phase, in the Meiji era, saw the state seize direct control of economic enterprises in an attempt to push industry into a modern mold. It failed after about 15 years because, plan rational though the state's efforts were, corruption, ineffective monopolies and bureaucratism hindered further development. The state then shifted to a policy of collaboration with private firms, encouraging those that were technically competent and forming close alliances with the **zaibatsu**, huge financial and industrial combines that flourished in pre-war Japan.⁶

The pre-war period was especially important in Johnson's view, for it was then, he argues, that the bureaucracy learned the lessons of economic management that worked so well in the post-war era. In particular the roots of MITI may be found, he claims, in the pre-war experiences of its bureaucratic precursors, the Ministry of Commerce and Industry (MCI) organized in 1925, and the Ministry of Munitions (MM) which was established in 1943.⁷ The most important of the pre-war lessons was the growing retreat from the Meiji policies of direct interference in the economy to utilizing interfirm competition, that is the market itself, for policy ends. The pre-war government "induced the **zaibatsu** to go into areas where it - felt development was needed," Johnson writes; and this led to economies of scale in manufacturing and banking.⁸

These trends continued in the post war era. The need for recovery brought about a return to a plan rational system and a 'reincarnation' of the

pre-war MCI, which was incorporated as MITI in 1949.⁹ MITI, perfecting its policy of inducing outcomes in the private sector, employed a range of tools including protectionist legislation, foreign investment controls, tax incentives and the provision of technical and other infrastructural aid to push firms into key sectors. Johnson is explicit about the importance of MITI's guidance and its use of the market as a policy tool in producing the post-war miracle:

Most of the ideas for economic growth [in the post-war period] came from the bureaucracy, and the business community reacted with what one scholar has called "responsive dependence." The government did not normally give direct orders to businesses, but those businesses that listened to the signals coming from the government and then responded were favored with easy access to capital, tax breaks, and approval of their plans to import foreign technology or establish joint ventures.¹⁰

In this view Japan's post-war economy depended on MITI's ability to formulate industrial growth plans and then to cajole or to bribe industry to adopt its ideas.

According to Johnson, a developmental state is one in which the body that executes industrial policy enjoys the most "positive power"--it attracts the best people available. He points out that MITI is a premier agency in an elite bureaucracy, staffed by graduates of the finest universities. Indeed, Johnson argues that if the US should emulate the economic planning functions of the Japanese state, it must create an elite bureaucracy staffed by people who have proved their excellence "academically and competitively, preferably in the best schools of public policy and management."¹¹ Johnson's confidence in the quality of the

Japanese elite reinforces his claim that economic direction in Japan flows from MITI outwards.

MITI is thought to have pursued two basic types of policies: industrial rationalization policy and industrial structure policy. The former refers to state efforts aimed at promoting the efficiency of business operations performed by individual enterprises. The state discovers what the best producers are doing, and then induces all of its enterprises to adopt similar techniques.¹² Structure policy is the selection of strategic industries to be developed or to be eliminated because of their future prospects. It is the attempt by the state to change the overall nature of the economy; rationalization policy takes place at the micro level of the firm itself.¹³ Industrial structure policies were among MITI's greatest successes, Johnson argues, because MITI was the "inspiration and the cause of the movement to heavy and chemical industries" that in turn was the basis for the Japanese economic miracle itself.¹⁴

Johnson's work and his historical perspectives comprise the best articulated version of mainstream thought about Japanese political economic development. The notion that Japan shares with other late developers a strong bureaucratic tradition of economic leadership is one of the major themes of both Japanese and comparative industrial research. Japan is routinely classified as a "strong" state in comparison with the US or Britain, and as an example of corporatist economic regulation in which the government makes or facilitates substantive industrial decisions. The idea that the pre-war period saw the emergence and gradual perfection of the style of economic management that would re-emerge in the post-war has been the conclusion of several scholars who have studied the era. Finally, the belief that MITI, through a variety of incentives guided Japan's

movement into the manufacturing sectors that were the centerpiece of its spectacular post-war achievements has surfaced in countless debates about trade issues, academic studies and popular press accounts.¹⁵

We can see the same idea that efficiency enhancements in mass production were the key to Japanese advances in work that explicitly rejects the idea that the state could have promoted these changes. One example is the Hudson Institute's scathing critique of Johnson, **Japanese Industrial Policy in the 1980s**.¹⁶ The claim of the study was that Johnson's arguments were not provable and in any case probably false. Instead, it suggested that Japanese international economic successes were due to the fact that in Japan the principles of *laissez faire* were religiously adopted, reducing barriers for capitalist management. Thus, low taxes, docile labor, a lack of environmental controls and other regulations contributed to the emergence of a more "natural" or "undistorted" mass production system. The Hudson Institute study therefore accepts that mass production advances were behind the industrial expansion of Japan, but offers a different explanation from that of the statist perspective.

Thus, though nominally conceived of as polar opposites, the statist and free-market approach do share a fundamental assumption in common: both assume that it is only efficiency that distinguishes the Japanese economy from other nations. The debate between these two contending schools of thought focuses on to what extent various political, social or cultural factors can account for the emergence of the presumed Japanese perfection of mass production techniques. Nor is this idea confined to just economic and political analysis; the notion that Japan has somehow pushed "ahead" in a race to realize the benefits of increased efficiency in

international competition has informed studies in other branches of Japanese scholarship as well.¹⁷

Indeed, even treatments of Japan's "miracle" that are familiar from the popular press--stressing on the positive side Japanese capacity for "plain hard work" or on the negative supposed advantages of low wages or labor exploitation--implicitly assume that basic economic practices really do not vary all that much from country to country. Their basic premise is that international competition is the race to create in any one national economy the lowest cost, most efficient production system. And, in this light, it has become a commonplace to portray the Japanese economy as a super efficient machine in contrast to the older, worn-out industrial systems in other nations.

Various additional impressions about Japan help sustain the idea that the perfection of mass production is the source of Japanese successes. One is simply the timing of Japan's economic advancement. As a country whose economy as late as the early 1960s appeared much less technically sophisticated than the norm in Europe or America, Japan appears to be a textbook case of a "developmental state" that caught up and surpassed its one time superiors. Key to this notion is the belief that countries that are behind in comparison to other nations in the race to enhance efficiency will tend to develop an interventionist or "strong" state to more rapidly promote needed reforms. Depending on whether a country is advanced or behind in mass production, it will develop a more or less interventionist bureaucracy.¹⁸ In turn, much of the support for the statist thesis is drawn from these theoretical implications of the timing of Japanese development. In the developmental view, it is as "rational" for a late developer to have an

Interventionist bureaucracy as it is for early developers to invoke the principles of *laissez faire*.

More subtly, the picture of what an efficient factory at the micro level would look like dovetails with perceptions of Japanese social discipline and control thus contributing to the idea of Japan as an efficiency machine. When we imagine an optimal plant, we think of a smoothly running operation in which all variability and conflict have been removed to promote the highest degree of efficiency. There is a long tradition of cultural interpretation suggesting that the Japanese may be particularly well disposed to accept the kinds of rationalized, consensual behavior particularly suited for modern production. Generations of American and European and Japanese writers, frequently with the active encouragement of Japanese elites, have held forth at length about Japanese loyalty, hard work, self sacrifice, humility and quiet stoicism. Even a casual visitor to Japan comes away with visions of fast food workers or menial employees who dress neatly and hew to tyrannical company rules that are elsewhere viewed with horror. Longer term visitors invariably know of personal acquaintances who insist on working 80 hours per week and decline vacations to go to the office. Popular conceptions of Japanese subservience, particularly that of blue collar staff have undeniably contributed to the conviction that Japan moved ahead of other states by creating a streamlined, coordinated, economically efficient society. An orderly culture is one best suited to efficiency gains.¹⁹

Supplementing the cultural stereotypes is Japan's history of political authoritarianism. The most graphic example is, of course, the military oligarchy that in mainstream Japanese historiography is said to have dragged an unwilling populace into World War Two. Another example is the

Meiji Restoration, a "revolution from above" in which elites are credited with restructuring a feudal society and preparing it for "modernity."²⁰ The developmental position of Japan, which is thought to encourage centralized economic regulation is buttressed by cultural predispositions towards authority and a history of elite management, irresistibly pushing the researcher to link efficiency gains with industrial advance.

Thus, a variety of impressions and often dimly perceived assumptions about the industrial destiny of contemporary states has produced a remarkable conformity in studies of Japanese development. Order, rationality and discipline, it is thought, were exploited through the vision of an authoritarian economic elite to result in a streamlined mass production system in Japan. Debate is over which institutions and which elites actually accomplished this task. The central task of Japanese research has thus become the search for the differentiating social or political factors which can account for Japanese industrial "advancement" in mass production management.

But the irony is that this analysis of Japan has recently flowered even as the established categories of political economic research and the historical assumptions on which they were based have come under increasing theoretical and empirical attack. And just as new perspectives are making possible novel interpretations of where other industrial societies have been and where they might develop to, these same insights also suggest that conventional Japanese studies have left important questions unanswered, while misinterpreting the implications of the research they did undertake. To see this, we must treat briefly the general theoretical problems inherent in the perception of economic development that have dominated Japanese studies, and to show how these concerns are

further linked to a number of empirical difficulties suggesting the need for an alternative research framework.

General Problems in Conventional Economic History

The theoretical view of economic development on which Japanese studies have drawn takes its strength from the idea that refinements in mass production define the natural, internally driven path all economies must trace to be effective.²¹ Mass production is the attempt to produce a stable good in very high volumes to reduce costs. Central to this strategy is the increased rationalization of manufacturing tasks in the factory; by first breaking production of a good into a number of very simple tasks along an assembly line, labor can specialize in unskilled production which saves on training costs and reduces the potential bargaining power of workers by eliminating skill in the factory. Gradually, additional economies are realized as machines substitute for labor in manufacturing; in a mass production factory single purpose machinery is set up along an assembly line to enhance reliability and reduce personnel costs.

It has been a crucial, if sometimes obscured, assumption of such diverse political economic research traditions as neo-Marxism and Liberalism that the rise of mass production as a system of manufacturing in the 19th century and its spread throughout the world represented the natural triumph of the most efficient industrial system.²² Once the tremendous productive and military applications of mass production were exhibited in the automobile and armaments factories in the United States, the rest of the world was compelled to adopt the system or suffer devastating social and economic penalties: a laggard would find that its

economy would not be competitive, its industrial and military base would be weak, and labor and regional dislocations would be chronic. And indeed, to most people it appeared self-evident that mass production was almost pre-ordained to succeed as the most efficient manufacturing system given American international power in the wake of its refinement in the 1920s.

This view of economic development as an internally motivated, relentless drive for efficiency led to the notion that politics, both in the sense of national electoral debate and in the smaller sense of struggles between workers and managers in the factory, could have only a limited effect on industrial order: political struggle could only affect the speed or degree of implementation of refinements in mass production. A measure of how deeply engrained this idea is in social thought is that both Marxists and Liberals alike seem to have gradually converged in the belief that political or social factors in any given society only affected the pace at which the internal, logical progression of mass production transformations would take place.²³ By treating national cases as if the economy were subject to essentially the same developmental pressures everywhere, a comparative research tradition arose in which the problem was to account for variation in industrial performance as a function of the effects of political and social influences on the "natural" progression of the manufacturing system itself.

But a recent body of literature has begun to question whether politics can only affect the relative success a country experiences in implementing the drive toward mass production efficiency. Instead, there is a growing conviction that such factors as ideologies, labor practices, business strategies, interfirm relations and financial structures of any given nation can actually transform the nature of the economic system itself. Indeed, in the most dramatic example, an industrial system the antithesis of mass

production--one based on continuous product flexibility rather than stable economies of scale--can emerge.

This critique of the vision of economic history and of the role politics played in the process arose from a number of diverse sources. One was the apparent failure of the traditional comparative research program itself. The goal of the conventional studies was to explain industrial variance as a function of a concise set of factors affecting relative mass production efficiency. But in study after study it was discovered that the economic system in any particular case could not be divorced from the context of the surrounding politics and social factors associated with it. Thus, attempts to describe diversity in industrial success as a function of timing of development, interest group structure, financial systems and bureaucratic organization broke down because it was necessary to buttress the explanatory variables with a host of secondary elements. Moreover, once the researcher began to link additional factors to the intended explanation it became increasingly difficult to exclude almost *anything*-- ideologies, market strategies, labor relations--as having had an influence on the outcome.²⁴ In effect, the traditional research agenda rediscovered the political context in which industrial systems operate. But in doing so, it undermined the idea that industrial history was internally driven by the relentless search for efficiency because it inadvertently demonstrated that economic development could not be described independently from particular political and social contexts.

At roughly the same time, new and startling historical studies were emerging that called into question the inevitability of the adoption of mass production as the singularly unique or "natural" solution to manufacturing.²⁵

In the traditional view, mass production came to dominate manufacturing industries because it was inherently more efficient. The drive for efficiency dictated the one best solution to production problems, which was apprehended by prescient visionaries and subsequently put into practice. Historical research, however, pointed more to the role of contextual politics in shaping the responses of industrialists to what and how they should produce; at any given point, there was considerable uncertainty about which path was best. In fact, historical studies even suggested that in the 19th century there was a serious rival to mass production, craft production. In contrast to the strategy of volume manufacturing sought by mass producers, the logic of craft production was to make small batches of specialty, high quality products based on the skill of the manufacturer. The central finding was that mass production was adopted not because of its self-evident superiority to the craft alternative, but because the ideology and political power of its proponents were particularly suited to the context of turn-of-the-century America. Given a different context, a form of manufacturing based more on the principles of the early craft industries might well have flourished. If comparative studies illustrated the inseparable nature of industrial order and the surrounding contexts, historical research revealed that alternatives to mass production were possible.

A final source of criticism directed at the traditional political economic view came from European case studies which discovered contemporary evidence of a dynamic industrial alternative to mass production.²⁶ The methodology of these studies was to imagine in the abstract what a manufacturing economy based on craft principles might look like if it had developed as fully as mass production did from its roots in the

19th century. To distinguish this system from the mass alternative, this hypothetical "craft" economy was called "flexible specialization" and at many points contrasted with mass production. Unlike the mass producer, the aim of the flexible manufacturer would be to create specialty products suited for unique needs, and to try and flexibly change its product line to both defend itself from imitators by creating new niches, and to meet (or create) new market needs. To accomplish this task, the flexible producer would need to use general purpose machines rather than the dedicated equipment used on high volume assembly lines in order to effect rapid product shifts. Further, since product transformations would preclude the regular division of tasks as in mass production operations, the flexible firms would need highly skilled workers with broad shop floor authority to facilitate the continuous construction of new goods. Where the mass producer would try to make a single good with deskilled labor and dedicated machinery, the flexible producer would seek to build constantly changing products in small lots on general purpose machines manned by highly skilled workers.

With this ideal-typical dichotomy serving as the basic framework for research, comparative studies of France and Italy showed that some of the most technically dynamic, successful regions, particularly around Lyon and in Northern Italy, appeared to be organized more according to the principles of flexible specialization than mass production. Indeed, in competition with mass producers, the ability of the smaller, more flexible firms in these regions to differentiate continually their products actually made them more competitive than the larger firms. These studies provided dramatic confirmation of the possibilities for alternatives to mass production suggested by the failure of traditional comparative research and

the results of historical investigations of the rise of mass production itself.

All of these findings and observations point towards a radically different view of economic history from that which informed Japanese studies, and also to a new research strategy. The traditional view imagines that the development of manufacturing is basically governed by the search for efficiency; mass production is the self-evident optimal solution to this problem. Instead, the alternative view is that in any given economy deciding how to organize an industry is fraught with ambiguity. Producers might try to adopt mass production, or they may be guided by their own unique experiences towards the flexible specialization strategy. And even if they make conscious choices, the specifics of their interaction with government, labor, finance and other economic players will inevitably affect the way their choices are implemented and revised. Hence, in any given case a myriad of contextual factors uniquely combines to affect not only the way people conceive of their industrial choices, but also how they achieve them. This process of ideological formation, and the struggles to implement or refine choices affects more than the relative efficiency of a national economy: it can determine whether an industrial system is inherently orientation to mass or flexible production.

The assumption of a fundamental ambiguity in industrial development mandates a shift away from the traditional research program of trying to isolate factors affecting mass production efficiency. First, the questions one must ask about comparative industrial cases are broadened; since the assumption that the economic system is internally driven is rejected, research must explicitly examine the way manufacturing takes place to determine to what extent different cases are shaped by either mass or

flexible production principles. Next, the nature of what constitutes an "explanation" is different. The alternative view must reject the idea that single, isolated factors can account for industrial divergence since in any given case the number of contextual influences on manufacturing is practically limitless. Thus, a research effort based on the assumption of economic ambiguity in development seeks to link systematically as much diverse information about a case according to the specifics of its history and context, and to choose between competing explanations on the basis of which account can make the most sense of the industrial behavior of the nation under study. The range of potential industrial diversity between cases is broadened in the alternative view of industrial development, and the criteria governing research are also changed.

Specific Problems in Japanese Developmental Studies

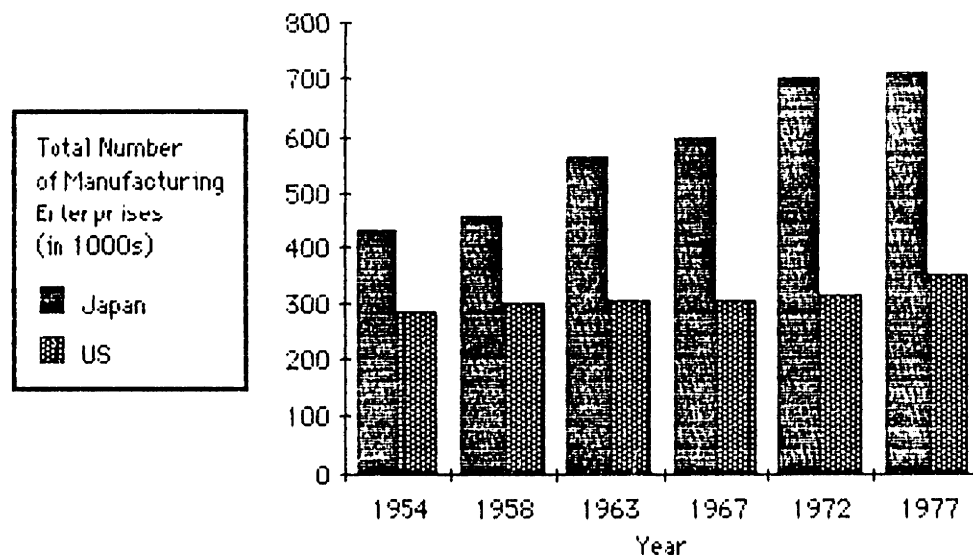
The transformation of research perspectives involved in the critique of traditional economic history directly affects our interpretation of Japanese industrial development. Conventional wisdom asserts that Japan was successful because it was able to centralize its economy and foster more advanced mass production practices. But there is a great deal of evidence that is anomalous under this view, data that resonate strikingly with some of the ideas central to the alternative historical perspective developed above.

Let us first consider the comparative number of firms engaged in manufacturing in the US and Japan. If the conventional thesis were correct, we should expect to see a greater concentration of production in large factories in Japan because consolidation leads to economies of scale,

enhanced planning, and therefore cost reductions. But as Figure 1.1 illustrates, the trend in firm growth and the absolute number of companies in each country contradict the expected finding. As we can see, from 1954-1977, at the height of the economic "miracle," the number of Japanese firms engaged in manufacturing almost doubled from 429,000 to 720,000. During the same period, the number of American firms grew only slightly, from 288,000 to 350,000.

Figure 1.1.

Historical Statistics: Total Number of Firms, Japan and US



Sources: Statistics for Japan were compiled for the years cited from *Tsusansho* (MITI) **Kogyo Tokei Nenpo** (Annual Industrial Statistics) and for the US from the Bureau of the Census, "Summary Statistics," **Census of Manufactures**, again for the years cited.

More impressive are the absolute numbers. By 1977, the Japanese economy was only 30% as large as the American and yet it undertook manufacturing in twice the number of enterprises. Not only are there more firms in Japan than in the US, but their scale of operations, averaged against total output, is close to 1/6 that of the US. The extremely high influence of small firms and the growing trend towards production decentralization as compared to

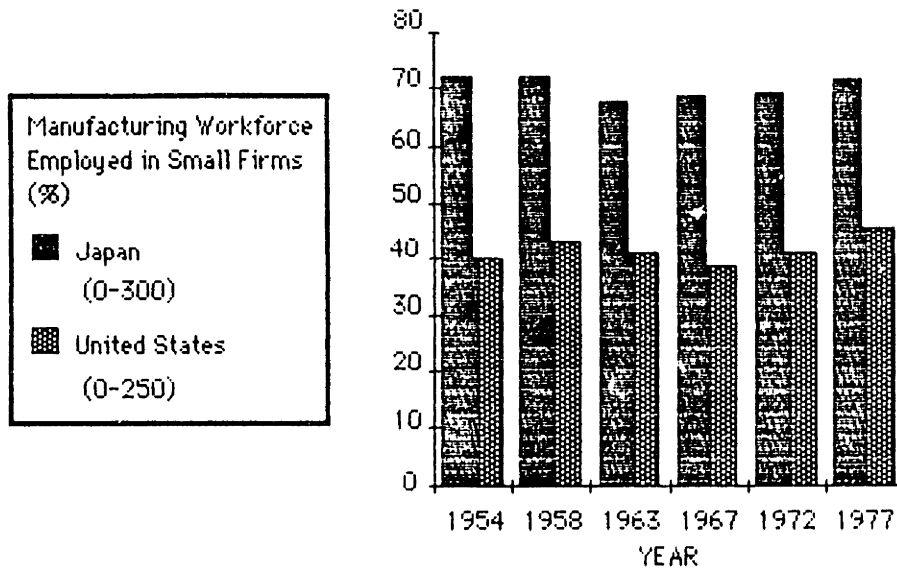
the US runs against the traditional interpretation of Japanese economic development.

Next, let us look at the proportion of workers that are employed in small firms in Japan and the US. Most of our knowledge about work conditions in Japan comes from generalizations based on the experiences of laborers in very large companies. Hence, most people are familiar with concepts like "lifetime employment," "quality circles," or practices such as singing the company song before work, and believe that these are the norm. Intense worker loyalty and precision seems to confirm the conventional view of Japan as hyper-efficient. If conventional arguments are correct, we should expect that over time large factories would increase their share of production as the Japanese economy "rationalized" itself.

As Figure 1.2 illustrates, almost the exact opposite is true. Historically, over 70% of the Japanese workforce has been employed by small or medium firms of 0-300 workers where just 27% work in large firms. In contrast, small or medium firms take up just 40% of the workforce in the US; about 60% of American manufacturing workers, the large majority, work for extremely large companies.

Figure 1.2

Workers Employed in Small Manufacturing Firms, US and Japan



Sources are the same as for Figure 1.1

Furthermore, the trend in both countries appears to be stable. Japanese production workers throughout the postwar period were for the most part small or medium firm employees, while those in America are large firm laborers. If concentration and coordination is thought to enhance efficiency, then America appears to be much more "advanced" than Japan.

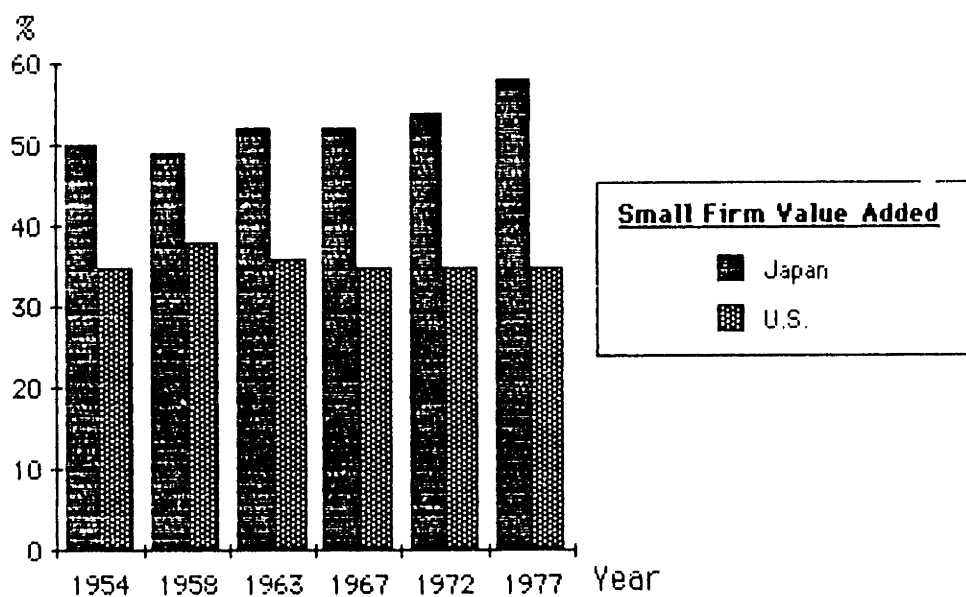
Nor are small firms in Japan marginal in terms of total production. The conventional view might be saved by showing that even if small scale factories are more widespread, their contribution is dwarfed by large manufacturers. If this were true, we should expect to see that value added in manufacturing by size of firm was concentrated in larger firms. Additionally, if Japan were thought to be more efficient than the US, large firm production should be more important.

In fact we see nothing of the sort. Figure 1.3 presents the percentage of postwar value added in manufacturing accounted for by small firms of

Japan and the U.S. It shows that from 1954-1977, the share of small and medium firm manufacturing value added has risen in Japan from about 45% to close to 60%. Most of the value in Japanese production is accounted for by these smaller enterprises, and their share has steadily grown as the Japanese economy registered its spectacular expansion.

Figure 1.3

Historic Share of Small Firm Manufacturing Value Added
United States and Japan



Sources are the same as for Figure 1.1

In contrast, small and medium firms account for much less value added in the U.S. In 1954, firms of 0-250 employees produced just 35% of American value added in manufacturing, a share that remained steady throughout the postwar era. Thus, 65% of US value added is accounted for by large firms as compared to just 40% in Japan. Furthermore, the trend has been towards greater centralization in the US, and towards greater decentralization in Japan.

The traditional rejoinder to evidence of Japanese decentralization is to discount the independence of the smaller firms and cast them as the captives of larger ones. This argument is particularly well-developed in Japanese language economic literature, which has portrayed the domestic economy as fragmented into a "dual structure" [*ni-ju kozo*].²⁷ Large firms are shielded from the effects of economic dislocations by passing the costs of adjustment onto smaller firms. Small firms survive in this view only at the largess of larger companies and because they make cheap parts. Small firm demand in Japan is thus seen as unstable, smaller company wages are low and labor is exploited, and finally small manufacturers have a lower technical capacity than larger firms. Thus, in this view economies of scale are supported by the huge small firm sector because it protects the stability of the largest firms while supplying them with cheap goods.

But this argument, even if it were true, would still profoundly upset the idea that refinements in mass production were the source of Japanese success. For Japan to have succeeded through volume expansion, real volume output gains at the factory level have to be achieved. But if in fact as the "dual structure" proponents claim most of Japanese value added in the economy and the bulk of the workers is accounted for by exploited smaller firms producing goods in batch lots, then the source of Japanese successes cannot be in scale economies: production would be fragmented among thousands of small factories in Japan where it is centralized in giant plants in the U.S. Further, the problem of explaining why Japanese products retain their quality if over half of the value of the economy is produced in "marginal" exploited firms would still need to be explained. Thus, even if the dual structure thesis were correct, it requires proponents of the

conventional view to sacrifice their basic understanding of the Japanese economy as governed by mass production principles.

But in fact, as we will show in Chapters Four and Five, the dual structure argument is substantially wrong--it was probably only applicable to Japan in the 1950s. The relationship between large and small firms in Japan has undergone extensive transformation since then and in the process moved away from the chronic exploitative system suggested by the traditional argument. Small and large firms occupied different, not supplemental roles in the economy and were mutually dependent. A number of factors including the manufacturing strategies of large firms, the political influence of small producers, the transformation of financial markets to the benefit of smaller producers and the growth of regions of small scale factories self-consciously attempting to reduce possible dependence on large firms all combined to preclude the full blown emergence of the "dual economy." Indeed, in the high growth period, wage differentials between large and small firms narrowed to levels equal with those in other nations and the technical skill of small firms in even the smallest of manufacturers often surpassed that of the largest firms. These developments, as we shall see, undercut the idea that price and wage exploitation in the production of cheap goods was the basis of existence for small Japanese manufacturing enterprises.

Thus, the weight of small producers in the Japanese economy remains problematic in the framework of conventional Japanese research. The view that Japan is centralized and coordinated, a seamless manufacturing machine dedicated to enhanced efficiency, is attractive only so long as researchers focus on the largest industrial units. And even in large firms there is overlooked evidence of internal fragmentation explicable more as

the product of a search for flexible production than mass economies of scale. But small or medium enterprises account for the vast majority of the workforce and value added in Japan, and there are far more small firms per unit output than in America. Further, their influence is growing. Any rendition of the structure of the Japanese economy and the institutions that support it must provide an account of why these smaller firms are so dominant, and why they continue to expand.

A second empirical problem is the market behavior of Japanese firms. If Japan represents a more efficient version of a mass production system common to all countries then its major competitive advantage should be product price. There can be little argument that in several industries, especially for standard components where Japanese production is cartelized and foreign competitors are strong as in semiconductors or steel, the Japanese compete on the basis of product cost. But at the same time that Japanese market inroads appear to be based on price advantages accruing from greater efficiency, Japanese manufacturers also pursue a strategy of constantly differentiating products in a manner more reminiscent of the flexible specialist producers we discussed above. Moreover, in modifying their products on a continuous basis, Japanese producers often pursue manufacturing strategies that flatly cut against the reduction of costs through economies of scale inherent in mass production.

One example is automobiles.²⁸ Japanese market penetration into the U.S. market stimulated a number of cost comparisons suggesting Japan had an unfair, or at least excessive price advantage. But lost in the debate over price was the fact that Japanese firms were producing cars at unit volumes of between 3-4 times less on average than American producers. Further, when significant product components like engines or body frames (as

opposed to the body metal fitted over the frame) were considered, Japanese diversity per unit volume was much less than that in the U.S. Moreover, Japanese producers changed their products more extensively and more rapidly than did the Americans. In the context of the automobile market, Japan appeared more as a flexible producer, seeking continuously different market niches, and the U.S. more as the mass producer.

Two illustrations help to make clear the extent of Japanese commitment to flexibility in automotive manufacturing. The first were the effects of earlier market penetration efforts mounted by the Japanese in the late 1950s and early 1960s. In that instance, Japanese firms actually did attempt to compete with American firms on the basis of price with standard models. The Americans beat them back by simply stripping their lowest models and selling them at a discount. Several Japanese auto firms drew from this the lesson that only by continuously differentiating their products could they avoid the price pressures from U.S. firms; even if they successfully found a niche, the Americans would eventually drive them from it should they standardize their production. The result, fortuitously concurrent with the rapid gasoline price hikes of the 1970s was a successful effort to appeal to U.S. consumers with autos that were different, including recreational vehicles, fuel economy, pollution control capabilities and so on. The effects of international competition led the Japanese to modify their approach to mass production to allow for more flexibility.²⁹

These developments were enhanced by inter-firm competition at home and abroad. If, as the conventional wisdom has it, the Japanese enjoy price advantages compared with other countries due to their enhanced efficiency, this advantage would have little effect on competition *between* Japanese

firms who would all, it must be assumed, share the advantages of their national cost structure. At home, and in competition with each other abroad, then, incentives to try and differentiate products would be greater than reducing costs. And indeed, new entrants in the Japanese domestic auto market have traditionally made their mark by creating totally new products such as the micro mini cars introduced by Honda and Suzuki in the late 1960s as they made their successful bid for a share of domestic Japanese auto sales.

Consequently, while price competition is an important part of Japanese domestic and international strategy, so too is a focus on finding and exploiting niches in a continuous manner. In turn, this strategy cuts into the attainment of ever greater economies of scale. Auto firms in Japan clearly sacrifice scale economies for more rapid, and extensive product changes than do firms in the U.S.; in other industries such as electronics, or as we shall see machinery, new products, not low cost, was the key to competitive successes. The problem for the conventional view is to square evidence of flexibility and decentralization with the idea that advances in mass production alone account for Japanese success.

A final set of problems signaling difficulties with the conventional view is that no one has yet identified conclusively a Japanese practice, economic measure or management technique that can clearly account for the tremendous variance between the U.S. and Japan. Part of this difficulty, as we shall see in this essay, has been the almost exclusive focus on comparing large U.S. factories, where the bulk of production in America occurs, to large Japanese firms which account for a much smaller fraction of Japanese production. The smaller firms, we shall argue, are an overlooked contributor to the Japanese "miracle." But in any case, such

commonly cited "explanations" for greater Japanese efficiency as newer machinery, lower taxes and labor discipline turn out on second analysis to be only marginally different from case to case, or even to put the Japanese at a disadvantage.³⁰ Moreover, examples in which allegedly superior Japanese management techniques failed to generate expected efficiency gains are also well documented. For instance, attempts to institute "quality circles" in the US or to 'involve' labor in the firm by rotating jobs have produced mixed results; many firms and workers discovered that the older ways were more efficient and more enjoyable.³¹ Additional experiments with the **kanban** or 'just-in-time' supplier system have been less than a total success, so much so that many firms went back to their previous methods to increase efficiency.

More generally, when the machinery or factory management of *mass production assembly lines* (as opposed to the more flexible operations in both large and small firms) have been carefully compared, Japanese manufacturers do not have readily identifiable advantages as compared to their American or European counterparts. Japanese machinery often is as old, or even older than in the U.S. and labor practices are not really all that distinctive.³² If Japan were really a more advanced, efficient industrial nation, more dramatic evidence of uniquely effective techniques should be observed--for only dramatic developments could possibly account for the spectacular expansion of the Japanese economy.

The magnitude of small manufacturing in Japan, the market strategies of Japanese firms and the apparent difficulty of actually observing evidence of Japanese production advantages undermines the conventional wisdom. It is hard to imagine that a bureaucracy or an unfettered business elite created an integrated, coordinated production network when small firms employ 72%

of the workforce and produce 60% of the value added in manufacturing. Skepticism is further heightened by the fact that the trend towards decentralization has been increasing throughout the high growth period. It is also difficult to reconcile the idea that the Japanese have succeeded in improving production methods to increase efficiency with the fact that even the largest firms often strive as much to flexibly differentiate their products as much as they work to cut costs. Nor can the repeated failures to specify concretely the way that Japanese manufacturers outproduce other companies increase our confidence that the conventional view is substantially correct.

A Second Interpretation of Japanese Development

This essay will present a new interpretation of Japanese economic successes based on the modified view of industrial development we presented above. Our argument will be that several related strands of political conflict in Japanese industry effectively blocked and transformed an attempt to copy and improve on American mass production techniques. Instead, large firm industrial strategies and the recovery of the small scale manufacturing sector led to a hybrid economy in which the drive for scale economies was moderated, and then enhanced by the capacity to continuously and flexibly differentiate production. Mass production and flexible production coexisted in Japan to a greater extent than in the U.S., and the competitive advantages of this hybrid economy accounted for Japanese successes.

While the number of factors affecting the way Japanese producers developed is, as we suggested above, literally limitless, we shall focus on

three related issues in this essay. The first is the nature of political, especially bureaucratic regulation of the economy. Our argument will be that the bureaucracy was unable to centralize production to increase economies of scale, and that in fact was ultimately compelled to provide financial assistance crucial to the survival and expansion of the smaller manufacturers it opposed. Bureaucratic influence in the economy, to the extent it had a direct effect at all, thus led to increased opportunities for *decentralization*; the historical interaction between the bureaucracy and industrialists promoted technical and market dynamism, which in turn cut against the drive for scale economies.

Second, we will explore the industrial strategies of large scale producers and the way they interacted with smaller ones. We will contend that large and small firm relationships underwent vast changes from the Depression, gradually leading towards a system of mutual dependence: large firms came to rely on smaller subcontractors for quality products with which they could differentiate goods and utilize new technical possibilities. In the prewar large capital, especially the **zaibatsu** had never fully moved into manufacturing as it had in banking or extraction industries. Small firms transformed raw materials or primary manufactured goods like steel or thread into finished products, accounting for the growth of export and domestic consumer markets. Then during the wartime buildup, which brought with it policies initially intended to draw large capital into machinery and electronics sectors at the expense of small firms, politics protected small enterprises. Their role in the economy was changed, however; though many continued to manufacture final goods, a large segment of Japanese small scale factories began to specialize in making components later assembled into complex products by large contractors.

In the immediate postwar the dislocations of the occupation period led to a relationship somewhat like what the "dual structure" imagined, but several developments precluded its full-fledged "dual structure" might emergence. Larger firms were forced to decentralize internally while small subcontractors took advantage of new opportunities, frequently entering markets with new or modified products. More subtly, large assemblers, in machinery, autos and electronics to mention a few key sectors, learned that they could build better products and a wider range of goods by utilizing the small manufacturer's specialist skills. They also found that they could not make rapid modifications of mass production techniques to increase efficiency without also relying on the skill of their subcontractors in flexibly meeting new demands. Indeed, firms that tried to vertically integrate found themselves at a competitive disadvantage because they could not compete with the incremental, high quality product modifications small subcontractors afforded, nor with the flexibility less integrated firms possessed. Coupled with market uncertainties In the 1970s In the wake of oil crises, movement towards a dual structure was substantially reversed.

Finally we will argue that the growth of regional groups in Japan self-consciously dedicated to protecting and nurturing small firms helps explain why the opportunities provided by the politics surrounding financial allocation and the needs of large firms ultimately led to flexible specialization in smaller manufacturers. Smaller companies discovered that the only way they could preserve their independence as high quality, high value-added goods producers was to share in machinery and technical skills so that they could reduce risks associated with moving into new subcontracting areas. There was a constant threat that large contractors

would apply pressure, seeking cheap standardized parts at low costs by virtue of squeezing profits or wages. But by cooperating in a limited way, small companies could obtain orders in new fields, preventing reliance on a single industry or firm, and thus reducing pressure from the contractor. In addition, by fostering a regional resolve to resist price pressures, cost constraints were somewhat reduced. In turn, by increasing the range of skills which it mastered, a small firm enhanced the possibility that it might be able to integrate this knowledge into a unique good or technique, and thus reap especially high profits. Regional associations further administered financial programs permitting rapid, inexpensive technical growth, particularly in equipment purchases, while reducing financial pressures that could bankrupt firms in the short run.

The combination of all of these developments, and others which we shall allude to in the course of our discussion, provided a context leading to a hybrid economy in Japan. Its basic competitive strategy was to try and standardize basic components--fasteners, semiconductors, or machinery frames--and produce them in high volume to reduce costs. Then these standard products were combined with an ever-changing array of specialty items to make high value added goods that could be rapidly and continuously differentiated. This capacity, to use low value added basic goods in combination with sophisticated, high value-added products to compete in or create new markets was the basic strength of the Japanese successes at home in the 1960s and early 1970s, and abroad during the spectacular export advances of the mid 1970s and 1980s.

Our argument in effect reverses most of the stereotypical perspectives we hold of Japan and America. Indeed, given deeply rooted cultural features in these two countries, it is counterintuitive. Japan, we

have been taught, is a country where the weight of tradition and the force of consensual conformity reduces independent action; America is the home of the free spirit, the lone entrepreneur. There is a vast anecdotal literature supporting this view. And yet, we will show that in manufacturing it is the Japanese that more fully realize the dream of independent, decentralized factory operations that motivates American industrial mythology; in contrast, the image of workers laboring in hierarchical factories under the direction of centralized economic authority that is the cornerstone of the social ideology held by Japanese elites is much more applicable in America. Paradox though it may be, industrial contexts in the US and Japan have produced industrial systems that are the opposite of the popular ideologies in each country. Indeed, compounding the irony, we will show that Japanese decentralization was in part an unintended consequence of conservative politics and industrial strategies that originally aimed at the greater consolidation of Japanese society and the implementation of mass production.

We have developed two competing hypotheses about the nature of the Japanese economy. Conventional wisdom asserts that Japan was guided towards enhanced efficiency by authoritative institutions. Our claim is that the government was actually forced to decentralize the economy. The conventional view has it that Japanese successes are primarily due to cost or quality advantages achieved through the coordinated perfection of mass production; in contrast is our belief that Japanese decentralization led to the integration of flexible production with mass production in a new, hybrid form. This enabled Japan to produce flexibly newer, high quality goods, a strategy that was the cornerstone of its advance. Where conventional wisdom asserts that authoritarian policies were linked to economic

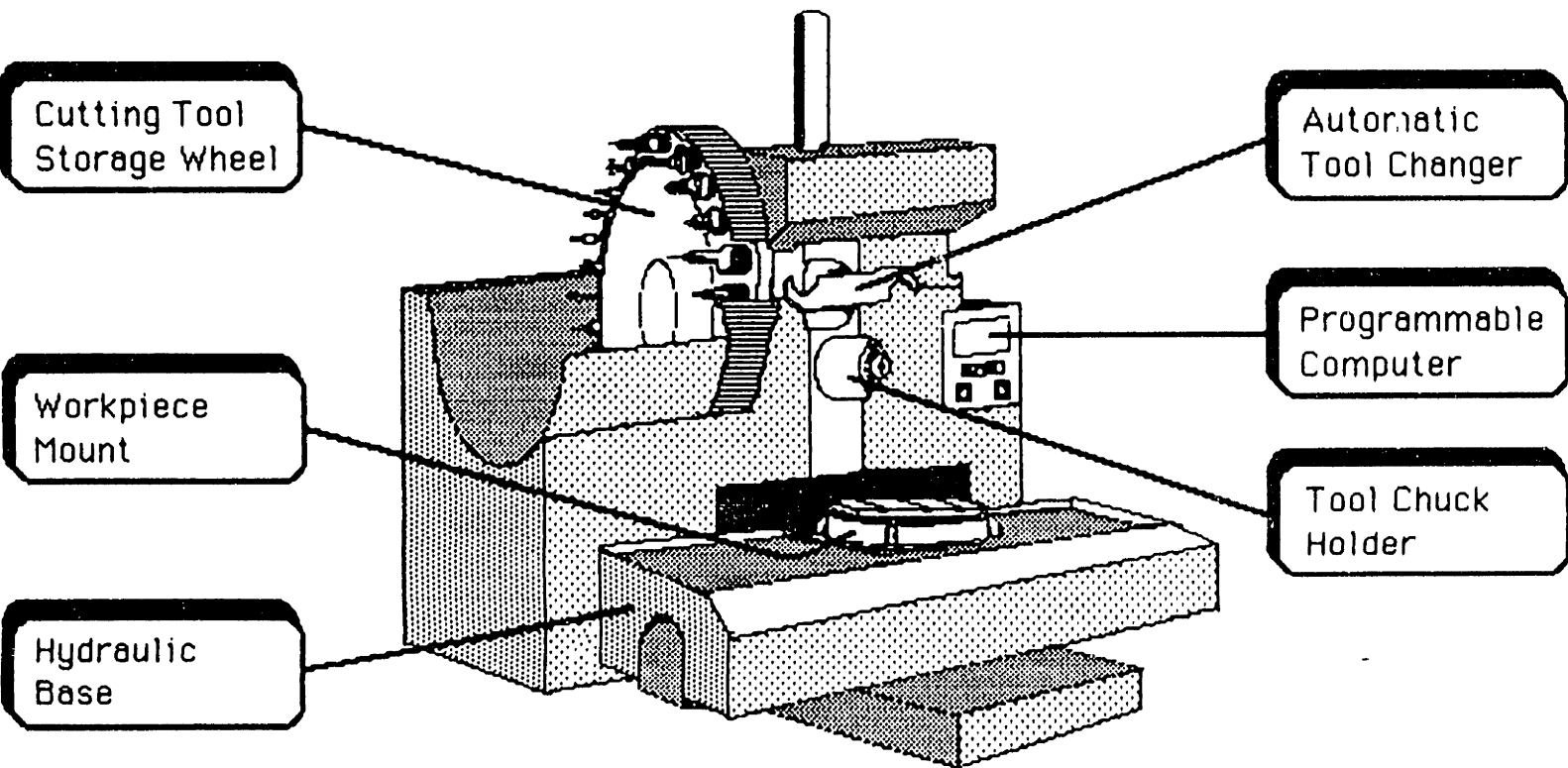
advance, our argument is that the defeat of centralized industrial solutions constrained the expansion of mass production, leading instead to an economy where small scale factories coexisted with larger ones and were an important force behind Japanese economic expansion.

Testing Competing Views of Japanese Growth

In order to "test" the two competing theories of Japanese development discussed above, this essay will examine the numerical control (NC) machine tool industry. Machine tools are the equipment used by other manufacturers to make their products; they shape raw metal or plastic into finished parts. Typical machine tools are lathes, which enable an operator to cut a symmetrical part while the material is being spun rapidly, boring machines which drill or tap materials, and mills, which apply a high speed cutting tool to stationary workpieces in order to cut grooves or faces.

NC machine tools are automated versions of these basic machines. They are named for the system of digital controls or "numbers" that manipulate the workpiece mount, the cutter and the tool changer on the machine itself. When the tools were first developed in 1957 by the Massachusetts Institute of Technology under a defense department program, machine tools were automated much like a player piano; a role of punched tape would be fed into an adjacent reader, which would then translate the codes represented by the punches into directions that guided the cutter and the material mount.³³ Gradually, computers have begun to substitute for the tapes; a machine tool can now be linked directly to a computer on which parts are designed, receiving an automatically generated cutting plan via digital interface. This kind of equipment is sometimes

Figure 1.4
A Vertical Machining Center



called Direct Number Controlled (DNC), although in general any machine tool that can be programmed using tapes or on-line commands is now called NC. NC tools are the basic building blocks for all advanced, automated manufacturing; sets of NC or DNC machines that are linked to perform successive tasks on a group of parts, sometimes serviced by materials loading robots, are often called flexible manufacturing systems (FMS) or cells; and a whole factory composed of integrated FMS units comprises the so-called automated or "manless" factory that has been the subject of limitless fascination.

The machinery's latent production potential affects the strategies of the firms we shall study. A simple diagram of a vertical NC machining center is shown in the attached Figure 1.4. A "machining center" gets its name from the fact that it can perform a multitude of cutting tasks and can automatically mount its own cutting tools; it is like a mini automated factory. To operate an NC machine tool, the planned cutting routine must be entered into the machine's central processing device. This can be accomplished in two different ways. If the part under construction is composed of simple rectangular (XYZ coordinate) or circular shapes, commands can be sent to the machine via the programmable computer's interactive television monitor. More complex parts involve either punching a tape or setting up a computer routine that must then be fed to the machine; not shown in Figure 1.4 is a typical auxiliary tape reader, essentially a large box with a wide-spool tape feeder that looks like an oversized audio reel to reel recorder.

Once cutting instructions are coded, the workpiece, raw metal stock for instance, is clamped to the workpiece mount. The hydraulic base underneath the mount can rotate the metal, move it up and down or combine

rotation and vertical movement by virtue of servo motors controlled by digital commands. Most modern machines use air pressure motors, although some still depend on oil hydraulics. The machine, following instructions, can select the cutting tool required for a given task, such as a drill for boring, or a cutter for facing. The cutting tool storage wheel rotates the necessary tool into place where the hook-like automatic tool changer grasps it, and spins to put the tool into the chuck holder. The chuck is where precision motors are used to rotate the tool, causing a drill or cutter to spin so it can shave away material and make a part. The chuck can be moved in this example up and down along a metal shaft (hence "vertical" machining center). This motion, affecting the cutting tool, and the complex hydraulically controlled movements of the base on which the part is clamped are carefully coordinated through digitized commands to result in a part conforming to desired specifications.

NC machine tools offer enormous advantages for producers facing certain manufacturing challenges. Once programmed, they can automatically produce parts within high tolerances, thus promising productivity gains since manual set up time and operator attention are reduced. However, NC tools are also programmable; once they are through making one part, they can be recoded to manufacture something completely different. Finally, because the equipment can be programmed to make extremely accurate, difficult cuts which would be impossible on normal machines, NC tools offer the possibility of constructing new products; indeed, one of their first tasks in the US was to contour jet fighter wings in shapes not previously possible.

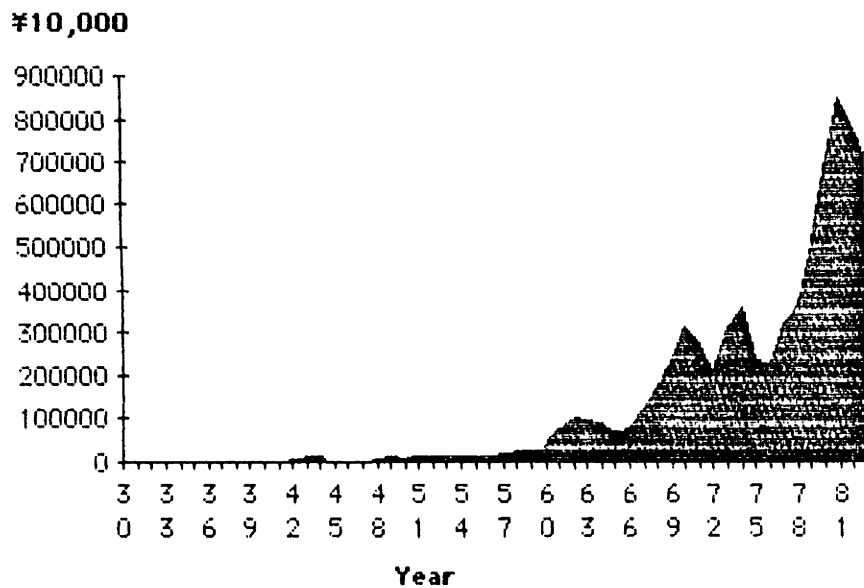
NC tools are thus ideal for manufacturers engaged in changing lot production rather than mass or extremely specialized work. The mass producer would not need the flexibility NC programmable capabilities

provide and would instead use dedicated machinery. The one of a kind specialist would use general purpose machinery, having little interest in NC repeatability. In terms of manufacturing capability, NC tools permit their operators to make parts that would be impossible with ordinary equipment, and to do so within exacting tolerance limits.

The development of the NC machine tool industry provides an excellent case for testing competing views of the Japanese economy for several reasons. One is that the growth of Japanese NC machinery firms exhibits all of the general traits associated with the Japanese advance; NC output has increased spectacularly, propelling the Japanese machine tool sector into a position of global dominance from a condition of devastation just 30 years before. Figure 1.5 illustrates the history of Japanese machine tool output from 1930 to 1983.

Figure 1.5

Value of Japanese Machine Tool Output, 1930-1983



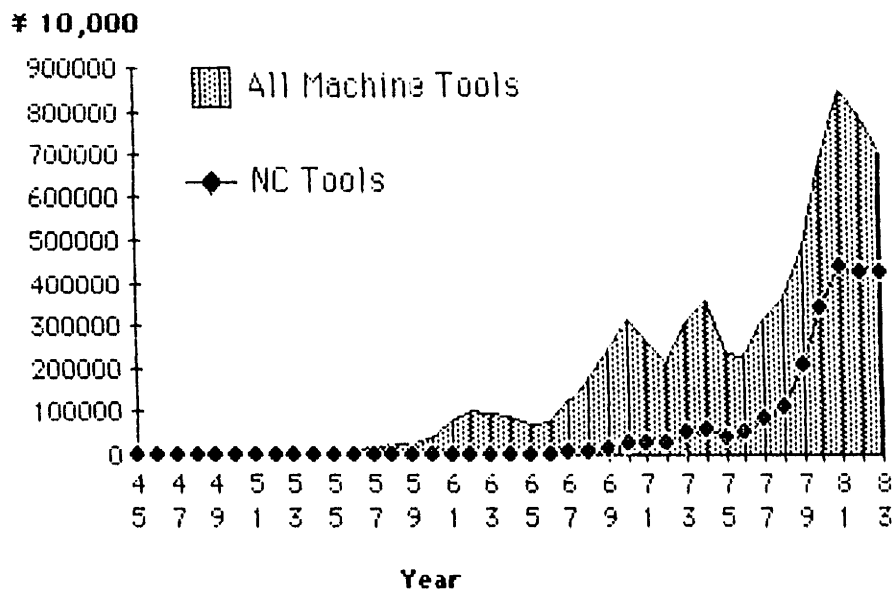
As compiled from *Nihon Kosaku Kikai Kogyokai, Hahnaru Kikai: San-ju Nen no Ayumi* (Tokyo: Seisanzai Marketing, 1982) pp. 47 and 99. [Japan Machine Tool Builders Association, **Mother Machines: A 30 Year History**].

As we can see, machinery production experienced a very small expansion in the wartime period of the 1940s, and spectacularly increased between 1953 and 1983 as output rose from ¥300 million to ¥80 billion (28,000%). The machinery industry is thus one of the typical "miracle" sectors of the postwar Japanese economy.

Central to this miracle was the diffusion of NC equipment in the 1970s, when Japanese producers recorded their biggest gains. As illustrated in Figure 1.6, by 1983 NC equipment accounted for 75% of the value of Japanese output.

Figure 1.6

Japanese Total Machine Tool Output and NC Share, 1945-1983



Compiled from *Nihon Kosaku Kikai Kogyokai, Hahnaru Kikai: San-ju Nen no Ayumi*, pp 112-113.

And with production increases came export successes. By the late 1970s, exports accounted for more than 40% of the value of total Japanese machine tool output, and 70% of export volume was NC equipment.³⁴

A nutshell summary of the growth of Japanese NC machinery shows that the industry has much in common with the way postwar successes were achieved in other sectors. A handful of electronics and machinery firms made their initial NC products by religiously copying American designs in the early 1960s. But for reasons that will occupy the body of this essay, Japanese machinery manufacturers concentrated on developing small, easily programmable, general purpose machines catering to job shop scale operations--a market all but totally ignored by US manufacturers who viewed NC equipment as a big-ticket specialty item for large clients who could afford the price.³⁵ At home and abroad, Japanese NC machine tools machines turned out to be a smash hit.

The consequences of this growth affected American machinery producers hard, a group that as in autos, steel, electronics and all too many other cases had once enjoyed global prestige and regular balance of payments surpluses. But in 1982, the American machine tool sector recorded its first balance of payments deficit, which topped \$1 billion. Echoing developments in other affected industries, the industry's national coordination organization, the Machine Tool Builder's Association asked for import relief charging Japan with dumping and unfair practices.³⁶ Its allegations, contained in a brief sponsored by the US firm Houdaille Industries, quickly became a model for future litigants and academics; it was an uncompromising attempt to show that the Japanese government had permitted and organized a domestic machine tool cartel that had targeted America with devastating effect. Indeed, the Houdaille Petition emerged as the rallying banner for those who view Japanese successes as a function of illicit efforts to cut costs; the dealings the lawyer for Houdaille, Richard Copaken, had with Japanese officials in preparing his argument were assembled into the introductory chapter of **The Japanese Conspiracy**, the bible for so-called "Japan-bashers" in industry and government.³⁷

Hence, the NC machine tool case is a perfect example of a familiar pattern in American and Japanese trade competition. American firms, frequently with military research support, develop new technologies that have a number of possible product applications. But US producers rapidly settle on one standard notion of how the new technology should be used. After a short learning period, Japanese firms, using the same basic technology begin to enter domestic and international markets with products that appeal to overlooked groups of consumers. When Japanese firms convert latent demand into secure product niches, they are able to continue

to expand their market share and begin to challenge directly American firms. US companies cannot adjust their strategies to meet the new competitive challenge; the result is a charged political atmosphere in which politicians, academics and industry spokesmen compete to account for Japanese successes with a variety of appreciative or accusatory arguments stressing low costs and efficiency.

Because NC tools are a representative case of Japanese economic successes, focusing on the industry makes it possible to evaluate the competing claims of the mainstream approach and those of our alternative argument. The industry's development exhibits the rapid introduction and redefinition of new technology characteristic of Japanese advances and the adjustment problems this strategy posed for US firms. Our task will be to explain this pattern of growth; we will ask the question: Why did the Japanese NC machinery sector grow as it did? Can the conventional view that authoritarian institutions pushed producers towards new products like NC tools, centralizing production to enhance economies of scale and cost reductions explain what occurred? Or instead did the decentralization of the Japanese economy in some way create the conditions for new product developments and a market for their use?

A second reason for studying the machine tool industry is that the industry has been subject to all of the major policy initiatives commonly cited as generating the Japanese "miracle." In the 1930s, machinery producers were one of a set of sectors, including aircraft, steel, petroleum, automobiles, shipbuilding and light metals that were the target of special legislation to transform them into centralized industries for military purposes.³⁸ The industries affected by this activity, based initially on the Important Industries Control Law of 1931 formed the heart of postwar

Japanese manufacturing, and this prewar legislation was the first concerted attempt by the bureaucracy to shape the economy's structure.

Then, in the postwar period, machinery producers again were the focus of promotional policies that were applied throughout the economy. From 1956-1971 the industry was regulated under the Extraordinary Measures for the Promotion of the Machinery Industry Law which granted to MITI authorization to plan, set up cartels and to use fiscal incentives to promote the affected industries. The law was extended three times. After its expiration, a new bill was passed, the Extraordinary Measures for the Promotion of the Electronics Machinery Industries Law which was in force from 1971 to 1978. This law, which listed machine tools as one of its targets, again provided MITI with a panoply of powers to promote the affected industries. Finally, in 1978, the Extraordinary Measures for the Promotion of Information Machinery Law was passed to take the place of the Electronics Machinery Industries Law. MITI powers of regulation were somewhat tempered in the bill's language due to trade friction, but once again it was designed to promote special equipment. NC machines were among those it listed.

The fact that the machine tool industry has been a part of every major regulatory effort in Japan since the 1930s when industrial policy first emerged provides an opportunity to examine conventional wisdom in some detail. It is particularly useful for testing whether statist arguments are accurate because focusing on an *industrial sector's* history rather than the history of legislation avoids many of the methodological problems that have bedeviled statist research. The most glaring difficulty, readily apparent in Johnson's work but also that of others such as Vogel, Pempel and Okimoto³⁹ is that studying policies in isolation from the industrial and

political context in which they were formed and administered does not permit the falsification of other hypotheses than bureaucratic control. Most studies assert what they must prove, that legislation administered by MITI is evidence of successful, independent government guidance. But if industrial politics and structure is ignored, a number of counter arguments cannot be excluded. For example, policies may have been passed by the legislature but blocked by recalcitrant private interests, negating their effect. Or, the policies themselves may have been designed by the firms they were supposed to control so that the bureaucracy was but an intervening rather than authoritative actor. Finally, even if policies were independently designed and administered by MITI it may be the case that industrial transformations in the economy were due to factors completely divorced from government activities. The fact that conventional studies of the history of legislation in Japan cannot exclude any of these hypotheses is their greatest weakness.

A good example is Johnson's **MITI and the Japanese Miracle** itself. Although he argues that the fact that the locus of economic decisionmaking is in the bureaucracy means that Japan's economy is ultimately *political* in nature, his exclusive focus on MITI precludes any appreciation of the political roots of industrial planning.⁴⁰ MITI's policies have no background in his account; they seem to spring fully formed from the desk of the relevant industrial bureau. The government, he claims can wield the power of an "absolutist state" as its "elite bureaucracy...makes most major decisions,...controls the national budget and is the source of all major policy innovations." ⁴¹

But Johnson's research is filled with important instances where political opposition to MITI's plans led to their transformation or wholesale

rejection. He shows that control of prewar regulatory institutions came to be totally dominated by business after only token bureaucratic resistance; that even in the midst of war proposals for military economic leadership were shot down by private firms; that in the postwar period severe political opposition sunk a number of MITI structural or trade initiatives, most notably in the auto industry; and finally that the bureaucracy had an unbroken string of failures in trying to obtain legislative approval for expanded powers, the defeat of the Special Measures Laws of the 1960s as the best example.⁴² When the record Johnson himself provides is examined carefully, there is little support for the idea that MITI and its predecessors guided development. Indeed, it seems more likely that policies resulted from at best a compromise forced on the bureaucracy, or even that business constrained the state. Johnson's research design, an historical account of MITI's internal politics, cannot provide a way to falsify any of these propositions.

In order to avoid these problems we will examine the historical interaction between the Japanese bureaucracy and the machine tool industry from the 1930s to the present. By focusing on the development of a particular industry it is possible to compare secular trends in the economy with bureaucratic efforts to modify business behavior. The effectiveness of policies may then be determined. Analysis of the interaction between a specific industry and bureaucratic policymakers also makes it possible to find out who actually makes policy, and in what way the contents of various initiatives comes to be defined. We will show that Japanese industrial policy in machine tools as elsewhere was marked by the influence of private interests; further, when overall objectives are considered, the regulatory effort failed to promote desired consolidation or centralization.

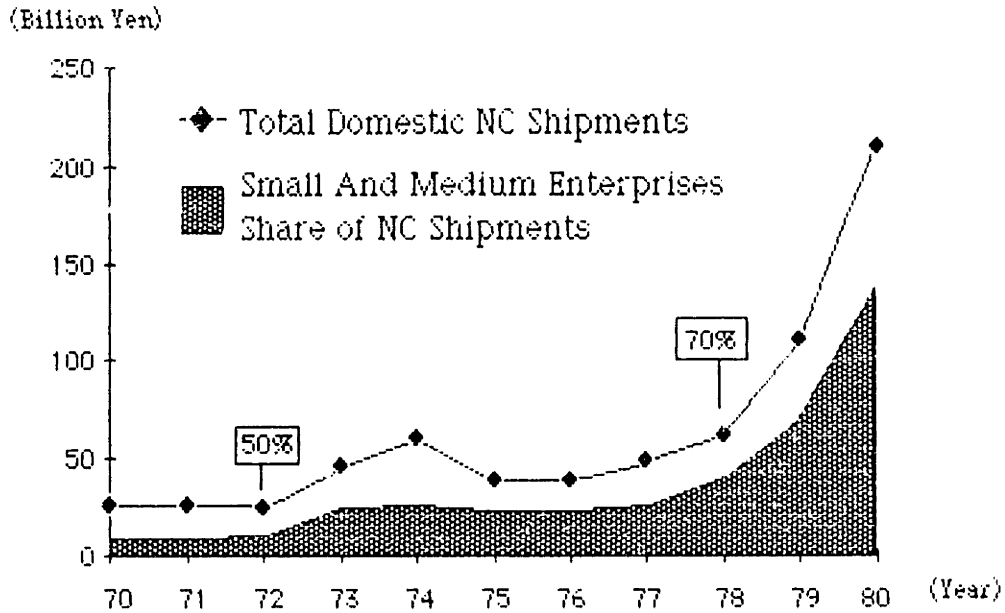
The third reason why the machine tool industry is an important case is because the development of NC equipment is clearly linked to the phenomenal influence of small firms in Japan. The industry itself is one where medium scale firms predominate; among the 1918 firms involved in Japanese machine tool production in 1982 only 33 employed more than 300 employees.⁴³ Moreover, most of these larger companies were cases of huge enterprises like Mitsubishi that had established much smaller specialized manufacturing operations in a separate internal division. The scale of machinery production is generally small.

But much more compelling, and puzzling under conventional assumptions is the fact that small and medium enterprises take up as much as 70% of total Japanese domestic consumption; the industry's main consumers are small scale factories. In America, where increasing factory scale is thought to correlate with greater technical capabilities, NC machine tools were produced primarily for the largest US corporations who alone were thought to have the skills necessary to use them. Hence, the idea that small businesses could utilize NC equipment appeared to be contradictory, like an illiterate buying the complete works of Shakespeare, an attitude that prevailed until Japanese imports proved it false.

But before imported products forced a reappraisal of potential NC markets in America the Japanese had already focused their production on small firms. Figure 1.6 shows that by 1972 50% of domestic sales were to smaller firms, a proportion that rose to 70% by 1978. Furthermore, growth was almost entirely attributable to small enterprise sales expansion.

Figure 1.6

Small and Medium Enterprise Shares of NC Domestic Sales, Japan, 1970-1980

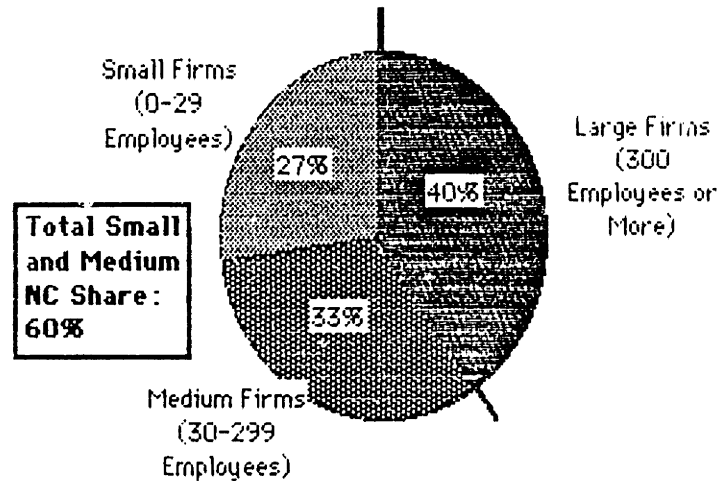


Compiled from *Kokumin Kinyu Koko Chosabu, Nihon no Chusho Kigyo Kagyo*, no. 10, (Tokyo: Chusho Kigyo Research Center, 1982) page 10. [The People's Finance Corp. Survey Group, **Japan's Small Business Manufacturing**, no. 10.]

Even more surprising is the large share of extremely small firms purchasing NC equipment. Figure 1.7 illustrates NC sales in Japan to large firms (300 employees and more) medium firms (30-299 employees) and very small firms (0-29 employees) for 1982.

Figure 1.7

NC Tool User Shares by Firm Size, Japan, 1982



From "NC Kosaku Kikai Seisan: Shitchinen Buri ni" In *Seisanzai Marketing*, October, 1983, page A-114.

Over one quarter of total 1982 Japanese sales of NC tools went to very small firms of 0-29 employees. 33% was accounted for by medium/small firms of 30-299 employees and just 40% by large firms.

The influence of small manufacturing enterprises in the Japanese NC market means that any account of the machinery industry must directly confront the problem of small Japanese enterprises. We will show that the conventional argument, particularly in its statist variant makes an explanation of the technical level and dynamism exhibited by small firms extremely difficult. Instead, it is only by appreciating how broad contextual factors transformed and strengthened the role of small firms in the economy that the reasons for Japanese success can be made clear.

Finally the NC machine tool sector is important because the way that machine tools change and develop indicates more general manufacturing trends throughout the economy. Machine tools are capital goods bought by

other companies to make the products they sell. If Japanese NC tools differ systematically in design or application from those in the US, it is possible to generalize more widely about the nature of the two economies. Like a fossil record, the development of NC machine tools is suggestive of the history of the production ideology operating in the economy at large. We will show how small firm expansion led to the integration of flexible manufacturing practices with mass producers in Japan as reflected in the development of NC tools.

This essay will systematically explore the conventional argument and our alternative hypothesis. In Chapter Two we will examine the rise of industrial policy in prewar and wartime Japan. Scholars working in the statist tradition argue that it was during this period that Japanese bureaucrats learned how to direct the economy, and indeed given an authoritarian military government and the emergency of war we should expect substantial state control. But we will show that the major initiatives undertaken by the government, even at the height of the war, were frustrated by private firms and the industrial outcomes they produced were not what the bureaucrats wanted. If economic regulation began in the prewar, its administration and effects were far from what conventional wisdom believes to be true.

Chapter Three moves to the postwar era and considers both private and public policies aimed at centralizing the economy to produce economies of scale. Again we will show that authoritarian initiatives failed, leaving Japan with a more competitive manufacturing sector composed of more firms than elsewhere. We will show how planning goals were not remotely related to market outcomes, and how their content was determined either by guesswork or through the intervention of the very companies they were

supposed to influence. By arguing that consolidation policies, whether of bureaucratic or industrial origin were ineffective, we will compile evidence leading us to reject the conventional view that economies of scale were central to Japanese advances.

Chapter Four begins a new tack; we investigate the historical expansion of small scale manufacturing in Japan. We will show that small factories and subcontractors do not serve to cushion big companies from economic shocks nor survive by supplying cheap parts to contractors. Rather, large and small firms are interdependent, with smaller subcontractors frequently supplying larger firms with the high quality, high value added goods they need for successful market competition. We will detail the historical development of this relationship. Chapter Four will demonstrate how convergent, if often paradoxical developments in public financial policies, large firm mass production strategies and small firm responses all combined to bring about a vibrant flexible component in Japanese manufacturing.

Chapter Five explicitly links the small firm sector with NC expansion by detailing the case of one manufacturing hamlet, Sakaki Township, in mountainous Nagano Prefecture. Though it has but 16,000 residents, and extremely small firms run by one or two relations are the norm, Sakaki possesses over 1% of all the NC tools deployed in Japan, forming one of the most concentrated collections of advanced production technology in the world. We will show how the historical developments described in Chapter Four in broad terms actually worked out in one specific case at the local level. Our focus will be on how the **shokokai** or "chamber of commerce," provides firms with the capital they need for expensive equipment and how the desire for independence sparked a system of cooperation among Sakaki's

companies that was fostered by NC tools. Sakaki will afford us with a closeup view of why there was such a demand for the type of general purpose NC equipment the Japanese developed, and how regional units of smaller factories provided effective institutions for capitalizing on the new machinery once it was available.

In Chapter Six we will relate our findings to the machine tool industry, to manufacturing in general, and to theories of Japan and industrial change. We will show that our alternative view of Japanese development makes it possible to better understand how Japan's NC market expanded so rapidly. Then we will generalize this pattern and try and illustrate how the hybrid Japanese economy differs systematically from American industry; in Japan, the flexible sector is more developed. Finally, we will suggest how our study compels a revision of established views of Japanese politics and economic regulation, and of the basic theories on which they have been based.

¹c.f. Oswald Johnson, "Jobless Rate Climbs to 7% in Month; Slump In Manufacturing Cited" *Los Angeles Times*, Part IV, p. 1, quoting Allen Sinal, Chief Executive of Shearson Lehman Brothers.

²Chalmers Johnson, **MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975** (Stanford: Stanford University Press, 1982.)

³Johnson, **ibid**, page 19.

⁴Johnson, **ibid**, pages 18-19.

⁵Johnson, **ibid**.

⁶Johnson, **ibid**, page 23.

⁷Johnson, **ibid**, page 35.

⁸Johnson, **ibid**, page 38.

⁹Johnson, **ibid**, page 33

¹⁰Johnson, **ibid**, page 24.

¹¹Johnson, *ibid*, page 315.

¹²Johnson, *ibid*, page 27-28.

¹³Johnson, *ibid*, page 31.

¹⁴Johnson, *ibid*, page 31.

¹⁵Political scientists writing about Japan in the same vein as Johnson include T.J. Pempel, "The Bureaucratization of Policy Making in Japan" **American Journal of Political Science**, November 1974, pp. 647-664; Daniel Okimoto in Okimoto et al., **Competitive Edge: The Semiconductor Industry in the U.S. and Japan** (Stanford: Stanford University Press, 1984) pp. 78-133; comparative literature associating Japanese development with a "strong state" includes the influential book, Peter Katzenstein, **Between Power and Plenty** (Madison: University of Wisconsin Press, 1978) pp. 3-22 and John Zysman **Governments, Markets and Growth: Financial Systems and the Politics of Industrial Change** (Ithaca: Cornell University Press, 1983), a book which relies heavily on Johnson for its comparison with other "strong" states such as France; a sociologist emphasizing the role of the state is Ezra Vogel, **Japan as #1: Lessons for America**, (New York: Harper, 1979) and **National Strategies** (New York: Harper, 1985); other sociologists who utilize a convergence framework in their studies of Japan include Hirshmeier and Yui, **The Development of Japanese Business 1600-1973** (London: Allen and Unwin, 1975); Marsh and Mannari, **Modernization and the Japanese Factory** (Princeton: Princeton University Press, 1976); the historical account of how prewar Japanese regulation presaged postwar developments was best achieved by Nakamura Takafusa, **Senzenki Nihon Keizai Seicho no Bunseki** (*An Analysis of Japanese Prewar Economic Growth*) (Tokyo: Iwanami Shoten 1971) and (Robert Feldman, trans.) **The Prewar Japanese Economy** (New Haven: Yale, 1983) on whose work Johnson heavily relied.

¹⁶James Wheeler, et al, **Japanese Industrial Policy in the 1980s**, (New York, Croton on Hudson: Hudson Institute, October 1982)

¹⁷The influence of the notion that Japan is more advanced in mass production on Japanese research is not limited to proponents of the statist thesis. It has been the basic theoretical framework of important sociological studies such as Ronald Dore's **British Factory-Japanese Factory**, (Berkeley: University of California Press, 1973--especially pages 404-420), a comparative study of labor practices in British and Japanese electronics factories. Dore illustrated many fascinating ways that British labor and Japanese workers varied in their approach to their employment and work. Like Johnson, he accounted for this finding by citing Japanese late development: With the experience of other nations as a guide, Japan could choose the most efficient practices, avoiding the confrontational labor strategies that grew up in early developing England. Indeed, Dore

further speculated that as countries like Britain found themselves in a state of comparative underdevelopment, they would converge towards the newer states such as Japan. Thus, Dore viewed differences in labor practices between the UK and Japan as variations within a single industrial model, the more advanced practices being those that were most disciplined. In this way, he reiterated the link between efficiency, control and economic convergence that also informs the "strong state" tradition of Japanese political economy.

¹⁸This idea was first put forward by Alexander Gerschenkron and subsequently has been the intellectual inspiration for many essays. c.f. Alexander Gerschenkron, **Economic Backwardness in Historical Perspective** (New York: Praeger, 1965) and for works which were cast in light of Gerschenkron's essay c.f. **Between Power and Plenty, op cit.**

¹⁹The association of Japanese culture with economic advance has declined in popularity of recent years. The argument is, of course, a variant of the statist or *laissez faire* approach; what led to efficiency gains was a fortuitous coupling between Japanese social or mental traits and "necessary" economic activity. See the critique by Johnson, **op cit.** page 8 which argues (1) that presumed cultural traits usually have their source in some other "situational" i.e. timing of development, rational behavior factors and (2) that there is considerable evidence of behavior contradicting cultural claim--i.e. great disharmony or lack of cooperation and (3) that growth in other countries such as Korea suggests that the roots of development do not lie in unique cultural traits. Needless to say, while I am in agreement with Johnson's critique, I disagree with his own response.

²⁰c.f. Johnson, **op cit.**, page 23.

²¹This section draws heavily on a number of recent works dealing with the historical development of mass production. For an initial treatment of how alternatives to mass production may emerge in often subtle areas of labor relations or business strategies see Charles Sabel, **Work and Politics**, (Cambridge: Cambridge University Press, 1981) especially the final chapter, "The End of Fordism?". Sabel and Piore, **The Second Industrial Divide**, (New York: Basic Books, 1984) especially Chapter One and Two, further refine this thesis and show how the idea of mass production as the "blind destiny" of economic development has informed both Marxist and Liberal research--thus dominating the intellectual landscape. Friedman, **op cit.** contains a brief treatment of mass versus flexible production in the case of the Japanese and American auto industry.

²²See Sabel and Piore (1984), **op cit.** Chapters One and Two in which the idea of mass production as internally driven, and its apparent inevitability to contemporary observers is discussed.

²³See Sabel and Piore (1984), **op cit.**, Chapter One, for a full discussion of the theoretical influence of this idea in conventional thought, especially the section, "The Surprising Convergence of Neo-Classical and Neo-Marxist Thought."

²⁴One example is a comparative study of financial systems and economic development, John Zysman **Governments, Markets and Growth: Financial Systems and the Politics of Industrial Change** (Ithaca: Cornell University Press, 1983). Zysman wanted to account for divergence in industrial performance by the nature of the financial system in each case, but to buttress his claims he had to resort to circumstantial or market explanations in each national chapter. Another example is the developmental studies spawned by **Between Power and Plenty**. Typically, the developmental argument tries to link industrial outcomes and national regulatory styles to the timing of a nation's development. But the usual problem is that timing cannot predict much about outcome or style; contextual variables determine what obtains in each case. Thus, comparative research has been marked by the attempt to offer a consistent differentiating variable in *theory* and the practical problem of supplementing, then submerging that variable in a morass of additional factors in actually researching the problems at hand.

²⁵The best treatment of this historical material is found in Sabel and Piore (1984), **op cit.**, Chapter Two, which summarizes the way that the careful attention to detail sought by industrial historians led them to appreciate the contingent, contextual way that mass production rose and expanded.

²⁶This discussion is from Piore and Sabel, "Italian Small Business Development: Lessons for US Industrial Policy" in Zysman and Tyson, eds., **American Industry in International Competition** (Ithaca: Cornell University Press, 1983), pp. 391-425.

²⁷The use of the term "Dual Structure" in the Japanese self perception of the role of small firms was first popularized in Arisawa Hiromi, "*Nihon ni Okeru Koyo Mondai no Kihonteki Kangeakata*" [Basic Thinking About Japan's Employment Problem] in Japan Productivity Center ed., ***Nihon no Kozo Mondai to Koyo Mondai***, (Tokyo: 1957). It later was incorporated into a small business White Paper the same year and became a basic phrase in small business studies for the postwar era.

²⁸For an account of how the Japanese were able to enter successfully American auto markets only after they abandoned price strategies and moved to new products see David Friedman, "Beyond the Age of Ford" in Zysman and Tyson, eds., **American Industry in International Competition** (Ithaca: Cornell University Press, 1983) especially pp. 363-369.

²⁹See Friedman, *ibid.* for details of the first and second import waves.

³⁰For instance, even the American machinery industry, a hostile group seeking to show that Japanese tax policy was discriminatory was forced to conclude that "investment incentives are no more liberal in Japan than in the USA." National Machine Tool Builder's Association, "Meeting the Japanese Challenge" (September 14, 1981) page 5. Indeed, after the passage of the Economic Recovery Tax Act of 1981, the opposite was true; American terms were much more liberal.

³¹c.f. "Humanizing Work" in **The Los Angeles Times**, December 28, 1983, part V pages 1 and 3.

³²See for example the excellent, but unpublished report by Kim Clark and William Abernathy of the Harvard Business School prepared for the IEEE in 1982; see also such machinery surveys as the **American Machinist's** "Annual Study of Production Equipment" which shows that U.S. tooling is actually newer than Japan's. (November, 1983.)

³³An excellent history of NC development, marred somewhat by the leftist polemics of its author is David Nobel, **Forces of Production: A Social History of Industrial Automation** (New York: Knopf 1984).

³⁴Calculated from *Nihon Kosaku Kikai Kogyokai, Hahnaru Kikai: San-ju Nen no Ayumi*, *ibid.*, pp. 121, 133.

³⁵This fundamental distinction between US and Japanese NC products was recognized by the US military, among other interested machinery users. C.f. Defense Industry Analysis, "The Machine Tool Industry," Industrial College of the Armed Forces, May 1983, p. 7.

³⁶For an analysis of the deteriorating US machinery trade balance and the industry's response see U. S. Machine Tool Builder's Association, "A Petition for Relief Under Sec. 103 of the Fair Trade Act," (Submitted to the USA Special Trade Representative, Washington DC by Richard Copaken associates, 1982.) This document, initially sponsored by the Houdaille Industries, a machine tool company, became known as the Houdaille Petition.

³⁷c.f. Marvin Wolf, **The Japanese Conspiracy**, (New York: Empire Press, 1983).

³⁸c.f. the account in Johnson, *op cit*, p. 133.

³⁹See note 15 above for relevant citations.

⁴⁰Johnson, *op cit*, pp. 24-25.

⁴¹Johnson, *op cit*, p. 20.

⁴²Johnson, *op cit.*: On cartels, see pages 162-163; on the defeat of the military see page 168; the auto industry case is detailed on pages 287-289; the failure of the Temporary Measures Laws is described on pages 265-266.

43c.f. Japan Machine Tool Builders Association, **Machine Tool Industry, Japan, 1984**, (Tokyo, Sept. 1984 page 7).

Chapter Two

Prewar and Wartime Regulation of the Machine Tool Industry

In this chapter we will examine prewar and wartime efforts to control the machine tool industry to determine if conventional arguments about the effects of regulation on Japanese industrial growth are true. For many reasons, evidence of state control should have been particularly marked in Japan prior to World War II. The country was on a war footing, which typically leads to centralized state coordination. Further, the government was increasingly dominated by rabid nationalists who were prone towards interventionism to build up the military while subject to only the most modest electoral constraints. Finally, big business was under attack, so much so that assassinations of **zaibatsu** leaders or their political allies were commonplace by the late 1930s. Given these conditions, bureaucratic power should have been particularly marked.

Yet, we will show that even with all of these factors maximizing the command power of the state, government regulatory efforts in this period were ineffective. Industrial transformations commonly assumed to have been the result of state policies never took place; policies designed to produce one outcome led to another; and economic adjustments congruent with policy goals were the product of factors unrelated to government activity. Thus, the Japanese economy in the 1930s and 1940s should have been an "easy" test for conventional historiography. But instead the view that centralized economic authority was born in this period cannot be sustained.

We can divide prewar and wartime regulatory initiatives into three main periods. The first was a time of planning in which the government learned about the structure of the economy; it began with the creation of the Resources Bureau [**Shigen Kyoku**] in 1927, and led to the establishment of the Ministry of Trade and Industry (MCI), MITI's bureaucratic ancestor, in 1929.¹ Then, with the passage of the Important Industries Control Law, the MCI administered an attempt to consolidate and centralize militarily important industries.² This effort, the duration of which varied with different sectors but was basically mounted between 1931 and 1939 first involved attempts to cartelize the economy, but later moved towards industry-specific legislation. Finally, with World War II, the government sponsored the development of industry control associations [**toseikai**] that were intended to regulate minutely the industrial behavior of firms in specific sectors according to a general plan.

Proponents of the statist vision of the Japanese economy argue that this sequence of government activity was the first step towards bureaucratic centralization of the economy that produced handsome rewards in the postwar period. In Johnson's account, and the work of Nakamura on which Johnson heavily relied, 1930s policies were designed to induce the **zaibatsu** to enter machinery, electronics and other heavy industries to create economies of scale. The initial thrust of these efforts was to have the state directly coordinate the rationalization of heavy and machinery industries. However, the political strength of the firms involved led to a system in which the bureaucracy provided financial incentives while actual economic activity was controlled by the industrialists themselves. Then, as the wartime emergency deepened, the bureaucracy again made initial steps to increase direct control over the economy, pushing towards even greater

consolidation by either bankrupting smaller firms, or forcing them to subcontract to larger companies. Large industry, however, was able to defend itself and ultimately utilize regulatory institutions, especially the **toseikai** or wartime control councils, for its own purposes. After the war, in this historiography, Japan inherited a heavy machinery sector that had achieved economies of scale. Thus, the bureaucracy learned how to direct the economy in the prewar period, absorbed the lessons of fragmented economic stewardship in conflict with the **zaibatsu** during the war, and set the stage for the miraculous postwar economy by creating a heavy industrial base through incentives provided to the **zaibatsu** and by restraining small firms. In the postwar, MITI led a "reincarnation" of the prewar system of regulation that the MCI had controlled.³

We will argue that the movement from planning, to cartels and industry specific measures and finally to the **toseikai** in machine tools did not result in centralized manufacturing dominated by either the government or big capital. The prewar government and the **zaibatsu** were locked in a power struggle conclusively decided in favor of private interests; cartels, industry legislation and the control councils all eventually were twisted by big capital towards their own interests. But government policies and the desires of **zaibatsu** affiliates were not enough to force small businesses out of manufacturing; the notorious prewar "adjustment" policies aimed at centralizing at the expense of the small factory only succeeded to the extent that materials shortages or bombing eliminated whole sectors, and large and small firms together, as in textiles. Where materials were made available for weaponry, small firms not only flourished in the affected industries, they insinuated themselves into the **toseikai**, the very institutions partially set up to manage their eventual demise. Thus, even

where adjustment seemed to follow in the way envisioned by the MCI, outside factors like war shortages or allied reprisals account for the observed changes.

Our discussion will begin with the mid 1920s, just before the Great Depression. There is common agreement that "industrial policy" in Japan dates from this period. Prior to the late 1920s, the government's economic policies were for the most part shaped by political or international concerns like the balance of payments. An early state presence in heavy and extractive industries was eliminated in the 1880s in a celebrated series of sales of state interests to the **zaibatsu**. Large capital more or less independently ran the financial, extractive and commodity markets while very small firms produced final goods for actual market sale. But the Depression coupled with rising militarism brought the state to experiment with interventionist policies explicitly designed to reshape the economy.⁴

There were four major groups concerned with the pace and shape of prewar industrial policy. First was the bureaucracy, of which the MCI, the locus of detailed industrial planning was the most important. The bureaucracy was itself composed of two subgroups distinguished by their view of economic development and the role of the state. One faction, which advocated a "soft" approach to government policy, wanted to use the power of the state to stabilize the activities of private firms. In their view, unrestricted price wars, labor competition and the like had been the cause of the Depression; the policies they sought included consolidating sectors to reduce confusion, stabilizing prices, and the orderly division of product lines to assure an economic scale of production. Members of this faction included the then MCI Minister Yoshino, and it was from this group that the goal

of managing "excessive competition" entered the vocabulary of economic thought in Japan.

A younger cadre of bureaucrats, typified by Yoshino's protege Kishi, who later became both the wartime MCI Minister, a war criminal and an influential postwar prime minister, adopted a "hard" view of government intervention. The more radical among them came to be known as reform or "new bureaucrats," a phrase applied to those officials heavily influenced by Nazi thought, particularly in the notion that a group acting in the name of the country should protect the nation purity by controlling the rapacious behavior of private interests. This group wanted to use state power to force on the economy efficient scales of production and to ensure that labor and management was disciplined. They thus were antagonistic to the **zaibatsu** and sympathetic to militarist ideology; many of them served in Manchuria, where the military government first provided them with the heady experience of complete economic authority. From the "hard" faction Japan inherited the idea of "rationalization" as enforced structural or managerial transformations guided by an authoritative bureaucracy.⁵

The second group was the military, and the cluster of economic planners the militarists employed in Manchuria and at home to focus their economic thinking. The militarists had a complex, perhaps contradictory view of the economy. In order to support the military buildup, they were sympathetic to the consolidation efforts sought by the MCI, and encouraged the more radical bureaucrats in their efforts to centralize production. But they diverged in one respect from the MCI view: the military wanted to create new **zaibatsu**, coordinated by individuals it felt were more conducive towards their political and social ideology. Indeed, many industrialists like Ayukawa Giusuke, founder of Nissan, made their mark on

the economy in part from their connections with the military in the Manchurian operations. Also, the military wanted to boost domestic production of all war materiel since it feared the consequences of an embargo of goods or basic commodities. Thus, it was opposed to import dependence and wanted to use the state to direct the economy towards domestic manufacture.⁶

But at the same time the military's opposition to the **zaibatsu** led it to style itself as the defender of the small traditional workplace. Consequently, while militarists sought large factories for munitions, they also advocated a populist resurgence of the small scale manufacturers that in the prewar period fragmented production. We will return to this in Chapter 4; here we will confine our comments to note the fact of the military's strong support for small firms. This support went beyond rhetoric; in armaments sourcing, and in the letting of contracts, the military did promote some redirection of production away from large firms towards the economic periphery. One example was the stipulation that a certain percentage of government contracts be recontracted to rural producers.⁷

Next was the **zaibatsu**, the huge financial cliques of prewar Japan. The **zaibatsu** often were not unified and competed heavily among themselves. Nor was their economic presence as vast as many have assumed. Indeed, as late as the mid 1930s, in the consumer goods sectors - which we associate most strongly with Japanese postwar advances--autos, machinery and electronics--**zaibatsu** companies actually producing goods were extremely rare. And even in heavy machinery, steel, shipbuilding or textiles, areas in which there was **zaibatsu** presence, the extent of their involvement remained low until the late 1930s. For instance, in 1934 the

share of total production by firms of 500 or more employees in all manufacturing sectors was just 38%; in spinning it was 49%; chemicals just 28%; and raw metal production 57%.⁸ And, of course, many of these large firms were not **zaibatsu** companies. Further, careful historical studies of the period by Nakamura Takafusa show that in almost all manufacturing sectors there was a very marked trend towards *deconcentration* from the 1920s to the mid 1930s, which further undercuts the idea of **zaibatsu** coordination or control.⁹ **Zaibatsu** domination in the economy was most advanced in finance, raw materials and primary manufacturing such as pig iron or steel. When **zaibatsu** affiliated firms required manufactured products such as automobiles, machine tools or electrical equipment, they imported them from overseas producers.¹⁰

The **zaibatsu** gradually became the focus of government efforts at transforming the prewar economy for several reasons. The financial cliques possessed most of the capital in prewar Japan and the bureaucracy wanted to divert this towards the manufacturing industries where it was felt Japan severely lagged behind the western powers. Thus, most of prewar industrial politics may be interpreted as a search for a regulatory scheme under which the **zaibatsu** could be induced or forced to begin to utilize its capital resources for manufacturing industrial development. The military, as we have seen, wanted to control the **zaibatsu** but also sought the apparently contradictory goals of a "modern" economy married to traditional Japanese culture. The result was an additional complication in the bureaucracy/**zaibatsu** struggles of the prewar period. At times, the military would back strong intervention on the part of the bureaucracy as a measure aimed at *preventing additional centralization of power* at the hand of the **zaibatsu**. But of course the aim of the bureaucracy was to achieve

the power to coordinate the consolidation of the economy under the **zaibatsu**. The same policy might be pursued by different forces for different reasons. Thus, interpreting whether an initiative was intended to centralize or decentralize the economy, or as a pro- or anti-**zaibatsu** ploy requires careful attention to the political positions of the actors involved.

Small businesses were the fourth and final group. Their political organization and the policies they inspired are reserved for Chapter 4. For now, we will observe that small scale factories were opposed to the **zaibatsu** and especially concerned with reforming the financial system. This reflected the nature of their interaction with the huge combines. In production, they had few direct links to **zaibatsu** interests who were concentrated in commodity, standard materials manufacturing. Instead, their ties were with the wholesalers of these goods on whom they were often forced to rely for expensive, if not usurious, financial support. Consequently, small firms were excluded from **zaibatsu** capital sources, and starved for operating funds. As we shall see in Chapter 4, not only did this lead to a strong (and successful) movement to reform the financial system, it also was the source of the very first bureaucratic "industrial policy" measures in the 1920s.

Prewar regulation was marked by the interplay between these four major groups in the initiation and application of policies. We shall see how a general pattern emerged in which none of the centralizing goals sought by either large capital or the MCI were achieved. With this brief background as our guide, we can turn to the machinery industry itself.

The Initial Expansion of Prewar Machine Tool Firms

The structural position of the machine tool industry immediately prior to the Great Depression typified the general state of Japanese manufacturing. There were no **zaibatsu** affiliates involved in production. Import reliance was approximately 50-60% of the market, a staggeringly high level.¹¹ Both the lack of big capital presence and the high degree of imports were related. The **zaibatsu** were primarily trading and banking houses. They were extremely reluctant to compete in world markets in "modern" consumer or producer goods industries since they felt Japan had neither the latent demand nor the technical capacity to support such a move. Indeed, Japanese consumption was badly fragmented between traditional Japanese products and "western" goods: it did not appear that mass markets could be easily established. When the **zaibatsu** expanded into manufacturing, their markets were almost always standard goods such as commodity steel or protected markets such as shipbuilding.

The fact that they controlled most of Japanese investment capital meant, however, that domestic machinery or consumer goods needs had to be met through imports; domestic entrepreneurs could not expand rapidly enough given capital shortages to meet challenges from abroad. But trade in imports was controlled by the **zaibatsu** who made a handsome profit acting as brokers for foreign goods. Because of this relation between capital concentration, blocked domestic expansion and imports, the **zaibatsu** became the focus of bureaucratic efforts to free up capital for Japanese manufacturing enterprises, and the subject of militaristic enmity because of their role in permitting foreign interests to expand sales in Japan.

Despite these problems, a growing number of entrepreneurs were generating a modest machine tool industry expansion in Japan by as early as

the 1920s. There were two main ways that firms established themselves as machine tool producers. One route was for individuals, mainly former factory employees to begin production on an experimental basis for their original employers and then to become independent manufacturers. The other was the hiving off of specialized machinery departments of larger firms to operate as machinery producers.

The first path was typified by Ikegai, named for its founder, which was the largest machine tool firm in Japan by 1930. In the 1880s, Ikegai began work as a teenager in a military plant. He then took employment as a machinist in a private factory, where he used and studied American style lathes. In 1889, he set himself up as a subcontractor to his former factory, where he built his first lathe modelled on the English designs of the day. His attempts to establish himself as a machinery maker were hampered by stiff foreign competition and a restricted market--the majority of Japanese manufacturing took place in smaller firms which had no capital to spend on his products. Consequently, Ikegai survived by accepting a variety of subcontract and specialty production orders; among the products the company concerned turned out over the period 1895-1910 were bulbs, water sluices, rolling machines and military parts for the Russo-Japanese War. Increases in demand spurred by the First World War finally made it possible for Ikegai to specialize in machine tools by the 1920s. Other firms which were founded by entrepreneurial machinists or technicians like Ikegai include Shin Nippon Koki, whose founder was an assembly worker in the 1880s, and Karatsu.¹²

The second type of machine tool firm was typified by Okuma, whose management played an important role in both the pre and postwar politics surrounding the industry. Okuma was a successful noodle machine maker in

the 1890s and early 1900s. World War One provided the firm with a chance to use its machinery expertise in a new field--weapons tooling. It spun off its noodle business and began a division dedicated to machine tools, concentrating on lathe production. The sharp drop in machinery demand that the post World War I depression and import boom brought forced the firm back into noodle machinery manufacturing, but it retained the facilities for machine tool production throughout the 1920s.

Another example was Niigata Machinery, situated on the remote Japan Sea side of the central mountains. The company was originally a repair shop for Nippon Oil. In 1896, Nippon Oil received an order for 50 lathes from the military in Niigata who wanted to make use of the stock of tools the repair facility possessed. Though Nippon Oil itself merely lent its equipment during this incident, the military contract proved to the company that independent machinery production was feasible; building on the experience, the company spun off the repair shop as Niigata Machinery in 1910, when the demand boom of World War One led to sustained growth. Niigata, Okuma and finally Tokyo Gas, a utilities firm that also set up a specialized, independent machine tool division, were examples of machine tool firms which originated as parts of larger concerns.¹³

Ikegai, Karatsu, Niigata, Okuma and Tokyo Gas were the five largest firms engaged in machine tool production through the mid 1930s. They were sometimes known as the "Big Five," a misnomer in terms of the manufacturing scale of their global competitors but an accurate description of their influence in the Japanese machinery industry. Together they created and ran the first industry organization, the Japan Machine Tool Producer's Group which provided the economic bureaucracy with its major contact point in the attempt to regulate the machinery sector.

But despite their pre_eminence in the eyes of the bureaucracy the "Big Five" did not account for the majority of total production. Instead, prewar machine tool manufacturing was accomplished by hundreds of smaller enterprises. These firms were much like the types of companies the Big Five had been at their inception: part time manufacturers of machine tools surviving in slack times through subcontracting or other manufacturing. Their expansion, as shown in Figure 2.1 was quite dramatic, rising nearly 500% in 1932-1938. Particularly impressive were the gains registered by extremely small firms of 5-30 employees whose numbers rose from just 360 to 1,531 enterprises in the period. Furthermore, government surveys ignored companies in the 1-5 employee class, which probably outnumbered all other sizes of firms combined, and so they understated the degree of small business activity in the prewar machine tool sector. While large firms registered growth in 1938, a fact we will treat in detail later, even in 1937-1938 when large firm expansion reached its greatest rate, small firms just about kept pace: large firms doubled in number over the two year period, while the 5-30 size class increased 180%.

Figure 2.1

Growth In Machine Tool Firms, By Size, 1932-1938

Size \ Year	1932	1933	1934	1935	1936	1937	1938
5-30	360	428	534	661	631	824	1,531
31-100	27	57	77	86	120	151	354
101-500	9	6	7	14	16	41	83
500+	1	2	3	4	4	5	10
Total	397	493	662	765	771	1,021	1,978

[Firm size calculated by number of employees]

As compiled in Chokki Toshiaki, *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki* [An Analysis of the Development of the Japanese Machine Tool Industry] (Tokyo University PhD Thesis, Tokyo University Economics Department Library, 1963) page 152.

Thus, as World War II approached, the Japanese machine tool industry was not the focus of **zaibatsu** attention due to the import strategies and investment reluctance of the large combines. Industry relations with the bureaucracy were for the most part handled by a group of five large concerns. The market was highly cyclical, and imports were running at approximately 50% of total domestic production. Production was badly split among hundreds of smaller producers.

The Growth of Machinery Regulatory Initiatives: Planning

Government attention towards the machine tool industry, and indeed industrial policy for all of Japan, began with the establishment of the

Resources Bureau or **Shigen Kyoku** in 1927. This agency was a semi-detached cabinet organ charged with surveying various industries so that bureaucrats and politicians could appreciate the state of the Japanese economy. It was born out of the worsening economic conditions of the late 1920s, which legitimated a direct state interest in the economy, and the rise of the militarists who wanted to develop a policy tool that could be used to counter the influence of the **zaibatsu** while moving the economy towards a war footing through manufacturing expansion. The bureau was thus originally conceived as a device by which problem areas in the economy would be identified, and then government corrective measures set up to rectify the difficulties.¹⁴

However, in a pattern soon to recur throughout the prewar period, the intended targets of the legislation, the **zaibatsu**, greatly weakened the scope of the Resources Bureau's power. Proposed authority for military planning was eliminated, and its eventual status as a semi-cabinet board with ambiguous authority manned by a staff of but five employees severely restricted its activities. Despite this, as a piece of leading legislation, the founding of the bureau smoothed the way for the passage of the Resources Survey Law [**Shigen Chosa Ho**] in 1929, which established the first regular industrial surveys undertaken in prewar Japan in conjunction with the MCI.¹⁵

As it emerged from the political attacks surrounding its founding, the Resource Bureau was finally given authority to undertake an independent evaluation of Japanese industry, especially the metal manufacturing sectors of utmost importance for the prosecution of the invasion of Manchuria in 1931. Although the much stronger powers envisioned by the military for reshaping the economy were lost, the survey functions were

seen as a possible first step towards eventual policies aimed at reducing **zaibatsu** power and developing the manufacturing base. However, in practice the scope of the Bureau's authority was even further reduced by the structural fragmentation of the metal industries themselves. Because these sectors, typified by machine tools, were composed of hundreds or even thousands of extremely small firms, the Resources Bureau had to rely on the self-appointed industry groups set up in the sectors it sought information about. In the machine tool industry, its collaborators were the Big Five firms.

In actual operation the Resources Bureau tried to first map the condition of the sectors it was concerned with, and then suggest policies that would rectify problems. Its method of achieving these aims was to convene a commission [**shingikai**] at which selected industry representatives discussed their problems and prospects with bureaucrats. The use of discussion groups or commissions--the **shingikai**-- were a ubiquitous feature of prewar industrial regulation, and remain important today as well. This planning phase varied from sector to sector, but generally coincided with the late 1920s to the mid 1930s. After that period planning or survey functions were usurped by other institutions we shall describe below.

In the case of the machine tool industry, the interaction with the Resources Bureau began in 1929 and lasted until 1937. As we have suggested, the fragmentation of machinery producers led the bureaucracy to rely on the the Big Five for the establishment of the basic orientation of government policy towards the machine tool industry. Resource bureau policies were thus heavily influenced, if not totally determined by the Big Five though their effectiveness hinged on the responses of machine tool

producers outside of those represented in the **shingikai**.¹⁶ And, as we shall see, the reaction of outsider groups not represented by the Big Five doomed Resource Bureau policies to failure.

The first assessment of the machine tool industry was published in 1929 by the Resources Bureau. It identified two concerns, Japan's excessive import reliance and problems with the types of machines domestic firms produced. The problem of imports was a matter that both industrial representatives and militarists strongly emphasized. Domestic producers obviously wanted to halt the flow of foreign, mainly American tools that competed directly with their own copies of those tools. For its part the military was concerned that if essential imported equipment were to be cut off in response to contemplated military adventurism in Asia, Japan would be caught without an adequate ability to manufacture its own tooling, crippling the armaments sector. Thus, the report argued for support to enhance domestic production.¹⁷

The Resource Bureau also raised the matter of the kinds of tools Japanese firms produced. It reviewed the product lines of the major firms, dividing their tools into 11 categories such as grinding, turning and boring machines. The report concluded that Japanese tools were all ordinary, standard, general purpose machinery equipment. Imported equipment was of the dedicated variety of use in mass production. This was of considerable concern to the military, which sought special purpose machinery to build military vehicles, aircraft and armaments. As a result of this pressure and spurred on by the Big Five who saw the potential for huge profits in the subsidized expansion of military machinery, in 1929 the Resources Bureau announced the goal of redirecting Japanese machine tool production from general purpose to war related specialty machines.¹⁸

Given the growing strength of the military, and the very real wartime preparations leading to a sense of national emergency in the 1930s, we should expect that the Resource Bureau's policy goals had an effect on machine tool development. They did not. Though backed by both the military, the economic bureaucracy and the largest machine tool firms, the Bureau's efforts did not lead to a single concrete policy *proposal*, let alone an effective measure, for nearly a decade. Despite changing conditions which crystallized the problem of machine tool embargoes such as the Manchurian invasion of 1931, as late as 1935 the Resources Bureau was repeating the dire warnings found in its 1929 study.¹⁹

Consequently, the goals of transforming production and reducing imports were not attained. Imports continued to keep pace with domestic production; the value of imports was 53% of domestic output in 1933 and 46% in 1937.²⁰ At the same time, military economists grew increasingly alarmed at the lack of specialty machine tool development. As Figure 2.1 illustrated, not only was production centered on general purpose machinery but hundreds of smaller firms were entering the market with their own often idiosyncratic designs. To military planners who sought standardized machinery for rapid wartime conversion, this was a particular worry.

The reason for this lack of action was politics. Users, producers and even different branches of the bureaucracy could not agree on what or if any action should be taken. In an effort to solve this problem, the Resources Bureau convened a Joint Survey Research Discussion Group [**Chosa Kenkyu Kyogikai**] in February of 1935, which included the Big Five, representatives from various other bureaucracies and a contingent from Tokyo University. At the first meeting of this group it was proposed that special standards be set for all machine tools. While this fell short of the idea of moving from

general to specialty machines, it would nevertheless ensure that all tools produced in Japan were roughly interchangeable, which appealed to the military. At the same time, the domestic firms whose product specifications best matched the standard type tools would have an advantage over their competitors. This appealed to the Big Five who faced increasing competition from what they called 'inferior' smaller firms.²¹

The actual task of writing the product specifications was handed over to the Big Five who in turn divided up the machine types according to their own area of expertise and product lines. They met in a special Machinery Members Group [**Kikai I-In Kai**] set up as a special subcommittee. Ikegai was given the task of drafting specifications for radial ball lathes, Tokyo Gas drew milling machines, Okuma, step lathes, Niigata Metal Manufacturing gear lathes and Karatsu drew up plans for vertical boring machines. From the standpoint of these firms the push towards standardization was a gift: they had the opportunity to enshrine their own machinery designs as the national standard. The group of specifications they drew up came to be known as the S-Type (for "standard type") machine tools.²²

Implementation of even this modest proposal for industrial development was delayed two years until it appeared in a Resource Bureau report of April 1938. The report was passed to the Planning Agency [**Kikaku-In**], a cabinet organ set up by the now powerful interventionist wing to establish industrial targets for wartime production. Standardizing tools appealed to more than just the Big Five and the military. The MCI also viewed the effort as justified under its association of quality tools with larger scale of production. Standardization it was hoped, would drive companies from the market by limiting the range of acceptable products. Backed by an impressive consensus, the Planning Agency issued the S-Type

specifications in July to compel standardization among the myriad smaller firms that were riding the war boom in machinery production.

The smaller machine tool firms killed the proposal. Many argued that their products were superior to those produced by the larger firms who had written the S-Type specifications. Another group rejected the idea that they should build to someone else's design. Finally, some smaller firms admitted the S-Type machines were beyond their capabilities. The S-Type tool designs were never adopted by the smaller firms for whom they were developed. The goal of standardization and consolidation went unrealized.

In fact, in an ironic twist, the S-Type campaign led to further fragmentation of the market through a series of curious circumstances. The only party in Japan to make use of them turned out to be the National Railways. The Resource Bureau had persuaded the Railways Ministry to underwrite a number of experiments to help produce the S-Type designs the Big Five had developed. It was hoped that if a major industrial force like railways were to embrace the designs, other firms would follow and generate demand-side pressure for their development. Railway orders for machine tools often amounted to close to 25% of total domestic machinery demand. Acting with utmost cooperation, the National Railways adjusted its tool procurements and requirements forecasts around the use of the S-Type tools. But as it became clear that these designs would not be available from the domestic producers who spurned them, and the Big Five could not - possibly meet railway machinery demands alone, the National Railways began making the machines itself rather than abandon its plans and installed them throughout its plants. Thus, a major machine tool consumer was driven towards self supply, causing its withdrawal from the very market bureaucrats and Big Five firms wanted to expand.²³

By 1937, then, the bureaucracy and its allies had failed to restructure the machine tool sector they held to be so critical to Japanese military and industrial capacities. Finally, war with China and the reality of a major embargo gave greater weight to the interventionist minded "new" bureaucrats who ascended within MITI and their military allies in government. Supplementing the Resources Bureau, the Cabinet convened a Resources Commission in which findings related to major industrial issues were addressed immediately prior to legislative activity. Commission attention signaled a higher level of concern than that of Resource Bureau; where the Bureau was intentionally hamstrung in its efforts from the start by **zaibatsu** pressure, the Cabinet-level Commission had greater leeway to adopt whatever policies the prime minister and his advisors saw fit. With this development a new type of regulatory initiative was begun.

The Introduction of Cartels and License Schemes

Under pressure from the military and civilian bureaucrats in the MCI, a 10th Special Resource Commission was convened in June, 1937 to debate the problems of the machine tool industry. At last a concrete series of steps was outlined for promoting domestic machinery manufacture. First, in its report the Commission set an output target for the industry of 1.3-4 hundred million yen by 1941. Next, the report argued that strong bureaucratic efforts should be made to promote the technical development of machine tools produced in Japan. Reflecting military concerns, it particularly emphasized the need to move production towards the specialty, mass production oriented tooling that armaments required. Finally, it insisted that import reliance must be reduced, and that efforts be made to

promote the use and growth of domestic machine tools. The results of the Commission's deliberations were transmitted directly to the Prime Minister on June 30, 1937.²⁴

Though it was the most comprehensive look at the machine tool industry to date, the Resources Commission's report still did not rise much above platitudes. Yet, it became the basis for a separate "Machine Tool Industry Law," one of a series of industry specific laws enacted between 1934 and 1938 to enhance militarily important sectors. The China Incident, and with it the high probability of American reprisals affecting machinery trade, led the government to accelerate the law's passage through the Diet. In April, 1938, the law came into effect. It was the first real attempt to respond to the problems that had been identified close to a decade earlier by the Resources Bureau in 1929.

Before the Machine Tool Industry Law can be discussed it is necessary to recount more generally why the government came to adopt industry specific control laws in the late 1930s. The sectors involved included the petroleum industry in 1934, the automobile and fertilizer industries in 1936, gold, synthetic petroleum, and iron and steel in 1937, mineral production, electric power, aircraft, machine tools in 1938, light metals and shipbuilding in 1939 and coal distribution and synthetic chemicals in 1940.²⁵ At first glance it may appear that these laws represent a major extension of state authority into the private sector but they actually arose because of the failure of an earlier effort, the Major Industry Control Law (1931) on which they were based. In order to understand the goals embedded in the specific industry laws it is necessary to discuss why and in what ways their predecessors were ineffective, for the new legislation was designed to cure the problems of the old.

The Major Industries Control Law, like the Resources Bureau, emerged from the changed political climate of the Great Depression. It was based on legislation undertaken in the 1920s to promote the creation of industrial groups or unions [**kogyo kumiai**] among small firms, an effort we will detail in Chapter 4. It was, at root, a policy encouraging firms in certain industries to set up self-regulating cartels to promote price and output stability. The law's provisions were simple: under Article I if half of the producers in a given "major industry" set up a marketing, sales or pricing plan, the details of this plan must be reported to the government which gave it legal sanction; under Article II, if 2/3s of all the member firms in an industry agreed to the plan, then the MCI could, at its own discretion, require all producers to abide by it. The Law also provided for a review "Control Committee" to examine plans submitted to the MCI, with the possibility that the MCI might modify or abrogate certain parts of the agreement.²⁶ The position of the government was therefore to approve regulatory schemes put out by firms who then actually ran the cartels on their own.

The law's content was determined by the balance of power between state-control and private-control groups in the late 1920s and early 1930s. Ranged on the interventionist side were the military, the MCI and the small firms whose own legislation was the intellectual source for ideas about regulation. On the other was the **zaibatsu** who initially viewed the proposal for state-sanctioned cartels with alarm. **Zaibatsu** power on the committees which debated the Law and the still weak position of the military and its "new bureaucrat" allies meant that the state was only permitted to sanction actions private firms developed among themselves. The industrial combines essentially cut a deal with the more moderate

state-control advocates: the goal of concentration and market control sought by the bureaucrats would be achieved by private actors with the state's blessing. In this way, the most radical Interventionists were defeated, while private interests were defended, although the government was accorded a measure of oversight powers.²⁷ The Major Industries Control Law came into effect in August, 1931.

In many manufacturing sectors the law did promote a number of "cartels," price, marketing or production agreements officially submitted to the government. Some observers such as Hadley argued that cartels based on the law were effective in centralizing the economy to the benefit of the **zaibatsu**; the politics surrounding the law's content amounted to big capital's triumph over the bureaucracy and by extension over the whole of Japan.²⁸ But careful analysis suggests that the operation of the cartels was extremely ineffective, so much so that they could not even serve to enforce price or other agreements in the interests of the **zaibatsu** who were supposed to be their main beneficiary.

The emasculation of government authority in the creation of the Major Industries Control Law made it impossible for cartelized firms to police their agreements. In particular, the government was unable to exercise the powers it formally had under Article II, which allowed it to enforce agreements made by 2/3s of the firms against all the companies in an industry. Only one case of Article II application was reported by Allen in 1938;²⁹ Johnson indicates that there may have been three instances amidst a total number of cartels numbering, by various estimates, in the hundreds.³⁰ Thus companies that preferred not to obey the agreements were free to price and produce as they chose.

The problem of "outside" companies was acute because of the fragmented structure of firms in manufacturing sectors such as steel and chemicals; it was precisely to overcome this problem that the Control Law had been promulgated in the first place. Even where the majority of companies were party to agreements based on the legislation a single large recalcitrant firm could destroy the coordination necessary for cartelized behavior. In fact, the best organized cartels were those in textiles or paper --hardly the heavy industries targeted by the bureaucracy-- where growth was limited by foreign competition or a domestic glut. While there was close to 100% incorporation of firms in cotton or silk, the metals cartels were lucky to have even 50% of the manufacturers in any given industry. In the case of the angle steel, steel bar, wire rods and steel plate cartels, as many firms stayed outside the pricing or marketing agreements as were in the group. In copper plates all 15 firms refused to join a cartel authorized by the government. In carbon bisulphide and sulphuric acid the ratio of outsiders to participants was two to one in the first instance and five to one in the second.³¹

Even among the cartel members themselves there was no ready agreement on the application of principles. Opportunities to cheat on the terms of the cartel were legion. One popular method was to take advantage of the fact that the military controlled Manchuria, where enormous investments were taking place. The military refused to apply mainland laws in their sphere of influence. Many companies adopted cartel objectives to hamper their competitor's advantages in the mainland while covertly expanding operations in Manchuria for reshipment to the mainland.³²

In still other cases, battles over sales quotas or prices between members transformed all of the problems of market competition into intra-

cartel struggles without eliminating them. As Allen observed of the period, "...[T]he cartel, in Japan as elsewhere, has often been merely the result of the maneuvering of rivals for positions of advantage in the competitive struggle."³³ He further argued that inter-**zaibatsu** competition led to additional weakness in the cartelization scheme; after the depression had given impetus to consolidation among business interests, their natural antipathy led them to try and reduce the power of restraint agreements:

The policy of industrialists themselves towards cartelization has not been without ambiguity. During the period of Depression the leading industrialists as a whole were favorably disposed to cartels and to government encouragement of them; since in this way the "weak selling" of smaller rivals could be checked. But wherever cartelization led to the domination of an industry by one or more powerful financial cliques, then there was a demand in those quarters for a relaxation of government control. Further, some cartels, especially since recovery set in, have formed the battleground of rival groups. In some cases violent struggles concerning production or sales quotas have taken place among these groups within the cartels. In other cases, a powerful firm has preferred to stand outside the cartel, to which its rivals belonged, and to expand its output under the shelter of the restrictions which the cartel imposed on its member firms. Thus, while it may be admitted that cartels have reduced competition in some industries, a large number of industries may be found in which cartels have served as a medium for the struggle of rival interests.³⁴

The large business interests most affected by the cartels wanted to use the government to insulate them from both foreign and domestic competitors without infringing on their own autonomy.

The bureaucrats were not happy with the Law. Their bargaining position had deteriorated from 1931 when the effects of the Depression seemed to make businesses somewhat responsive to state involvement in the economy. But by 1934 even cartelized firms were pushing for a rollback of bureaucratic power. Further, the militarists were incensed that

attempts to regulate the **zaibatsu** had instead been transformed into institutions that assisted big capital without actually reshaping the economy. The government also caught heavy criticism from smaller firms and more 'liberal' spokesmen who argued that the cartels were out of control.³⁵

Pressures from companies seeking effective means of limiting competition and from various wings of the bureaucracy led to the application of the Major Industries Control Law in a new manner. The new scheme was for the government to license firms in a specific industry which would provide them with priority in the distribution of financial benefits, equipment, and orders. The idea was that by creating a set of preferred firms, the government would gradually induce centralization among manufacturers in a given sector by causing other companies to eventually drop out of production due to competitive disadvantages.

These special industry laws are often cited as evidence of creeping statism; firms would now need explicit recognition from the state to carry out their operations.³⁶ However, just as large private interests affected the operation of the cartels, the licensed firms shaped the terms and application of the special industries laws. In most cases, government objectives such as industry consolidation were sacrificed for narrow company interests such as increasing prices for licensed goods or crushing foreign competitors.

One example is the Petroleum Industry Law of 1934, the first application of the prewar specific industry laws. In its original form, it called for expropriation of company assets and comprehensive regulation by the state. Severe opposition from the affected oil firms caused the plan to be watered down to the point where the government merely licensed the

companies it would extend benefits to, a position, one analyst suggests, "that preserved the largest measure of independence for private capital while establishing its protection from foreign competition."³⁷ The interventionists wanted to consolidate and control the petroleum industry through the 1934 law, but what they were brought to accept was the preservation and support of the very companies they sought to transform.

Another instance in which domestic firms utilized the specific industry laws to reduce foreign competition was the Automobile Industry Law of 1936. The law was heavily influenced by Nissan, an automobile firm headed by Ayukawa who was the best known of the "new zaibatsu" industrialists. Because he had built up operations without explicit support from the **zaibatsu**, he was supported by the military and for a time he oversaw all industrial operations in Manchuria.³⁸ Ayukawa helped persuade the government that the Ford and GM subsidiaries operating in Japan in the 1930s were a threat to military preparedness; by licensing only domestic firms under an industry law, the foreigners would be made to leave. Indeed, this is precisely how the 1936 legislation was applied as only Nissan and Toyota received recognition from the government. The result was the elimination of foreign auto production in Japan. But the consequence was that Japanese motor vehicle technology stagnated, and the military had to rely on poor quality domestic equipment for its needs.³⁹ The spirit of the law was sacrificed for the benefit of politically savvy Japanese industrialists.

Given this background it is unsurprising that the Machine Tool Industry Law of April, 1938 also exhibits the failure of state control to bring about a desired market outcome. As with any particular sector case, the development of regulatory schemes for the machine tool industry was

shaped by many unique circumstances. In contrast to the automobile and oil cases, for instance, the bureaucracy did not face direct pressure from larger firms. Even the Big Five were midgets compared to the oil producers or to Ayukawa's Nissan motors. Yet, as we shall see, the regulatory outcomes were much the same in that bureaucratic goals were subverted by the companies involved, and anticipated market transformations did not take place.

The law stipulated that machinery firms possessing over 200 machine tools, or specialty firms with over 50 machine tools would receive licensed status from the government. These licensed firms would be permitted to write off investments over a five year period in new machinery to increase scale, provided with subsidies to expand operations, exempted from duties on imported equipment required for their operations, and exempted from state, profit and income taxes for five years. The government also pledged to provide depreciation assistance up to 60% of the value of the machinery involved, and to permit stock debentures of up to double the value of paid up capital. Finally, the law also exempted licensed firms from restrictions on pricing and materials increases imposed by the commercial laws of Japan.⁴⁰

Negotiations between the bureaucracy, industrialists and the military shaped the content of the Machine Tool Industry Law as it did all other prewar legislation. First was the decision to license machinery firms by the amount of tooling they possessed, a notion that was the product of intense struggles between the Big Five firms--most of which did not at the time meet the 200 machine tool limit--and the MCI. The Big Five, under tremendous pressure from smaller producers, whose numbers had swelled from just 700 firms in 1935 to 1,900 in 1938, wanted legislation that would freeze out these new competitors.⁴¹ By creating a licensed and non-

licensed tier of firms disaggregated by their scale of tooling competition could be limited.

For its part, the MCI's overriding aim as the law's administrator was to promote the expansion of scale production in the industry. Prewar bureaucrats thought that only large firms could promote technical advances and they viewed the market competition associated with smaller producers as destabilizing. But the bureaucracy was not convinced that the traditional machinery firms could meet domestic needs; it wanted to push them towards an even greater scale of operations while offering incentives for new operators to enter the market, provided they met certain scale requirements. New entrants and older firms would have to meet this standard to qualify for benefits while non-licensed firms would either have to consolidate, or go out of business. Either outcome would enhance centralized production.⁴²

The military agreed with the MCI on the need to increase scale economies, although its concern was less with the growth of big enterprises, which it associated with the **zaibatsu** it mistrusted, than with the development of standardized war equipment. Large producers, it was felt, would develop products with at least some internally consistent parts. But the military also wanted to promote specialty manufacturing since this kind of equipment was needed for weapons production. The larger machine tool factories the MCI sought to enhance, however, were producing only general purpose machines; smaller companies occupied the special-purpose niches. Consequently, the military pushed the MCI to modify its 200 machine tool test so that specialty producers with only 50 tools could also become licensed firms.⁴³ The smaller specialty producers in prewar

Japan would then be able to qualify for the various incentives the government was to provide under the law.

At approximately the same time as the Machine Tool Industry Law was promulgated, a series of other laws and rules were established that reinforced the general attempt towards centralization. One was the machine tool sourcing rule, created in 1938, which prohibited companies with 30 or more tools to sell to any buyer but the government without MCI permission. Another, based on the Emergency Capital Regulation Law of September, 1937, stipulated that any firm wishing to begin or halt machinery production must obtain a license to do so from the MCI.⁴⁴ These two acts were explicitly aimed at the small producers and sought to build up the armaments industries; by limiting new entrants, and encouraging consolidation to sell to the lucrative military market, small firms would either be forced out of the industry or made to increase their scale.

The goals of the Machine Tool Industry Law and its related legislation were to centralize machinery production in large firms for volume economies, increase output, and to build war related machinery. It tried to accomplish these aims by providing payoffs to a designated set of companies that met size requirements while freezing out those that did not meet the necessary qualifications. If this policy were effective, we should see increasing scale in the industry, the gradual disappearance of smaller firms and rationalized product lines and a growth in overall output. Though, as we shall see, there is evidence that seems congruent with this outcome, a closer look shows that the effects of the Machine Tool Industry Law were far from what was intended.

Let us first look at evidence which on the surface seems to indicate that the law was successful. Conventional historiography contends that the

effect of prewar regulation was to entice big capital into heavy industry, thus creating economies of scale.⁴⁵ And indeed, there was a flood of new companies, some with **zaibatsu** capital affiliation into the machine tool sector with the passage of the Machine Tool Industry Law. Between July 1938 and November 1940, 21 companies and 24 factories were licensed, as shown in Figure 2.2. Of these, four firms, Hitachi Mitsui, and Toshiba Machine Tools, and Mitsubishi Electric were directly linked to **zaibatsu** capital while several others obtained indirect **zaibatsu** financing.

Figure 2.2

Firms Licensed Under the Machine Tool Industry Law, 1938-1940

<u>COMPANY NAME</u>	<u>TYPE OF COMPANY</u>	<u>DATE LICENSED</u>
Okuma	Big Five Firm	July, 1938
Hitachi Machine Tools	Reorganized Firm	"
Ikegai	Big Five Firm	"
Niigata	Big Five Firm	"
Toyo Precision Machinery	Reorganized Firm	"
Tsujo Manufacturing	Reorganized Firm	"

Nissan Precision Machinery	New Company	October, 1938
Toyo Machinery	New Company	"
Toshiba Machine Tools	New Company	"
Osaka Wakayama Metals	New Field	"

Dai Nihon Weapons	New Company	December, 1938

Karatsu Metals	Big Five Firm	February, 1939
Shinobara Machinery	Existing Firm	"
Osaka Machinery	New Field	"
Mitsubishi Electric	New Company	"
Tokyo Machinery	New Company	"

Jinbara Manufacturing	New Company	December, 1939

Toyoda Machinery	New Company	November, 1940
Okamoto Machine Tools	New Field	"
Mitsui Machine Tools	New Company	"
Osaka Iron Machinery	Reorganized	"

From Chokki Toshiaki, *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki*, page 137.

However, the intent of the law was not to foster **zaibatsu** machinery interests but to enhance economies of scale, something the bureaucracy thought large capital would secure as a matter of course. The licensing

scheme did not achieve this end. If we consider the dominant strategies of the kinds of firms that obtained machine tool licenses over the course of the law's application, the often illusory extent to which real scale economies were promoted by the Machine Tool Industry Law is revealed.

Consider the very first set of licensed firms of July 1938 as shown in Figure 2.2. The six initial licensees were all either preexisting machine tool firms or reorganized companies in which two or more smaller factories were combined to meet the 200 machine tool limit specified by the law. They were attracted by the debenture and tax breaks offered licensed firms. Many of the reorganized firms were backed by the **zaibatsu**; Hitachi Machine Tools was funded by Hitachi Manufacturing, Toyo Precision Machinery was financed by Mitsui, and Tsujo was affiliated with the Yasuda commercial house.

But the rush to qualify for state sponsored benefits motivated many firms to make uneconomical investments or to merge incompatible, often physically separated assembly operations under a single operational banner. Okuma, for instance, engaged in what was later disparaged as "undisciplined" [**kakekomi**] purchases of machinery to make the limit; the company had 117 machines in 1936, but it expanded to over 200 by 1938.⁴⁶ In another case, Ikegai qualified only by counting two factories in Mita and Kanagawa, which were separated by several miles.⁴⁷ Operations which were divorced in this manner could not contribute much to economies of scale at the factory level. Finally, the **zaibatsu**-supported reorganized firms were often patched together more for nominal compliance with the law than to move towards volume or quality expansion. Hitachi was an amalgam of several companies, including Tokyo Gas' machinery division, located in the

areas of Omori and Kawasaki.⁴⁸ As in the case of Ikegai, operations were spread about a number of geographically separated plants.

This pattern of development extended to the second wave of licensees of October 1938, in which "new companies" predominated as shown in Figure 2.2. The establishment of the new machinery firms often resulted from the calculations of larger manufacturing concerns which undercut the volume and production objectives of the Machine Tool Industry Law. One strategy was to utilize the financial provisions of the law to fund internal company tooling requirements. Toshiba, Dai Nihon, Nissan, and later Mitsubishi, Toyoda and Mitsui were all examples in which the machinery divisions of large concerns were spun off as a "separate" machine tool firms and financed under the liberal stock, depreciation, subsidy and tax advantages of the Machine Tool Industry Law.

Some of these "new" companies eventually did contribute to the military market, and some dominated individual product markets. Nissan, for instance, accounted for about 9% of the total output of the licensed firm group as shown in Figure 2.2 by 1940.⁴⁹ But far more common were instances where even companies associated with famous **zaibatsu** interests made a negligible market impact. Mitsubishi, Toyoda, and Toyo, for instance each held less than 3% of total licensed firm production in 1941; if all firms, non-licensed as well as licensed were included in the proportion, their influence would be around just 1% of the total market. Rather than directly contribute to overall scale production increases in machinery, these firms were established more to further the technical interests of the manufacturing groups they were affiliated with. One role they played was to secure government machinery research grants for their parent interests so that corporate tooling could in effect be subsidized.

Nissan and Toyota (a unit of Toyota Motors) are especially good examples of large firms taking advantage of the law. Recall that Toyota and Nissan were the lucky subjects of their own Automobile Industry Law of 1936 under which foreign competition was eliminated and subsidies granted. The two firms sensed the opportunity for further support the Machine Tool Industry Law afforded. The military's desire to enhance special purpose machinery fit in perfectly with the mass production equipment development plans of the two automakers. They each spun off their own machinery divisions as machine tool firms, taking advantage of the 50 tool limit the military had pushed for specialty producers. They then wrote off previously imported mass production equipment under the import provisions of the law.⁵⁰ When trade embargoes dried up their sources of specialty tooling, the military was induced to sponsor experiments leading towards the eventual production of the necessary machinery at home. Thus, the technical assistance Toyota and Nissan secured under the law ultimately did more to strengthen their machinery technology for passenger car production in the postwar era than to bolster the domestic supply of machine tools.

The last type of licensees, those from about 1940, were firms shifting to machine tool production though their real expertise was in other fields. For example, Osaka Machinery was a spinning machine producer, Tokyo Machinery made printing equipment, and Jinbara manufactured hydraulic generators.⁵¹ In each of these cases, material or capital shortages eliminated demand in the major markets of the firms involved. Because the Machine Tool Industry Law was so heavily geared towards subsidizing investments, it provided large machinery manufacturers in other fields with a way to ease the burden of market adjustment. Most of these

firms tried to preserve their technical skills in their original markets by attempting to make machine tools on equipment better suited for other uses. In this way their fundamental technology could be maintained in the hope of future demand improvements though the quality of the machine tools they made was not enhanced. Thus, these "new field" or switching companies could be said to have entered the machine tool segment of the market as defensive move financed by the government. Under the law, large scale companies in declining sectors found a subsidized shelter from adverse market conditions; they were not 'induced' to shift to metal machinery production.

The fundamentally hollow character of the new large scale machine tool enterprises licensed by the law was recognized by even the law's most ardent supporters. One scholar, Toyozawa, had written forcefully of the regressive character of small producers in support of a policy that would stimulate centralization in the industry. But he lamented the law's results. Toyozawa observed that through the law the government had sought to enhance the production efficiency, output and technology of machine tools in Japan. But the licensed firms' behavior was not congruent with the policy's objectives:

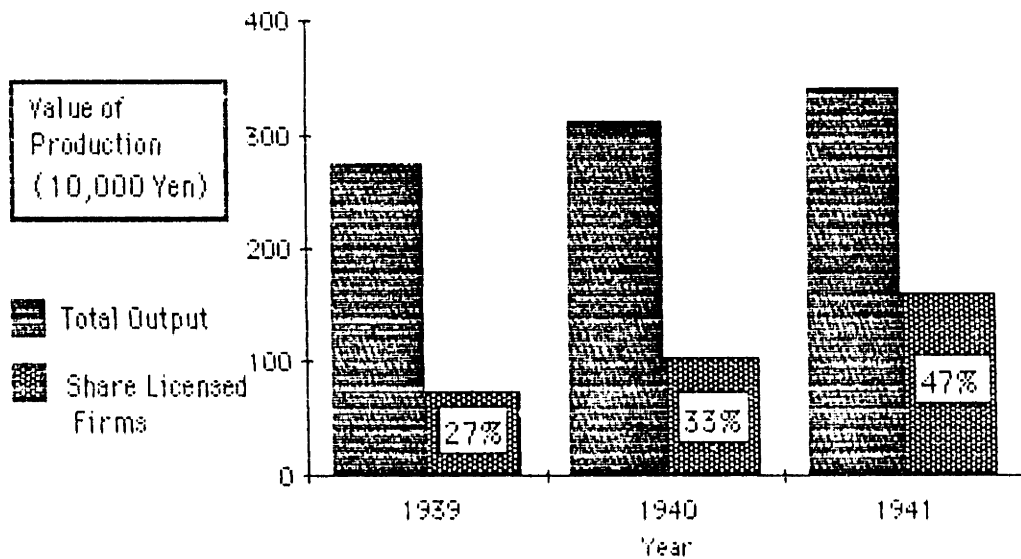
When the government's current machine tool industry policies are examined, they are not able to achieve their fundamental target through reorganization. For example, in order to promote technology the Machine Tool Industry Law was promulgated. With it came a "large scale industry" orientation in policy. But although we have a "large scale industry" based on the Law, the purpose of this industry has not been the promotion of technology.⁵²

The formation of licensed firms did not lead to expected results in production, efficiency or technological advances.

Another piece of evidence in support of the Machine Tool Industry Law's effectiveness was an apparent increase in the proportion of production achieved by the licensed firms. Between 1939 and 1941, as illustrated in Figure 2.3, there was an increase in licensed company production from 27% to 47% of the total value of output. This evidence seemingly indicated that the centralization scheme was working.

Figure 2.3

Share of Licensed Firms in Total Machine Tool Output by Value
1939-1941



From *Nihon Kosaku Kikai Kogyokai, Hahanaru no Kikai*, page 46.

In particular the rising share of the licensed firms suggests the success of the MCI policy of freezing out smaller firms in favor of the larger companies.

But several factors overstate the share of the bigger companies; indeed, given the forces ranged against them, the evidence points more to the surprising resilience of the small scale firms in face of concerted bureaucratic hostility and wartime contingency. The most important

distorting element was price inflation caused by the fact that the pricing mechanisms set up under the law were run by the licensed firms themselves. Under the legislation, licensed companies were organized into the Japanese Machine Tool Manufacturers Organization (JMTMO) in 1938. Standing committees in the JMTMO submitted price specifications for MCI approval. Approval was generally automatic in cases of standard classes of machines which were nominally set by the government, while "new" tools--even slightly modified models--were priced according to what the manufacturer submitted to the JMTMO. Furthermore, to enhance the trend towards scale increases, machinery prices the government paid for its equipment were set according to the size of the manufacturing firm. The bigger the firm, the larger the price. Thus, if the price of an "A" group machine tool--those produced by the JMTMO-- was ¥10,000, the same tool made by a medium sized firm would be classed in a "B" group category and priced at ¥7,500, followed by smaller firms in a "C" group who would get ¥5,000 and so on.⁵³

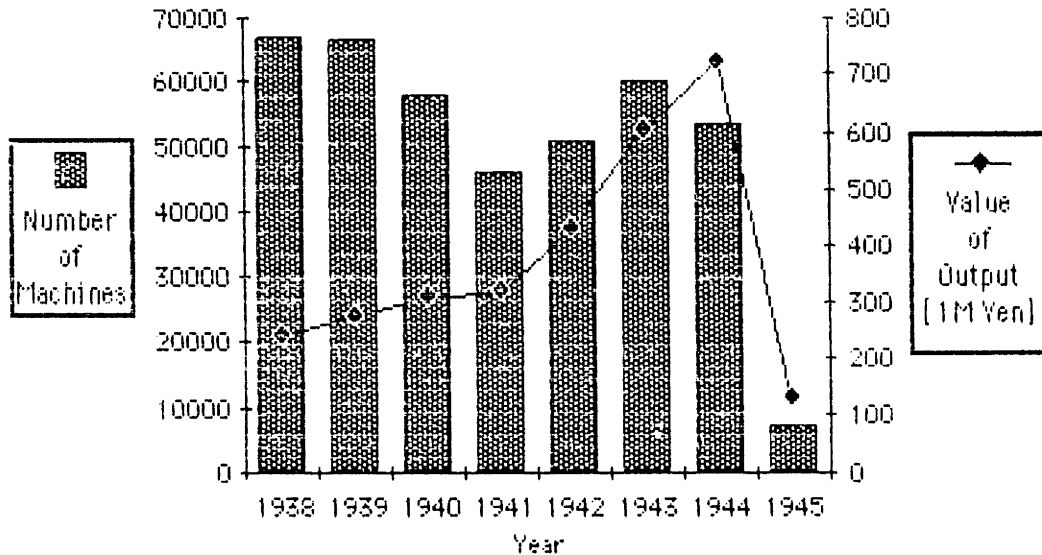
Because of this pricing system, by 1941 JMTMO members received over three times what other companies could charge for the same lathes, twice as much for milling machines, and three times for grinders. Overall, the licensed companies were paid about double the price of non-licensed companies' products. Their growing share was primarily a statistical aberration due to politically motivated price inflation.

Thus, as demonstrated in Figure 2.4, the primary product of the Machine Tool Industry Law was price inflation. Though the major goal of the law was to expand machinery output, production measured as the number of machines peaked in 1938 at 67,260, and actually fell about 20% by 1944

before the bottom dropped out in 1945. Nevertheless, the value of output of the industry rose 300% in the same period.

Figure 2.4

Price Inflation and Machinery Output, Machine Tools, 1938-1945



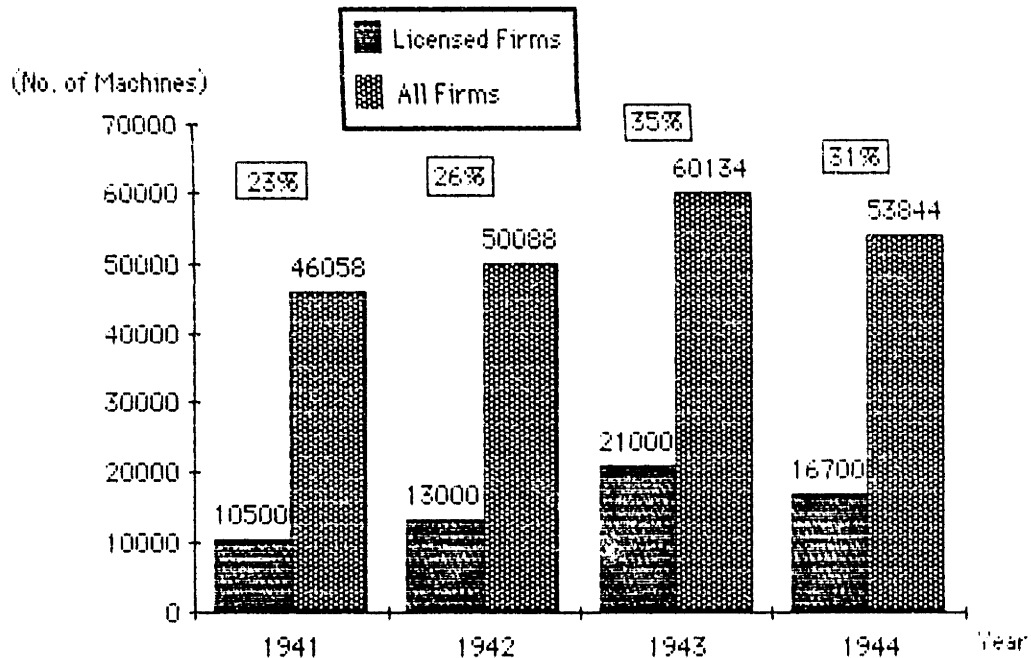
Figures compiled from *Nihon Kosaku Kikai Kogyokai, Hahanaru no Kikai*, page 47.

This record of inflation further suggests the political strength of the licensed firms, and of the advantageous character of their "regulation."

Indeed, if the number of machines rather than their value is considered, the share of production accounted for by licensed firms is much less than value statistics indicate. In Figure 2.5 we can see that in their best year, 1943, licensed companies made just 35% of Japanese machine tools, and their share actually fell back to 31% by 1944.

Figure 2.5

Licensed Firm Share of Machine Tool Production
Number of Machines



As cited in Sugiyama Itchiro, *Kosaku Kikai Kogyo no Genjo to Ikusei no Mitchi* ["The Current Situation of the Machine Tool Industry and the Road to Growth] in *Nihon Kosaku Kikai Kogyokai, Hahanaru no Kikai*, "shiryō" section page 12.⁵⁴

Though there was some increase in their share, the magnitude is much less than value figures would suggest. Another way of appreciating the structure of the machinery market after the Machine Tool Industry Law was passed is that even with the emergence of new companies, strong bureaucratic support and a wartime emergency, 70% of machine tools were produced by unlicensed firms.

The second factor affecting apparent evidence of centralization was the growing reliance of licensed firms on subcontracting. Licensed companies received priority in the placement of orders from the government, the major purchaser in the immediate prewar period and during the war itself. But because of a huge gap between orders and real capacity licensed firms in all manufacturing industries, not just machine tools, increasingly

met demand by shifting orders on to the small scale firms they were supposed to supplant. The increase in orders directed at the new set of firms was simply more than could be met under wartime capital and materiel shortages, even if the larger companies had incentives to invest. But because they could obtain premium prices for products that were subcontracted, in addition to those built in house, the licensed firms were content with farming out production. Thus, not only did smaller companies maintain their market share, but they also often recaptured sales made to licensees through subcontracting.

One famous example indicative of the general process in which centralization schemes supported smaller factories in an indirect manner was Nakajima aircraft. By 1944, as the war clearly turned against Japan, the military desperately sought to centralize all airplane production into one or two huge groups of machinery makers, metals firms, engine companies and all other component makers associated with aircraft. Late in 1944 they created the Homare Group, named for the airplane Nakajima produced, a supposedly integrated aircraft firm with Nakajima at its core. But the Homare Group was not a single production unit; rather it was composed of machinery producers who entered the market as their own market segments collapsed due to material, capital or demand shortages in the midst of war. They were drawn by the resources that the military was diverting to aircraft. In turn, as the military concentrated on (largely one-man, suicide mission) aircraft in a last-ditch effort to forestall defeat, Nakajima was swamped with orders it could not fulfill, leading to dependence on smaller firms. Hence, as depicted in Figure 2.6, subcontracting rose from about 30%--still very high--in the middle of the war to over 40% by 1945.

Figure 2.6

Growth in Nakajima Aircraft Subcontracting, 1940-1941

YEAR	PERCENT MANUFACTURING SUBCONTRACTED
1940	33.7
1941	33.4
1942	25.7
1943	34.4
1944	38.6
1945	43.4

As compiled in *"Senzen ni Okeru Nihon no Kikai Kogyo no Hatten no Tokushusei"*, page 59.

In fact, Japanese reliance on subcontracting was one of the distinctive features of Japanese production in comparison to other wartime economies; proponents of centralization often later remarked that one reason for the Japanese defeat was the fact that small firms had captured so much of the machinery market by the end of the war, impeding rationalization.

The same process was evident in machine tools. Prewar subcontracting averages varied from firm to firm but ran at about 20% per company.⁵⁵ This began to rise dramatically, however, as orders were directed to the licensed firms, who were not able to meet demand. In Figure 2.7 shortfalls in production relative to orders for Ikegai and for Tokyo Gas (later Hitachi) are shown for the last available years, 1937-1938. We can see that in 1937 for both companies the volume of orders was twice as much as capacity; one year later the ratio was 333% for Ikegai and 222% for Tokyo Gas.

Figure 2.7

Shortfalls in Machine Tool Production Ability

COMPANY	1937		1938		(UNIT: 1,000 YEN)
	ORDERS	CAPACITY	ORDERS	CAPACITY	
Ikegai	10,000	5,000	20,000	6,000	
Tokyo Gas	12,000	6,000	20,000	9,000	

Nihon Kosaku Kikai Kogyokai, Nihon Kosaku Kikai Kogyo Hattatsu no Katei, page 127.

Companies such as Ikegai and Tokyo Gas, burdened with orders that vastly outstripped their maximum capacity had to rely on outside purchases to meet demand. They simply could not feasibly supply the machinery orders alone; further, war shortages made it impossible to increase capacity since needed machines, most of which were imported before the late 1930s, were unavailable. The result was a reliance on smaller firms to make up the difference.

Thus, the "big company" policy central to the Machine Tool Industry Law neither produced scale economies nor enhanced output. It also did not halt the flourishing growth of smaller producers. The fact that these firms played any role at all in the industry is surprising given the strong pro-consolidation bias of the sourcing and capital laws that were promulgated in conjunction with the industry law itself. Yet, two strands of evidence strongly suggest that despite the effort to eliminate them, these firms were able to protect themselves and even expand operations.

One set of data, gathered by the Small and Medium Industry Survey Council covers changes in the total number of firms and employees in the machinery, tooling and equipment industries between 1938 and 1942. The survey, one of the few published due to wartime secrecy laws, covers more than just machine tool firms as it includes a number of related industries.

But because general machinery sectors would be affected by legislation in much the same way as the narrower machine tool industry itself, changes in the number of firms in the survey provide us with an important clue as to the fate of small businesses. If government policies were effective, we should expect to see that the number of machinery companies declined over time. Rather, as presented in Figure 2.8, the number of machinery industry factories grew from 17,750 in 1938 to 25,097 in 1942 (141%) as employment more than doubled. This is particularly impressive because the wartime machinery industry actually stagnated in total output, or even fell; more firms and more employees were crowding into a shrinking market. And because the vast majority of these firms were small companies, the survey indicates that small enterprises actually expanded during the consolidation effort mounted by the state.

Figure 2.8

Changes in Employment and Firms, 1938-1942, Machinery Industry

Year:	1938	1939	1940	1941	1942
Number of Factories:	17,750	23,150	24,990	25,601	25,097
Number of Employees:	990,000	1,352,000	1,541,000	1,702,000	2,084,000

From *Chushokigyo Chosakai Hen, Chushokigyo no Hattatsu (2): Chushokigyo Kenkyu Vol. VII*, page 55.

This finding is broadly confirmed for the machine tool industry in a survey conducted by the Eastern Japan Machine Tool Council between 1942 and 1945. The Eastern Japan survey did not cover very small machine tool firms which meant that it understated the total amount of active firms by a large margin--recall, for instance, that firms of 5 to 30 workers accounted

for 1,531 of the total of 1,978 companies engaged in machine tool production in 1938. But the survey does provide a good measure of growth in the middle level tier of firms, those that were not among the 21 licensed companies. The results, summarized in Figure 2.9, show that the number of medium sized machine tool firms increased 33%, from 353 to 446 enterprises between 1942 and 1944. The increase was halted only by the end of the war in 1945, when factories were destroyed by bombs and materials shortages became critical.

Figure 2.9

Growth In Medium Size Machine Tool Firms, 1942-1945

YEAR	NUMBER OF FIRMS
1942	353
1943	430
1944	446
1945	328

From *Nihon Kosaku Kikai Kogyokai, Hahanaru no Kikai*, page 48.

Thus, the license scheme apparently failed as did the technical and volume promotion efforts connected with the Machine Tool Industry Law. All of the goals first established as part of the specific industry control laws went unrealized in the machine tool case. Real output was not expanded; indeed, as total output fell, inflation of machinery prices was fostered instead. Increased quality and scale economies were not achieved as licensed firms pursued their own private strategies at the expense of the state. Finally, small businesses were not prevented from entering the market; where resources were available, small enterprises flourished.

The Toseikai and the Attempt to Coordinate Wartime Production

Our understanding of how and why the economy was not centralized in the prewar and wartime period must include an assessment of the effectiveness of the wartime control associations, or **toseikai**. The **toseikai** were set up among several war related industries in 1941-1943 to try and coordinate production. Their purpose, like that of the cartels and the industry specific laws was to try and increase volume economies and eliminate small firms--the goal of the bureaucrats--and to try and regulate the **zaibatsu**--the aim of the military.

Evidence of the internal politics of specific **toseikai** is extremely difficult to obtain since many deliberate and accidental losses of data occurred in wartime records. Nevertheless, we will argue that the bureaucracy did not control the **zaibatsu**, a fact more or less recognized by contemporary historiography. Further, if viewed in tandem with the expansion of small firms in the machinery sectors under the purview of the **toseikai**, it is possible to argue that smaller producers insinuated themselves into the regulatory networks, thus preventing their own demise. While direct data on how smaller firms actually utilized their entry into the **toseikai** to protect themselves is quite rare, several individual pieces of evidence, if viewed together, compel the conclusion that smaller producers were able to at least hold their own in the control councils. We will show how smaller machinery firms gained explicit membership in the control councils, and in the machinery case actually took over leadership roles from the **zaibatsu** affiliated firms. Most importantly, the smaller firms, who were targeted as the victims of the economies of scale build up, exhibited particular successes in obtaining raw materials--the most

important function of the **toseikai**--suggesting that they blunted the centralizing potential of the wartime control associations.

Images of what the **toseikai** were and how they operated are far from clear even today. In 1941 the government, under pressure from the military, began to push for the consolidation of militarily strategic industries into groups that it intended to manage through a system of centralized control. The government's idea was that it would establish basic objectives, and the oversight bodies created for each industry **toseikai** would then see to it that member firms obeyed the bureaucracy's plans. Machinery, rolling stock, armaments and other important **toseikai** could then be effectively directed towards wartime production.

Controversy still exists over whether the **toseikai** represented the apex of state control or instead the consolidation of monopoly interests. Nakamura, a staunch neoclassical opponent of economic intervention has written that the control councils were the product of ever greater expansion of state authority, with disastrous results; each time the bureaucracy interfered with the economy, it was driven towards additional meddling to undo its previous damage.⁵⁶ Marshall, a prewar admirer of the **zaibatsu** and of Japan's "capitalist spirit" viewed government wartime controls as the tragic coda to the Japanese rejection of free enterprise as exemplified by big capital.⁵⁷

Much more common is to interpret the **toseikai** as the ultimate triumph of big business; indeed, in passages that are unintentionally ironic, Johnson writes that the system of Japanese wartime regulation, the control councils, "were utterly dominated by the **zaibatsu**."⁵⁸ Furthermore, he cites with approval Bisson's argument that there was "surprisingly little government interference" in the economy during the war, and Peattie's

assessment that wartime regulation was so scattered among conflicting private, bureaucratic and military interests that it eventually was "disast_rous for Japan's war effort."⁵⁹ Bisson, who as a member of the Occupation forces was predisposed to viewing Japanese militarism as a function of the unchecked power of monopoly capital offers an unusually blunt evaluation of who controlled the **toseikai**.

The provisions of the Major Industries Association Ordinance, authorizing establishment of the Industrial Control Associations [**toseikai**], were basically dictated by the business interests and deliberately intended to round out their cartels...On the central issue the details are too clear to permit of any misunderstanding. The government was not asserting its control against the will of the monopolists, but was acting on terms set by the **zaibatsu** and in directions desired by them. Still less did the militarists impose their will on the business leaders. The whole history of Tojo's relationship with the **zaibatsu** before and after the Pacific War negatives any such conclusion.[Sic] In the crucial struggle, beginning with Tojo's request for special powers in January 1943 and ending with the final agreement which enabled the Munitions Ministry to inaugurate its activities on January 15, 1944 the **zaibatsu** held out for unconditional victory and won it. During the latter half of this period, which lasted for a full year, the **zaibatsu** were engaged in a maneuver that can be characterized, without unduly stretching the facts, as a sitdown strike. If the Army/Navy/ Air Force General Headquarters were to insist on retaining administrative control over an expanded aircraft production program, involving complete mobilization of the industrial giants of the Japanese economy, the monopolists were simply not interested. They became willing to play ball when the administrative authority was vested in a Munitions Ministry controlled by their men and operating within the framework of a Munitions Company Act to which they subscribed.⁶⁰

Here we see more than just an argument about the power of the **zaibatsu** but also the antipathy New Deal SCAP held towards concentrated capital; indeed, the military almost emerges as the victim of the story.

These competing views muddy our interpretation of the **toseikai**; even a careful scholar like Johnson apparently accepts two incompatible positions as he argues with Bisson that the control councils put the **zaibatsu** in power at the expense of the bureaucracy, while also suggesting with Peattie, in effect, no one was in control. Others still cling to the idea that the **toseikai** were instruments of government oppression, though the evidence does not appear to support them. But the problem of why a wartime economy should be subject to intense private pressures or to competition among various agencies has been glossed over in these accounts; if Japan has a tradition of bureaucratic centralization and a culture favoring obedience, why did wartime crises not produce the kinds of authoritative management institutions that even obtained in America? Moreover, all of these arguments imply that industrial regulation was a matter of conflict between **zaibatsu** operators and military or civilian bureaucrats. But if this is so, why were the sectors of the economy like machinery, aircraft or armaments that were the focus of contention the scene of substantial, growing, small firm activity?

We will show that the **toseikai**, at least in machinery, developed from factors unrelated to power struggles between "new bureaucrats" and big capital but rather became the center of competition among large, medium and small producers for scarce materials. Wartime shortages forced all producers to scramble for position to assure themselves of raw materials they needed for their operations. The various machinery **toseikai** grew out of a metals distribution program and it did not exclude small firms; rather, small enterprises pushed themselves into the distribution network and shared control of the **toseikai** itself. Thus, conventional arguments emphasizing competition between the **zaibatsu** and the

government seriously understate the real degree of fragmented wartime control because small firms were another actor in the regulatory scheme. Their presence on the **toseikai** ensured that they would be allocated raw materials, and this in turn helps explain their rapid growth and subcontracting influence even as the state, the military and big business--albeit for different purposes--desperately sought consolidation.

The machinery industry **toseikai** were the descendants of a metals distribution system established within the MCI in February, 1938 called the Metals Control Council [**Tekko Tosei Kyogokai**]. Metals shortages necessitated a system of allocation since the market in effect did not exist. Moreover, the government wanted to make sure that whatever resources were available went to munitions production. Out of these pressures the Metals Control Council was created. It began the actual dispersal of metal stock in July, 1938 when a "ticket system" was instituted; qualified machinery firms were provided with a card voucher later redeemed for necessary materials.⁶¹

Although it was not intended to be a major factor in industrial regulation--the Machine Tool Industry Law promulgated in the same year was the focus of attention--the dispersal of increasingly scarce metal stock was among the most important functions relating to company survival in the immediate prewar period. As a result, influence in the Metals Control Council was a life and death matter. From its inception the council was the scene of intense lobbying efforts by large and small firms to gain preferred status in metals distribution. In turn, the bureaucracy was provided with a new bargaining chip in its consolidation drive; it could trade official status as a metals council member for centralization or coordination by groups seeking admission.

The first move in the organizational battle was made in May, 1938, led by the traditional, non-**zaibatsu** large machinery firms in a number of sectors including machine tools. The Big Five companies referred to above formed the 15th division of a new organization, the Machinery Industries Metals Distribution Association. The attempt was to obtain authority to administer metals distribution, which would naturally result in preference for allied members.⁶²

But the MCI wanted to force large machinery manufacturers to merge, or to at least link production in exchange for control of materials allocation. In response, the big machinery firms reorganized in October, 1938, as part of what appeared to be an attempt to create the stronger, more integrated control associations the MCI requested. In the machine tool branch, this effort essentially meant that a larger pool of firms including licensed or soon to be licensed companies were invited to participate. The newly expanded group called itself the Japan Machine Tool Manufacturers Association (JMTMA); though it was supposed to enhance consolidation by expanding membership it was again dominated by the Big Five: a representative from Ikegai was the president, while four of the remaining five vice presidential posts went to Niigata, Tokyo Gas, Karatsu and Okuma.⁶³ Apparently these cosmetic adjustments in the machine tool branch and other sectors represented in the Distribution Association mollified the bureaucracy. It turned over the Metals Control Council to the new group which renamed itself the Japan Machinery Manufacturers Association.⁶⁴

In combination with the Machine Tool Industry Law, and the fact that the MCI was clearly favoring larger firms, initial large enterprise control of metals distribution might well have been expected to overwhelm the thousands of

smaller machinery manufacturers. Indeed, emboldened by success the president of the JMTMA went so far as to suggest a reorganization plan for the small and medium machine tool firms which would establish each of the JMTMA members as a parent company around which all the other factories would cluster. This would force the 1,900 or so small scale machine tool firms to accept either institutionalized subservience to the larger companies, or bankruptcy due to an inability to secure materials.⁶⁵

However, a large segment of the small and medium producers resisted these moves. The heart of their strategy was to organize into regional groups, and to use their combined strength to pressure the bureaucracy to permit them access to the metals councils. Thus, in 1939 smaller machinery manufacturers formed the New Diversified Industrial Manufacturers Association, an umbrella organization imitating the large firm Japan Machinery Manufacturers Association. In July, the machine tool branch of the small business machinery manufacturers organization was formed, calling itself the National Machine Tool Manufacturers Association.⁶⁶ Initially, entry was restricted to companies with about 20 machines or more although many members were much smaller but noted for their impressive technology. In 1939, 296 firms from seven geographical areas entered the small machinery manufacturers Association; by 1940, as depicted in Figure 2.10, the number of firms rose to 403.

Figure 2.10

Regional Groups of Small Firms in the National Machine Tool
Manufacturers Association, 1940

NAME	NUMBER
First Tokyo Machine Tool Manufacturers Association	162
First Osaka Machine Tool Manufacturers Association	128
Aichi Prefecture First Machine Tool Manufacturers Association	45
Shizuoka Prefecture Machine Tool Manufacturers Association	24
Niigata Prefecture Machine Tool Manufacturers Association	18
Hyogo Prefecture First Machine Tool Manufacturers Association	14
Kanagawa Prefecture Machine Tool Manufacturers Association	12
Total	403

From *Nihon Kosaku Kikai Kogyokai, Nihon no Kosaku Kikai Kogyo Hattatsu no Katei*,
op cit., page 127.

In addition to the effort by medium and selected smaller producers, thousands of very small machinery firms also formed locality-based industrial organizations. Accurate statistics are not available concerning changes in the growth of these organizations but by 1939 there were over 1,000 regional groups of more than 116,000 very small firms in 1939.⁶⁷

The combined efforts of medium and smaller firms brought about another reorganization of the metals distribution system. In late 1939, all of the representative bodies for large, small and very small machinery companies including machine tool firms were brought together under a new

group, the Japan Metal Products Manufacturing Amalgamated Union. Large firms were represented under one division called the Japan Machinery Manufacturers Union which numbered 19 industries and 233 firms. Medium firms were entered in a division called the New Diversified Products Union composed of groups from 13 regions, involving 69 industries and 2,146 enterprises. The smallest firms were part of either a division titled the Diversified Parts Union of 229 industries and 14,023 firms, or the City, Town and Prefecture Manufacturing Union representing 1,233 regional groups of 116,153 members.⁶⁸

The representation of smaller and medium machinery firms in the metals councils was quite surprising given the aim of the distribution effort. Since the bureaucrats wanted to use metals access as a tool for forcing consolidation, the fact that the smaller producers had their own voice on the distribution process meant that they could secure access to raw materials without meeting the initial criteria of increasing output volume to qualify. Indeed, their activity brought about a system of shared interests in which **zaibatsu** power was not even dominant in the *large firm* branch of the Japan Metal Products Manufacturing Amalgamated Union; older Big Five firms were the major force. And the influence of large firms as a group was reduced by the presence of medium and small producer organizations, a fact in part corroborated by the record of growth achieved by these companies during the period of most intense centralization initiatives. Within the distribution system, which became the basis for the machinery **toseikai** set up in 1942, big capital did not defeat the government and establish a monopoly. Rather, all affected industrial actors carved a place in the regulatory organization.

The growth of the Japan Metal Products Manufacturing Amalgamated Union coincided with a gradual disenchantment with piecemeal government regulatory efforts. From 1938, with the Machine Tool Industry Law the MCI had attempted to increase scale production by licensing, controlling market entry, limiting machinery sales to military clients, and finally by setting prices. As we have seen, all of these efforts failed, resulting in nothing more than inflated machinery prices paid for with public funds. Nor was the government alone in its displeasure; for different reasons, Japanese industrialists throughout the economy wanted to check the expansion of government power. In the initial stages of the war, industrialists, led by the **zaibatsu**, made it clear that future cooperation with government objectives would only occur if private firms were responsible for day to day economic activities. As Johnson, Bisson, and others have noted, this meant that during the war private firms actually controlled the economy, and the consequences of this victory were felt even in the machinery sectors where **zaibatsu** influence was light. In March of 1941 the Machine Tool Industry Law was repealed and with it the system of selective licensing. In conjunction, the ad hoc system of price controls, standards, sourcing rules and regulations concerning market entry were also abolished. Instead, preparations were made for incorporating all machine tool firms into an industry organization or **toseikai**.⁶⁹

The **toseikai** were mandated by the Major Industries Consolidation Order [**Juyo Sangyo Dantai Rei**] of August, 1941. The Order called for coordinated groups in designated industries to "more effectively strengthen the domestic economy" and for the integration of militarily significant industries to promote the war effort.⁷⁰ The Order was based on Article 18 of the National Mobilization Law, a hotly debated measure passed in 1938

that provided the military-controlled government with vague, general powers to control the economy in preparation for war.⁷¹ Again, the military's aim was to try and use these powers to check the influence of the **zaibatsu** while preserving traditional culture and smaller manufacturers, however contradictory these two goals might appear in retrospect. However, the formal powers the mobilization law conferred on the military were largely rolled back in practice such that the **toseikai** ended up resembling the ineffective, privately managed cartels of the mid 1930s.

The first **toseikai** were created in the the automobile and railroad stock industries in December, 1941. In January of the following year all machinery firms were organized into three, overlapping **toseikai**, an industrial machinery group, an electric machinery group and finally a precision machinery organization. These **toseikai** were given broad authority for pricing, production and structural policies. They were supposed to be an "external organ" of the MCI, faithfully implementing government policies.⁷² Instead, from the very start, private firms acting through the structure of the old metals distribution system controlled every aspect of the **toseikai**'s operation, including the definition of members.

Most machine tool firms were included in the precision machinery **toseikai**; in fact 318 of the 381 companies in this group made machine tools. Members were drawn from all three of the branches of the Japan Metal Products Manufacturing Amalgamated Union, although the large and medium firm groups had the most power. The **toseikai** elected its own president, from non-**zaibatsu** affiliated Osaka Machinery which the MCI duly approved in December of 1942. The precision machinery **toseikai** was thus a self regulating body made up of members originally brought together under the Materials Control Council of 1939.⁷³

Wartime conditions greatly affected all of the machinery **toseikai** and their term of operation was very short, just about 1 1/2 years from late 1942 to mid 1944. They attempted to carry out planning as did the cartels of the 1930s, but in the war, apart from the problems of coordinating companies there were additional problems with resources. Often distribution, still made by a ticket system approved by the **toseikai** was inefficient; a firm might be issued tickets for non-existent materials.⁷⁴ And promises to supply military demand for specialty equipment, a problem that was first identified in 1929 Resource Bureau report, went unfulfilled.⁷⁵ Instead, the **toseikai** grew into organizations that were competing for scarce resources, each pleading the special needs of its membership.

Indeed, materials shortages, which were acute by 1943 led to a bizarre development emphasizing the private nature of the control associations. In order to protect its members from a cutoff in metals supply, the precision machinery **toseikai** created its own resource company, the Precision Machinery Materials Procurement Stock Company in June, 1943. The company was funded through public support authorized in the self-regulated **toseikai**. Its purpose was to secure the various resources member firms needed by competing with other agencies, among them the military itself, in domestic and international markets. The firm could not overcome the problem of shortages and trade interruptions and in 1944 it was disbanded.⁷⁶ But its establishment suggests the dominant operational agenda of the precision machinery **toseikai**: it was an instrument through which critically needed resources might be obtained for the benefit of its member companies.

Thus, in manufacturing, particularly machinery, the **toseikai** did not lead to private or state centralization. At least in machinery, they were, in fact, especially useful for certain groups of smaller firms; by entering the regulatory network, small scale producers could assure that they received a share of the metals allocations. This was one reason they were able to survive and grow in the wartime period.

Another reason was that the structure of the **toseikai** actually provided firms with opportunities to escape **zaibatsu** pressure as much as it fostered big capital. Because they were organized along product lines the **toseikai** cut across the lines of power set up by the **zaibatsu** which were conglomerations of firms in different industries. Within the framework of the **toseikai** companies could play off group or government contacts to minimize the power of big capital where it existed. Thus, the **zaibatsu** actually became increasingly hostile to the **toseikai** because their affiliated firms repeatedly justified independent actions on the grounds that they were constrained by the decisions of the control associations. But, of course, these firms had a large say in the strategies to which they were "forced" to adhere. As Chokki observes in the machine tool case, this process may have reversed the trend towards **zaibatsu** entry into the sector inaugurated by the Machine Tool Industry Law.

With the creation of the precision machinery **toseikai**, the movement of big capital towards tieups with small and medium machine tool concerns died out. Also, mergers between members of the **toseikai** fostered by external capital sources ended. The reason for this was that within the precision machinery **toseikai**, a form of cartel, even small and medium enterprises could maintain their stock of capital, resources and workers. Moreover, the machine tool firms backed by big capital, in their role as **toseikai** members, would be subject to cartel-like regulations promulgated by small and medium machine tool firms and thus their previously close ties with their parent

companies would weaken. This gave rise at the time to a notion of "**toseikai** and **zaibatsu** conflict..."⁷⁷

In contrast to conventional arguments, the **toseikai** tended to retard both private and public centralization.

Most manufacturing **toseikai** were abandoned in 1944 as increasingly scarce materials were funneled in the face of wartime reversals to only certain classes of machinery for use by aircraft firms. In response, as we have seen in the case of Nakajima aircraft, machine tool firms poured into the industry because aircraft producers were forced to subcontract as their orders piled up. The aircraft manufacturing push was coordinated under a new Munitions Ministry, staffed by the MCI, which as Bisson argued preserved private interests even as the war effort was failing.

Nevertheless, the Ministry was intended as a centralization effort; the Munitions Ministry staff wanted to create integrated operations centered around factories such as the **Homare** division of Nakajima or the **Atsuta** airplane group built around Kawasaki.

Materials shortages alone, not to say potential private industry opposition, scuttled all of these efforts. The planning targets for each of the specialized central machine tool groups fell short by an average of more than 50%. The **Homare** group never came close to meeting its objectives while others like the **Atsuta** group were planned much too late in war and failed to be implemented.⁷⁸ The critical resource situation is revealed by production statistics: the total number of machines produced fell sharply from 53,000 units in 1944 to just 7,300 units in 1945.⁷⁹

The wartime emergency, if it did not centralize production, did transform the role of small firms as we shall see in more detail in Chapter 4. As resource shortages forced them to focus on munitions manufacture,

small firms began to specialize in subcontracting. Before the war, smaller enterprises built finished goods from mass produced commodities; after Japan's defeat they turned to making parts for final assemblers. There is no question that all companies suffered in prewar and wartime Japan. However, hardships were the result of wartime emergencies and not government policy. Reubens, one of the few American scholars to study small businesses in the direct aftermath of the war argued that centralization policies did not destroy small firms, but that allied bombing concentrated on industrial hamlets and the draft affecting small independent male enterprise operators did. And he showed that consolidation at the expense of small businesses did not take place:

To sum up the [wartime] history of small plants: they were not much affected by war-time changes until after 1942; as a widespread form of organization they persisted throughout the war; individual units suffered some closings during 1943 and 1944, and suffered widespread destruction during 1945; while the end of the war undoubtedly found a great reduction in the total number of establishments, (the reduction being concentrated around the smallest units), the physical and organizational potential for a fairly rapid revival still existed.⁸⁰

Thus, the **toseikai** provide continued evidence that conventional interpretations of the prewar are wrong. In all three phases of regulation, planning, cartels and finally control associations, there is no instance in which bureaucratic or military industrial plans were implemented without concessions to private firms. Indeed, the formulation of state strategies almost always involved reliance on the regulated parties for data, insight or advice.

Conclusions

As our survey of prewar and wartime machinery regulation shows, there is no single case in this period where the government succeeded in any of its policies. The major goal of the MCI was to enhance production scale through factory consolidation. Neither the cartel schemes, the license laws, pressure in the materials councils, the **toseikai** nor the late wartime aircraft reorganization produced this result. The firms that were directly subsidized and licensed were able to obtain support without complying with general policy; the Japanese public bore the burden of these ineffective payoffs. Small firms that were to be ignored or suppressed found ways of protecting themselves, often by partially coopting the initiatives that were to have been the agents of their own destruction. Production plans such as those for standard machines, even when authored by big firms met with no success. As late as 1945 the military was still trying to find a way to force companies to make the tools it wanted for armaments and aircraft.

This record of policy failure is not what one would expect given statist arguments. In order to carry out policies, strong states need to have authoritative powers for forcing compliance. But the prewar Japanese government either did not have this authority, or where formal powers were conferred on it like those in Article II of the Important Industries Control Law and in the comprehensive regulation stipulated under the terms of the **toseikai**, it could not independently utilize them. The prewar bureaucracy; even with military backing lacked the kinds of authoritative powers effective policy implementation required.

Nor did this failure produce a centralized manufacturing system dominated by the **zaibatsu** as conventional historiography contends. Even though some advance by big capital was observed in prewar Japanese

machinery and other important sectors, small firms retained, or in some instances even expanded their share of the market. Indeed, the comparison between prewar Japan with the United States underscores the fragmented, decentralized nature of the Japanese economy: where in the middle of the 1930s at most 40% of Japanese manufacturing value added was accounted for by firms of 500 or more employees, the figure was 70% in America by 1929, and rose to 75% by the start of the war.⁸¹ Ironically, as American SCAP reformers excoriated the **zaibatsu** for their control of the economy, large corporate interests were far more powerful in the US.

The prewar should have been an easy case for the statist argument. The government should have been observed developing interventionist skills while the economy built up scale production facilities and centralized institutions underlying the postwar expansion. Under conventional arguments, we expected to see cooperative coordination, whether managed by the MCI or by the **zaibatsu** in state-sponsored cartels, leading to eventual perfection of efficient mass production. Instead, the establishment of cartel-like groups provided no guarantee whatsoever that firms could coordinate production or prices, nor did it reduce conflict--it transformed market struggles into debates between firms within an umbrella organization without eliminating them. The idea that these various prewar regulatory initiatives enhanced production efficiency through coordination and cooperation must be rejected. Thus, the prewar experience offers little support for conventional wisdom. In the following chapter we will see that postwar policies affecting machinery also suggest problems with the centralization thesis.

¹Johnson's account of the internal history of the early MCI and the bureaucratic maneuvering that led to its creation is excellent. See Johnson, **op cit**, pp. 83-115.

²See E.B. Schumpeter eds., **The Industrialization of Japan and Manchukuo**, (New York: Macmillan, 1940 pp. 686-691, also Johnson, **op cit**, 109-111 for a background to the laws.

³The learning thesis is proposed by Johnson, **op cit**, pages 23 and 33. The idea that MITI was a reincarnation of the MCI and thus that there is a logical, developmental continuity between prewar and postwar regulation comes from the work of Nakamura Takafusa; see his *Nihon no Keizai Tosei* (Japanese Economic Controls) (Tokyo: Nihon Keizai Shinbunsha, 1974) page 164. It is worth noting that many contemporary accounts from the 1930s and 1940s differ somewhat from the developmental view held by Johnson. As we shall see Allen and Schumpeter, for instance, were very clear about the ineffectiveness of many of the cartel efforts; Bisson clearly believed the bureaucracy was utterly dominated by the **zaibatsu** and Lockwood observed that cartels, even when nominally controlled by an oligopoly, were hamstrung by inter-firm competition.³ However, none of these accounts were written with the perspective of the postwar economic resurgence in mind, and thus they were not explicitly cast in the attempt to systematically make sense of historical transformations in the Japanese economy. Johnson's most unambiguous achievement was to call attention to the continuity between pre and postwar Japan, and thus his argument represents the most completely developed historical account of how the Japanese economy eventually succeeded as it did. And, in any case, Johnson frequently treated these economist's works as though they supported his thesis.

⁴The effects of the Depression in stimulating an interventionist economic planning response are explained in Nakamura Takafusa, **The Prewar Japanese Economy** (New Haven: Yale University Press, 1973) pages 231-233 which discuss the role of Prime Minister Takahashi in building a quasi-Keynesian set of institutions; in Schumpeter, **op cit**, page 686 and in Johnson, **op cit**, pp. 83-115.

⁵The split between the Yoshino "soft" faction and the harder Kishi faction in the economic bureaucracy is described by Johnson, **op cit** on pages 123-125; the phrase "new bureaucrat" was applied by Nakamura Takafusa, **op cit**, pp. 30-31.

⁶The rise of the military and the search for planning institutions is found in Johnson, **op cit**, pp. 116-119.

⁷The policy of anti-**zaibatsu** decentralization as a part of military strategy is discussed in Schumpeter, **op cit**, pages 760-772, especially page 770;

and also In Isoshi Asahi, **The Economic Strength of Japan**, (Tokyo: Houseido Press, 1939) pages 108-109.

⁸See Nakamura (1983) **op cit.**, pages 195-210.

⁹**ibid.**

¹⁰Descriptions of inter-**Zaibatsu** competition can be found in William Lockwood, **The Economic Development of Japan**, (Princeton: Princeton University Press, 1954) pp. 228-235 which also argues that in machinery Japan was dependent on imports; an excellent revision of the view that **zaibatsu** achieved dominant power in manufacturing can be found in Nakamura Takafusa, (1973), **op cit.**, pages 230-235.

¹¹See *Hahanaru no Kikai*, **op cit**, page 47.

¹²A description of prewar machinery producers is provided in Chokki Toshiaki, *Kosaku Kikai Gyokai; Sangyokai Series 67* (The Machine Tool Industry; Industrial Sector Series # 67) (Tokyo: Kyokusha, 1978) pages 42-44.

¹³c.f. Chokki, **op cit**, pp. 45-50.

¹⁴The founding of the resources bureau is described in Johnson, **op cit**, page 118. Its creation was a direct result of military pressure although in operation to appease private interests it was made semi-autonomous.

¹⁵Johnson, **ibid**, pages

¹⁶ *Nihon Kosaku Kikai Kogyokai, Nihon Kosaku Kikai Kogyo Hattatsu no Katei*, (Japan Machine Tool Builder's Association, **The Process of Japan's Machine Tool Industry's Growth**) (Tokyo: Nihon Kosaku Kikai Kogyokai, 1951) page 111.

¹⁷ *Nihon Kosaku Kikai Kogyokai, Nihon Kosaku Kikai Kogyo Hattatsu no Katei*, **ibid.**

¹⁸ *Nihon Kosaku Kikai Kogyokai, Nihon Kosaku Kikai Kogyo Hattatsu no Katei*, **ibid.**

¹⁹ *Nihon Kosaku Kikai Kogyokai, Nihon Kosaku Kikai Kogyo Hattatsu no Katei*, **loc cit.**, page 112.

²⁰See *Hahanaru no Kikai*, **op cit**, page 47.

²¹ *Nihon Kosaku Kikai Kogyokai, Nihon Kosaku Kikai Kogyo Hattatsu no Katei*, **ibid.**, page 112.

²² *Nihon Kosaku Kikai Kogyokai, Nihon Kosaku Kikai Kogyo Hattatsu no Katei*, **ibid.**, page 112.

²³The politics of the S-Type machine tool episode is described in *Nihon Kosaku Kikai Kogyokai, Nihon Kosaku Kikai Kogyo Hattatsu no Katei*, **ibid.**, page 112-113.

²⁴ *Nihon Kosaku Kikai Kogyokai, Nihon Kosaku Kikai Kogyo Hattatsu no Katei*, **ibid.**, pages 114-115.

²⁵c.f. Johnson, **op cit**, page 133.

²⁶See Schumpeter, **op cit**, pages 686-691.

²⁷See Johnson's excellent, if ironic, in light of his argument, treatment, **op cit**, pages 109-111.

²⁸Eleanor Hadley, **Antitrust in Japan**, (Princeton: Princeton University Press, 1970) page 330. Johnson among others cites this appraisal with approval (see Johnson, **op cit**, page 110).

²⁹See Allen in Schumpeter, **op cit**, page 687.

³⁰Johnson, **op cit**, page 110.

³¹See Allen in Schumpeter, **op cit**, pages 719-723 for details concerning insider and outsider firms in various cartel arrangements.

³²Allen in Schumpeter, ed., **op cit**, page 687.

³³Allen in Schumpeter, ed., **op cit**, page 691.

³⁴**Ibid**; see also Fujita, "Cartels and their Conflicts in Japan," **Journal of the Osaka University of Commerce**, No. III, December, 1935 for a review of the fact that cartels were not only ineffective instruments of state control, but of private restraint as well. Fujita criticized the MCI for overstating the usefulness of the cartels.

³⁵See Johnson **op cit**, page 111 for details of public outrage over cartel abuses and a related "dollar scandal."

³⁶See Nakamura, **op cit**, page 301.

³⁷c.f. Richard Samuels, "MITI and the Market: The Japanese Oil Industry In Transition," **International Energy Studies Program**, [MIT EL 84-016 WP] (Cambridge: MIT Energy Laboratory, October 1984) page 15.

³⁸Johnson, **op cit**, page 131.

³⁹The poor quality of Japanese stock was a constant problem for the military as noted in the general history of prewar Japanese machinery industries, "*Senzen ni Okeru Nihon no Kikai Kogyo no Hatten no Tokushusei*" [Special Qualities of Japanese Machinery Industry Development in the Prewar] in *Gendai Nihon Sangyo Hattatsu Shi Kenkyu Kai*, **Gendai Nihon Sangyo Hattatsu Shi**, [The Contemporary Japanese Industrial Development History Research Group, **Contemporary Japanese Industrial Development History**] (Tokyo: Gendai Nihon Sangyo Hattatsu Shi Kenkyu Kai, 1967) page 56; growth in autos stagnated, while trucks rose from 1936-1941. Thus, the industry became a producer of poor quality trucks and sacrificed production of all other vehicles. Total vehicle output in 1936 was 31,000 units of which 5,000 were trucks; in 1941 it was 49,000 units, but all but 42,800 were trucks. See above, page 55.

⁴⁰*Nihon Kosaku Kikai Kogyokai*, **Nihon Kosaku Kikai Kogyo Hattatsu no Katei**, **op cit.**, pages 114-115.

⁴¹See Chokki Toshiaki, **Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki** **op cit.**, page 152 for growth record; for the negotiations

between the Big Five and the bureaucracy and the 200 tooling level see pages 129-130.

⁴²The problem of small machinery production scale was continually addressed in the prewar by the MCI. c.f. Chokki Toshiaki, *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki* op cit., page 127.

⁴³Chokki Toshiaki, *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki* op cit., page 131.

⁴⁴Kato, "Kosaku Kikai Kogyo no Kozo to Kadai," In *Gendai Nihon Sabgyo Hattatsu Shi*, loc cit., page 340.

⁴⁵c.f. Johnson, op cit, page 23.

⁴⁶Chokki Toshiaki *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki*, op cit., page 131.

⁴⁷Chokki Toshiaki *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki*, op cit., page 131.

⁴⁸Chokki Toshiaki *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki*, op cit., page 131.

⁴⁹Chokki Toshiaki *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki*, op cit., page 162.

⁵⁰Chokki Toshiaki *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki*, op cit., pages 139-140.

⁵¹Chokki Toshiaki *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki*, op cit., pages 139-144.

⁵²As quoted in Chokki Toshiaki *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki*, op cit., page 136, note 8.

⁵³Chokki Toshiaki *Nihon no Kosaku Kikai Kogyo no Hatten Katei no Bunseki*, op cit., pages 154-158.

⁵⁴ This document was the first postwar "White Paper" on the machine tool industry published by the **gyokai** in 1951.

⁵⁵c.f. *Chushokigyo Chosakai Hen, Chushokigyo no Hattatsu (2); Chushokigyo Kenkyu Vol. VII*, [Small and Medium Enterprise Survey Group, eds, **The Development of Small and Medium Enterprises (2) Small and Medium Enterprise Research Vol. VII**] (Tokyo: Chushokigyo Chosakai, 1962.) pp. 64-66.

⁵⁶Nakamura (1983), op cit., pp. 266-301.

⁵⁷Byron Marshall, **Capitalism and Nationalism in Prewar Japan: The Ideology of the Business Elite 1868-1941** (Stanford: Stanford University Press, 1967)

⁵⁸Johnson, op cit., page 153.

⁵⁹c.f. Johnson op cit., pages 153-154,

⁶⁰T. A. Bisson, **Japan's Wartime Economy**, (New York: Institute of Pacific Relations, 1945) pages 202-203.

⁶¹The metals distribution system is described in *Nihon Kosaku Kikai Kogyokai*, ***Nihon no Kosaku Kikai Kogyo Hattatsu no Katen***, **op cit.**, pp. 125-126.

⁶²**ibid.**

⁶³**ibid.**

⁶⁴A good account is in *Chusho Kigyo Chosakai Hen*, **op cit.**, pages 57-59.

⁶⁵*Nihon Kosaku Kikai Kogyokai*, ***Nihon no Kosaku Kikai Kogyo Hattatsu no Katen***, **op cit.**, page 128.

⁶⁶*Chusho Kigyo Chosakai Hen*, **op cit.**, pages 57-59.

⁶⁷*Chusho Kigyo Chosakai Hen*, **op cit.**, page 58.

⁶⁸**ibid.**

⁶⁹*Nihon Kosaku Kikai Kogyokai*, ***Nihon no Kosaku Kikai Kogyo Hattatsu no Katen***, **op cit.**, page 130.

⁷⁰*Nihon Kosaku Kikai Kogyokai*, ***Nihon no Kosaku Kikai Kogyo Hattatsu no Katen***, **op cit.**, page 131.

⁷¹see Johnson, **op cit.**, page 139.

⁷²*Nihon Kosaku Kikai Kogyokai*, ***Nihon no Kosaku Kikai Kogyo Hattatsu no Katen***, **op cit.**, pages 132-133. The "external organ quote is a translation of "gaikaku kikan" or auxiliary or external organ as the machinery **toseikait** described itself. See page 132.

⁷³**ibid.**, page 133.

⁷⁴**ibid.**, page 136.

⁷⁵**ibid.**, page 134.

⁷⁶**ibid.**, page 136.

⁷⁷Chokki, **op cit.**, page 149

⁷⁸Chokki, ***Kosaku Kikai Kogyokai***, **op cit.**, pages 75-76.

⁷⁹From ***Hahanaru no Kikai***, **op cit.**, page 47.

⁸⁰Edwin Reubens, "Small Scale Industry In Japan" **Quarterly Journal of Economics**, Vol. 61, No. 4, August 1947 page 592. For damage statistics see page 589.

⁸¹Figures for Japan from Nakamura (1983) **op cit.**, page 197; for the U.S. **Census of Manufactures** data for 1938.

Chapter Three

Centralized Authority and the Postwar Japanese Miracle

This chapter will examine the development of postwar industrial policies affecting machine tool expansion. We will attempt to evaluate the notion that the spectacular growth of the Japanese machinery industries, exemplified by successes in the NC market, was the result of consolidation initiatives directed by the state. Our survey of regulation from the immediate end of World War II to the present will show that centralized authority--public or private--had little or no effect in generating the industrial transformations that led to rapid machinery growth. Thus, not only was the bureaucracy unable to achieve the consolidation of production it sought, but centralization and volume manufacturing were not attained through other means as well.

For many reasons, the main body of Japanese economic research has been focused on the postwar era, often as if there was no history prior to 1945. Consequently, arguments about the postwar role of the government in the economy are more nuanced and admit of more variation than those concerning the prewar. There are, however, common points of agreement in what we have called the statist vision of Japanese industrial regulation.

Most scholars agree that the Occupation, which lasted from 1945-1952 greatly strengthened the bureaucracy as the power of the military and the **zaibatsu** was reduced through the influence of the American forces. Thus, the newly reorganized MITI could direct financial support towards key sectors in the mid 1950s to the early 1960s while protecting them through trade restraints. From the 1960s onwards, MITI's policy switched to one of

consolidation, propelled in part by imminent capital liberalization mandated by Japanese entry in GATT. The Japanese industrial base was centralized, economies of scale induced and manufacturing lines were rationalized. Finally, in the 1970s, MITI managed to transform many industries and push them towards integration with electronics or computers, a process that also increased the efficiency of Japanese factories through automation. Trade successes were built on this advantage. In the conventional view, then, MITI's guidance made it possible for Japan to perfect the mass production system, and to enjoy price and quality advantages over its trading partners.¹

We will show that this historiography is mistaken in several respects: It greatly overstates the ability of the government to reshape the economy in the way it sought, and it overlooks considerable evidence of deconcentration cutting against the view that economies of scale were the source of Japanese advances. In the SCAP era, although the bureaucracy had administrative control it was constrained to act as American officials directed; its power was severely limited. In the 1950s and 1960s MITI did direct resources towards many industrial sectors, but it provided far more support to economic losers; indeed, the bureaucracy could not selectively provide financial support but was forced to heed the wishes of firms throughout the economy. Moreover, MITI support for sectors of particular postwar success like machinery or autos was the lowest of all industrial groups, did not correlate with growth and was but a fraction of overall capital spending. Next, the consolidation schemes MITI proposed, or encouraged private firms to develop were among the most conspicuous planning failures in Japanese history: Japanese industry decentralized in the 1960s and 1970s even as the government was imploring industrialists to

merge. Finally, we shall show that the integration of electronics or computers with machinery, as in the NC case, for instance, was not in any way the product of MITI planning. Indeed, our argument will be that in an important sense MITI cannot plan at all--it must and does rely on the strategic advice of "regulated" firms in shaping the content of its initiatives. Consequently, subsequent export advances cannot be interpreted as the result of centralized direction or collusion.

The first part of this chapter will detail machine tool policies during the Occupation and show how the bureaucracy carried out a number of punitive measures that nearly destroyed the industry it had labored for 15 years in the prewar period to build. Then we will study the development of planning and financial support under the first and second terms of the Temporary Measures for the Promotion of the Machinery Industry Law (1956-1960; 1961-1965). We will see how industrial plans went totally unfulfilled as designed and how the machine tool industrial group, the **gyokai**, dominated policy formulation. Moreover, we will argue that government financial support, either in its aggregate level or in its possible role as an indicative planning tool also was ineffective. Then we shall test the statist view in the context of capital liberalization and evaluate whether consolidation efforts in the third term of the Machinery Promotion Law (1966-1970) actually resulted in scale economies, mergers, or orderly markets. We will argue that they did not. Finally, by looking at subsequent promotional measures and export developments we will suggest that centralization cannot account for the machinery and NC successes in the 1970s and 1980s.

The postwar development of the machinery industry was profoundly affected by the seven year American occupation of Japan. SCAP authorities,

some of whom would later become Japan specialists, wanted to totally reshape Japanese society, excising the institutions they believed had driven the country towards wartime fascism. Their work was fraught with ironies that have not gone unnoticed. For example, SCAP reformers eventually collaborated with and strengthened the MCI, the most outspoken proponent of Japanese centralization and a haven for prewar "new-bureaucrat" leaders--proponents of neo-nazi ideology--to assist in the administration of their policies. Another notorious outcome was spawned in SCAP's social liberalization programs, which prompted a wave of strikes after unions were legalized. The Americans, fearing that such activity might lead to the rise of communism in Japan, re-legitimized many conservative prewar politicians and bureaucrats as postwar leaders. American idealism frequently strengthened the most regressive elements in Japanese society.²

Many of these general contradictions in SCAP economic regulation were felt in the sphere of machine tool industrial policy as well. Immediately following the war in 1945, SCAP began to dismantle Japanese wartime manufacturing enterprises. A special group, the Ball Survey Commission, was convened to decide what to do with factories that had manufactured war materiel. As part of its report, the Commission recommended that machine tools be confiscated for reparations payments, and that the machinery and stock at 91 machine tool plants be confiscated. In addition, since machine tools were seen as the heart of the Japanese military production system, domestic manufacturers were prohibited from continuing their operations. Machine tools in other installations affiliated with military production such as armaments or aircraft were also seized. Through these means the Commission recommended the appropriation of 50%

of the machine tools and machinery manufacturing capacity of the Japanese economy.³

Political and market pressures led to modifications of the reparations plan. Indeed, the reversal of SCAP machine tool policies was part of a general redirection of American attitudes towards Japan. Incipient cold war hostilities and severe anti-communist fears, as we have mentioned above, provoked SCAP authorities to look much more kindly on alleged Japanese war crimes, an attitude that also spilled over into industrial policy regarding weaponry manufacturers. Rebuilding Japan as a strong ally took precedence over punitive measures and the US military and domestic Japanese machinery users strongly resisted moves to destroy machinery. An industrially strong Japan, it was urged, was needed as a front-line buffer against communists on the Asian mainland. Further, redressing wartime grievances through the seizure of machine tools was difficult because it was impossible to transmit large numbers of machines to the US, and because of the potential that an influx of foreign equipment might have in depressing US tooling markets. In response, the Ball Commission's plans to cut Japanese production potential were abolished in 1948 by the Strike Survey Commission, an industrial analysis group dispatched by the US Army.⁴

With no place to send the machines for reparations, no mandate to dismantle Japanese industry, and under pressure to support the regrowth of manufacturing, SCAP finally decided to distribute the confiscated machine tools to other Japanese factories. This devastated machinery producers. Of the 590,000 machine tools held by Japan in 1945 as estimated by the Ball Commission, 220,000 had been seized for reparations; the majority of these were ultimately distributed to Japanese manufacturers.⁵ The market effects

of this dispersal of machinery can be appreciated by considering that in the peak production year of 1938 Japanese machine tool firms built 68,000 machines; SCAP's policies provided machinery users in Japan with roughly 4 times that amount. Accordingly, there was a tremendous glut of standard machine tools which crippled the industry's postwar recovery. In terms of both the annual value of industrial output and the annual number of machines produced the machine tool industry did not return to its 1938 benchmark until 1960.

Other SCAP policies exacerbated the problem. The Dodge Line, a series of deflationary measures to combat postwar price increases named for the American banker who recommended them was particularly hard on capital goods producers. After it was adopted in 1949 machinery consumers cut back on credit purchases under the measure's high interest rates and made do with older equipment. Between 1949 and 1950, the total number of machines produced fell from 6,680 to just 4,039, the lowest since 1932 while the value of output fell 28% despite a still persistent inflation.⁶

Compounding the problem was the fact that the saturation of markets with older Japanese machines helped to promote machine tool imports. Large and small users of industrial machinery wanted state of the art equipment for their own recovery. But Japanese machine tool producers lacked the sophisticated machinery production required; in order to meet demand, investments in equipment and technology were unavoidable. The effective destruction of their mainstream tooling markets in the wake of the distribution of reparations equipment made it impossible for the domestic companies to generate capital for these investments. Japanese equipment users had to look abroad for tools. The result was that imports flooded the market after 1949, when foreign capital restrictions were specially eased

for the purpose of machinery imports. In 1950 the value of imports amounted to 29% of domestic production; by 1955 imports accounted for 57.7% of the domestic market; and as late as 1962 import dependency was still 32.6%.⁷

As they did in the Depression following the World War I boom, machine tool firms took on other jobs to maintain their corporate integrity. Many of the prewar licensed firms were just units of larger organizations, and they turned to alternative production within their groups. Others engaged in spinning, printing and weaving equipment manufacture, or took up the production of metal product parts such as cans or auto components. Some firms became repair shops for machine tools already in use. But despite these defensive measures, domestic oversupply and import penetration ravaged the machine tool industry. The number of firms surveyed by the Eastern Japan Machine Tool Council fell from a wartime high of 446 in 1944 to 186 in 1946, and then to just 21 companies by 1951 as 94% of the prewar and wartime firms suspended operations.⁸ The failures included **zaibatsu** affiliates and smaller independents alike; the slump was so severe that no one kind of company proved better able than others to withstand it. Indeed, even the very weak demand for domestic machinery was itself in part artificially induced through the procurement policies of large nationalized industries. For example, over 50% of production in 1947 went to the national railways, an essentially captured, public utility market.⁹

Economic distress prompted surviving machine tool firms towards the adoption of various countermeasures. The cornerstone of their effort was to try and recreate industry councils, or in postwar terminology, **gyokai**, to coordinate the interests of the machinery industry. Industrial

gyokai were a prominent feature of the postwar Japanese economy, typically composed of the major firms in any given manufacturing sector. Member companies were usually large, possessed some form of special or superior technology, or had a history of influence with the bureaucracy or in the industry as a whole. **Gyokai** had two purposes: they were the main lobbying organization for industry, serving as an industry contact for the bureaucracy; and they were the locus of contact between member establishments. To understand the development and effect of postwar policies in machinery industries it is necessary to trace the history and influence of the **gyokai**.

The postwar machinery recession was so severe that as early as January 1946, 100 machine tool firms from the Tokyo area tentatively established the Japan Machine Tool Council as an umbrella organization for their industry. Then, in May, 1948 a second Machine Tool Council, representing a different set of firms from Osaka and Kyoto was created. These councils were explicitly modelled on the **toseikai**, with which machine tool firms had registered great success in affecting wartime policies. But in contrast to the control associations, the "councils" were fragmented regionally, and contained different members. Further, while wartime **toseikai** were set up with the explicit participation of the government and the industrial combines, the new "councils" were independent creations of the affected machinery firms.

The Councils were not successful in the immediate postwar period. Sentiment against reorganizing industries associated with armaments, including machine tools, was extremely high; representative groups that resembled the **toseikai**, given American antipathy towards wartime institutions were in particular disfavor. Moreover, impoverished machine

tool firms could not afford the staff and facilities the proposed councils required. In consequence, the Japan Machine Tool Council was dissolved in July, 1948; the Machine Tool Council was disbanded in May, 1949.¹⁰

Factional splits between regional groups of producers and the problems of financing industrial groups led to the continued fragmentation of machine tool producer organizations. Remaining machine tool firms were generally grouped in one of three different organizations, the Eastern Japan Machine Tool Council (Tokyo) with 27 firms, The Kansai Machine Tool Council (Osaka, Kyoto) with 12 companies and the Chubu Machine Tool Council with 7 members. These three groups gradually increased their contacts, especially in lobbying efforts aimed at counteracting the effects of the reparations machinery dispersal and the ban on machine tool production. In August, 1948, the Kansai and Eastern Japan organizations, the two largest clusters of firms from the influential **Kanto** and **Kansai** districts, formally affiliated. Then, after intense negotiations, 40 surviving tool makers agreed to consolidate into a single Japan Machine Tool Builders Association (JMTBA) in December, 1951. A national machine tool **gyokai** was born.¹¹

The companies consolidated into the **gyokai** were an amalgam of formerly licensed firms, other surviving members of the wartime **toseikai**, firms with close links to machine tool producers and precocious new companies whose management exhibited considerable production and political acumen. Representatives of the licensed class of firms included the old Big Five, and **zaibatsu**-created companies such as Hitachi Precision Machinery and Toyo Machinery. Other **toseikai** veterans were Osaka and Tokyo Machinery, companies that had switched to machine tools in the materials crises of the wartime era. The third group of firms, those that

had close links to tooling producers either as consumers or parts manufacturers, included Railcar Manufacturing and Imperial Chuck, which made peripheral or integral parts for cutting tools. The final set of new **gyokai** members was best exemplified by Makino Milling Machine, whose founder built his small machinery company into the leader mill maker in Japan. The firm also would play an important role in the development of NC technology, the creation of machinery export associations and in reorganization politics in subsequent years.¹²

The **gyokai** was the center for debate about government and machine tool industry policies in the postwar. However, its membership was only a small fraction of Japan's total machine tool companies. For example, in 1955 the **gyokai** had 55 members while total firms in the industry numbered 264; by 1981 there were 113 **gyokai** members while the industry as a whole amounted to 1,928 firms.¹³ Companies not in the **gyokai** are commonly referred to in Japan as "outsider" [**ao-to-sidah**] firms by using an English loanword. The reasons for a firm's decision not to join a representative group in its industry frequently vary from case to case. Some companies, as we shall see in the case of Mori Seki, simply distrust the purpose of the groups. Others desire to maintain independence by not consenting to debate general policies in the **gyokai**. An additional reason is that many firms are not invited to join because **gyokai** members do not see them as an important enough player in the industry. Though until the late 1970s **gyokai** members accounted for 75% of total machine tool output, as we shall see, in new technology products the role of the outsider companies was crucial. Indeed, the largest NC lathe maker in Japan was an outsider company.

The earliest activity of the **gyokai**, between 1951-1952 was aimed at moving machine tool firms into the network of economic policymaking institutions created by SCAP. In 1952 the JMTBA took over the production of machinery records and other data for use by the GHQ. In February it gained a foothold on the procurement bureau which oversaw purchases made by the US Army. It also formed contacts with distribution companies based in Japan and in other eastern markets.¹⁴

In addition, the machine tool **gyokai** also began to coordinate its activity with other machinery industry groups to maximize the political power directed towards the bureaucracy. Producers in transport machinery, smaller equipment, precision products and other allied machinery sectors gradually developed their own **gyokai** and rebuilt an industry lobbying network that resembled the three integrated **toseikai** of the wartime period. Contacts were sometimes facilitated by the fact that one firm might be a part of two or more **gyokai**. Eventually, by the mid 1950s, all of these machinery groups were housed in a single building, the Machinery Promotion Building in Tokyo, emphasizing the effort to unify the political position of machinery manufacturers. The consolidated groups moved again in 1966 to their present location in Kamiyacho, near Shiba Koen (park) in Tokyo.¹⁵

Political pressure for machine tool industry relief intensified just prior to the formal incorporation of the **gyokai** in 1951. In August, the staff of the Eastern Japan Machine Tool Council wrote an internal report entitled "The Current Machine Tool Industry and the Road to Growth" [**Kosaku Kikai Kogyo no Genjo to ikusei no Michi**]. The document summarized the dire position of the industry and suggested some reasons for the postwar recession it was facing. It then turned to proposals for

recovery, which centered on the idea of equipment modernization. The report showed that the stock of Japanese machine tools was extremely old and technically deficient--in part the result of SCAP's distribution of reparation machines. The report suggested that in order for the machine tool industry to both recover its own vitality and meet the demand for tools in other sectors, promotional strategies expanding machinery markets and supporting the development of tooling technology were necessary.¹⁶

The "Current Machine Tool Industry" document became the first postwar "white paper" [**hakusho**] published by the **gyokai**. It set a precedent whereby the industry itself signaled appropriate policy responses for the bureaucracy to act upon. Throughout the postwar period, specialized committees dealing with technology, markets, demand, and finance would submit findings gathered into an overall document. The **gyokai** would then send its position paper to MITI's Industrial Machinery Division, which had responsibility for machine tools along with scores of other manufacturing sectors. Additional ideas or points would be clarified in liaison discussion groups between **gyokai** members and Industrial Machinery Bureau representatives. Occasionally, academics or other "neutral" parties would attend the discussion groups. Without exception, white papers always preceded major policy initiatives and were the basic referents from which the bureaucracy drafted its legislation.

The initial report was used as the basis for machine tool industry discussions--**shingikai**--held in November, 1952. These meetings were held under the auspices of the Industrial Rationalization Discussion Group set up in the MCI's machinery division. A second report incorporating most of the initial study's work was submitted to the Industrial Machinery Bureau entitled "The Current Machine Tool Industry and Recovery Policies." Based

on this document, MITI's Industry Machinery Division produced a summary of policy objectives in February, 1953 entitled "Machine Tool Management Administration Plans: 1953."¹⁷

The "Management Plans" paper was the first comprehensive machinery industry policy outline produced by the postwar economic bureaucracy; it coincided with the return of Japanese sovereignty in 1952. It underlined the need for restrengthening Japanese machinery firms and promised support from the newly set up Japan Development Bank, a public bank established to provide loans in conjunction with policy goals. It also promised that the government would help offset the costs of experiments leading to advanced equipment technology. Further, the plan suggested that import duties and taxes would be adjusted to promote domestic production of tools and the reduction of imports.¹⁸

Promotional and support measures largely echoed the industry's requests first addressed in the 1951 **gyokai** White Paper. But the bureaucracy, flush with the reversion of its independence from the Americans, wanted to accomplish additional objectives. The MCI inserted a clause to the effect that it would promote specialization in production and increase the scale of operations, a position congruent with its prewar efforts. Next, it linked machine tool development to enhancing rationalization throughout all manufacturing sectors.¹⁹ "Rationalization" [**gorika**], together with "modernization" [**kindaika**] continually appear in MCI or MITI reports and legislation. As many observers have noted these terms suggest different ideas in different contexts. Sometimes, particularly in bureaucratic application, "rationalization" has the meaning of "concentration" or central direction. In other settings rationalization means improving the qualitative level of firms in order to preserve their

independence; this was the dominant interpretation of smaller firms, for instance, which thought "rationalization" policies meant encouragement to buy advanced equipment.

In the case of the 1953 policy statement, the second meaning was eventually adopted through pressure by machinery makers; rationalization strategies would seek to promote the substitution of new tools for older machines. The **gyokai** wanted to mobilize newly established financial organs for small firms and tax breaks provided by the proposed Enterprise Rationalization Law to stimulate machinery sales. With the market glutted by older tools, the provision of aid for machinery purchases would create a market from which badly needed cash flow might be obtained. These market stimulation measures were known as "scrap and build" policies for they were to encourage old machinery users to throw out their equipment and buy replacement goods produced by struggling Japanese manufacturers.²⁰

The policies based on the 1953 policy plan did nothing to alleviate the machine tool crisis. In accordance with the scrap and build strategy, the Enterprise Rationalization Law of March, 1952 was amended to provide for a 50% first year write-down for 32 classes of machinery to encourage new machinery purchases. But the effects of this measure were more than offset by import policy. Machinery users in various industries resisted measures aimed at restricting their purchases to domestic equipment; they wanted support extended to all machines wherever manufactured. Even some machine tool firms supported this position since they needed new, foreign equipment themselves and would benefit from the program. The equipment users triumphed; the government was brought to pass a Machine Tool Import Assistance Regulation in late 1952 which provided machinery importers with subsidies up to 50% of the value of their purchases along

with generous amortization privileges. The result was that domestic machinery output continued to fall while imports rose. Moreover, competition for the import subsidies was so great that the bulk of allocations to machinery firms went to affiliated tooling or bearing manufacturers; only 10 machine tool firms were able to receive import assistance for a mere 26 machines under the regulation.²¹

Slightly more support was provided under a system of experimental research subsidies undertaken between 1953 and 1955. Machine tool firms and manufacturers from other industrial equipment sectors were eligible to receive a 50% subsidy for experiments leading to advanced machinery. In the three-year period of this program, approximately \$750,000 (¥280 million) was distributed to 28 companies for research related to 61 types of machine tools. The results of the research were published in the public domain. Though welcome, the research grants could hardly spark a recovery; the total amount disbursed under the program came to less than 2% of capital spending by machine tool firms in the same period.²²

Japanese machinery industries continued to stagnate although the Korean War did lead to recovery in a number of other sectors, especially those with military applications. In 1955 broad changes in the coordination of machinery **gyokai** and in the economic bureaucracy led to a new, intensified promotional effort. The MCI was abolished and MITI established in early 1952, and the new bureaucracy then strengthened itself continuously in the next four years.²³ Its primary objective with respect to industrial development was to foster economies of scale in industry to raise Japanese producers to the level of volume production achieved by overseas, especially U.S., firms. In this regard, MITI's industrial policy

outlook must be appreciated as a direct continuation of the ideas and principles developed during the wartime and prewar period in the MCI.

The similarity between the pre and postwar bureaucracy did not end with MITI's basic attitudes, but extended into the kinds of legislation that actually were passed to try and achieve market objectives. Just as prewar and wartime regulation frequently provided bureaucrats with formal powers of a seemingly sweeping nature to control companies, powers that in practice they were utterly unable to utilize, so too we will see that postwar initiatives were marked by a similar pattern. In the machinery case, the basic promotional laws all contained apparently tough provisions under which the bureaucracy could enforce its decisions against private interests. These provisions were placed in the measures as a tradeoff; MITI agreed to sponsor legislation in return for which affected firms permitted a formal statement of regulatory power. In practice, several factors stripped MITI of the ability to exercise its apparent authority, including its reliance on regulated firms for market information and planning data, and the general power of industrial actors, much like the prewar **zaibatsu**, to defeat bureaucratic efforts to obtain compliance authority through legislation. Companies simply ignored bureaucratic concerns while helping themselves to financial incentives, a point we will discuss in detail later. But before we can show what the bureaucracy was not able to achieve, we need to specify its objectives as contained in the body of legislation directed at the machine tool industry and in its initial conception of its overall strategy.

The machine tool **gyokai**, in alliance with machinery makers in the electrical, industrial (large scale), automotive, forming, plastics, watch and other machinery sectors began to lobby for their own special law that would provide them with earmarked financial assistance. In October, 1955,

the **gyokai** submitted a document entitled "A Petition for the Enactment of Legislation Concerning the Recovery of the Machinery Industry" to the Industrial Machinery Division. Together with submissions from the other machinery sectors, this petition became the basis for the Temporary Measures Law for the Promotion of the Machinery Industry [**Kikai Kogyo Shinko Rinji Sochi Ho**]. The bill was promulgated in 1956 for an initial five-year period; it was extended twice until 1971.²⁴ It was the basis for postwar bureaucratic involvement with the machinery industry.

The Machinery Promotion Law was typical of postwar Japanese industrial policy. It was short, containing only 24 articles which usually were of one sentence each. The bill provided only the barest minimum of statutory direction leaving details to the bureaucracy.²⁵

The law had four major sections. First, it called for the rationalization of designated machinery industries and gave MITI planning authority to meet that goal. The definition of rationalization was not provided. MITI was empowered to draft a plan to promote rationalization for each affected industry at the recommendation of a machinery industry council of businessmen and academics. Second, in Article Five, the government promised to secure funds to meet planning objectives. The third part of the law stipulated the conditions under which "concerted action" by affected firms might be undertaken. These sets of clauses were clearly modelled on the prewar cartels. They called for joint action where necessary to reach planning goals or restrictions on production, quotas, technology development and procurement of components. Firms contemplating concerted action were required to submit reports to MITI. Where joint action was necessary, but firms reluctant, MITI was given authority to force compliance. In this encouragement of private schemes to

cartelize production and the "last ditch" empowerment of the bureaucracy to compel joint action. If needed, the concerted action clauses were identical to the form of the Important Industries Law of 1931. Finally, the law described the machinery industry council, a group of academics, industry specialists and bureaucrats who would meet to establish overall policy. The terms and method of selection for members of the council was also indicated.

The Machinery Promotion Law was implemented in five year increments each governed by a master plan. The first, published in March, 1957 for the period 1956-1960 was called the "Basic Rationalization Plan," [**Gorika kihon keikaku**]; the second was made public in October, 1961 for 1961-1965 as the "Basic Recovery Plan" [**Shinko kihon keikaku**].²⁶ A final five year plan was established for 1966-1971. Each plan contained a set of goals or objectives for design improvements, production, exports, equipment investments, production techniques and industry organization.

Equipment improvements were technical goals such as increasing the rotational speed of lathe engines, or the overall capacity of a milling machine from what was the then optimal performance among Japanese machines. A series of machine types was presented together with the technical improvements that the plan hoped to induce. In addition, by comparing international indices of productivity, target reductions in manufacturing costs were suggested.

Production and export goals were set as monetary values for the last year of the respective plans. For example, the Basic Rationalization Plan wanted to boost overall production to 20 billion yen and exports to a total of 4 billion yen by 1965. Equipment or capital investment goals were stipulated over the entire five year period of each plan. The types of

investments were divided into those for "designated machinery," meaning machines to be encouraged by the plan, and "other machines." In 1956-1960, the total investment target was 6 billion yen; in 1961-1965 it was set at 85 billion yen.

Production technique objectives were either general ideas or specific targets for improvements in manufacturing. The Basic Rationalization Plan merely urged that firms "specialize by type of machine;" the Basic Recovery Plan indicated increases in average lot sizes for scale economies. Lot sizes refer to the number of units of a particular item made at one time in the same manufacturing set up. For instance, in lathe production, the plan stipulated a minimum recommended lot size of 50 units; below that it was felt that the cost of production relative to the units produced would be too high.

Finally, under industry organization, each plan suggested objectives that would further the industry's development. Both plans called for the "standardization of parts," in an apparent effort to increase scale economies by fostering interchangeable equipment. The Basic Rationalization Plan further called for the creation of a "joint research facility," while among the recovery plan's industrial organization goals was the establishment of an organ for export recovery.

The various objectives under each category are summarized for both the basic rationalization and recovery plans in Figure 3.1.

Figure 3.1

Summary of Goals Under Rationalization and Recovery Plans

Target \ Plan	Rationalization Plan: 56-60	Recovery Plan: 61-65
Rationalization	a. Increase Technical Capacity of specific types of machines b. Reduce Production Costs 20%	a. Increase Technical Capacity of specific types of machines b. Reduce Production Costs 15%
Production	Increase Production to 20 billion yen by 1960	Increase Production to 135 billion yen by 1965
Exports	Increase exports to 4 billion yen by 1960	Increase exports to 13.5 billion yen by 1965
Investment	Make 6 billion outlay 56-60	Make 85 billion outlay 61-65
Product Tech	Specialize in particular tools	Produce tools in appropriate lots
Other Goals	Standardize Parts; Set up joint Research facilities	Increase firm size; develop basic technology; set up export group; Standardize Parts

From *Hahanaru no Kikai*, op cit., page 64.

Government financial support authorized under the Temporary Measures Law was eventually provided to machine tool firms as either loans or subsidies for experimental research. The most important lender was the Japan Development Bank (JDB). The JDB was established in 1951, replacing wartime government lending institutions with the return of Japanese sovereignty to assist in providing loans to industries designated by the bureaucracy.²⁷ Approximately 80-90% of the value of all government financial support extended to the machine tool industry was in the form of JDB bank loans. The remaining loans were primarily made by the Small and Medium Enterprise Finance Corporation, a government-funded institution set up to make loans to small firms. The percentages of state support compared to total investment needs varied with the year and the type of industries

involved, as we shall see later; 92% of all government financial support provided to the machine tool industry from 1945-1985 was disbursed during 1956-1965 totalling ¥7.2 billion, amounting to less than 5% of all machine tool investment in that decade.²⁸

Experimental subsidies were granted by MITI itself through the use of authorized funds for that purpose. Grants were made to individual firms. The subsidies were an extension of the experimental support program begun in 1953-1955 as described above. However, the amount of the subsidies tailed off dramatically; in the mid 1950s, before the passage of the Machinery Promotion Law, average yearly expenditures were about ¥90 million, but by 1960 they had fallen to just ¥13 million.²⁹ A major reason, as we shall see, is that Japanese firms were importing technology through tieups with foreign firms rather than developing it themselves and so the need for subsidies was quite low.

Planning and the Machinery Promotion Laws

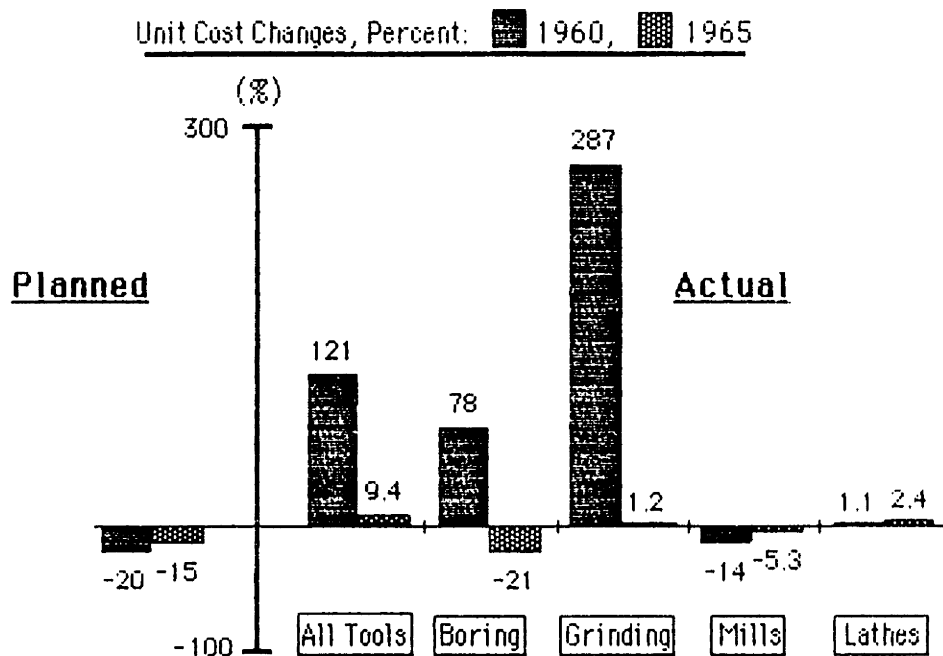
The 1956-1960 Rationalization Plan and its successor, the Recovery Plan of 1961-1965 provide us with a good opportunity to test the relationship of MITI policies to industrial outcomes. If the statist argument was correct, we should expect to see that machinery firms obeyed the planning targets set by the bureaucracy, and that MITI itself developed and enforced its industrial vision. But we will show that all of the planning goals MITI put forth were in no single case even remotely achieved. Further, these targets were developed using the most primitive methodology, and relied almost entirely on analysis and raw data supplied by the **gyokai** to MITI bureaucrats; the larger and medium firms in the **gyokai** set the terms

of MITI's policies, and the smaller and outsider firms were relatively unaffected by it. Consequently, the fact that MITI published machine tool planning documents does not suggest a rationally designed strategy for the industry written by bureaucratic regulators. In every dimension MITI "planning" was ineffective.

Consider first the actual statistical record of the machine tool industry as compared to the goals that the 1956-1960 and 1961-1965 plans set. If MITI possessed the power to affect industrial outcomes, or in Johnson's words utilize the authority of the "absolutist state," there should be a fairly good correlation between the objectives it stipulated and what targeted firms actually achieved. Figure 3.2 presents planned reductions in production costs for the 1956-1960 and 1961-1965 periods against what the industry in fact achieved for all machine tools and for selected individual categories of equipment. The Rationalization Plan called for a 20% reduction by 1960, and the Recovery Plan set a 15% reduction by 1965. But for all machine tools, unit costs actually *rose* in 1960 by 121%, and by 9.4% in 1965.

Figure 3.2

Planned and Actual Changes in Production Costs, 1960 and 1965



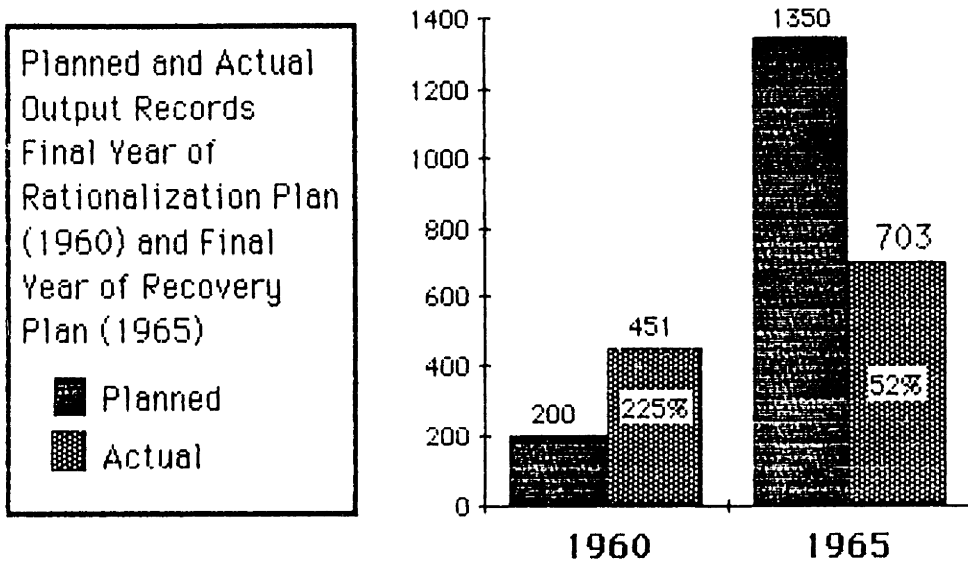
Production cost data was calculated from raw data on specified machinery in the "Seisan" [output] section of *Hahanaru no Kikai*, pages 104-111.

In the case of grinding machines and lathes production costs also increased for both years, lathes showing increases in the 1-2% range and grinders rising an enormous 287% by 1960 and 1.2% by 1965. Only boring machines and mills showed decreases but the magnitude of the reductions was between 30% and 50% less than targeted. By any measure, the plan's production cost decrease objectives were a failure.

The same is true of the production volume targets. The Rationalization Plan sought to boost annual output to ¥20 billion by 1960; the target of the Recovery Plan was ¥135 billion in 1965. Figure 3.3 demonstrates that actual results varied widely from planned values. Output in 1960 was ¥45 billion, or 225% of the planned value, where output in 1965 was only 52% of the plan at ¥70 billion. Again, bureaucratic targets had little effect on industry performance.

Figure 3.3

Planned and Actual Output, 1960 and 1965

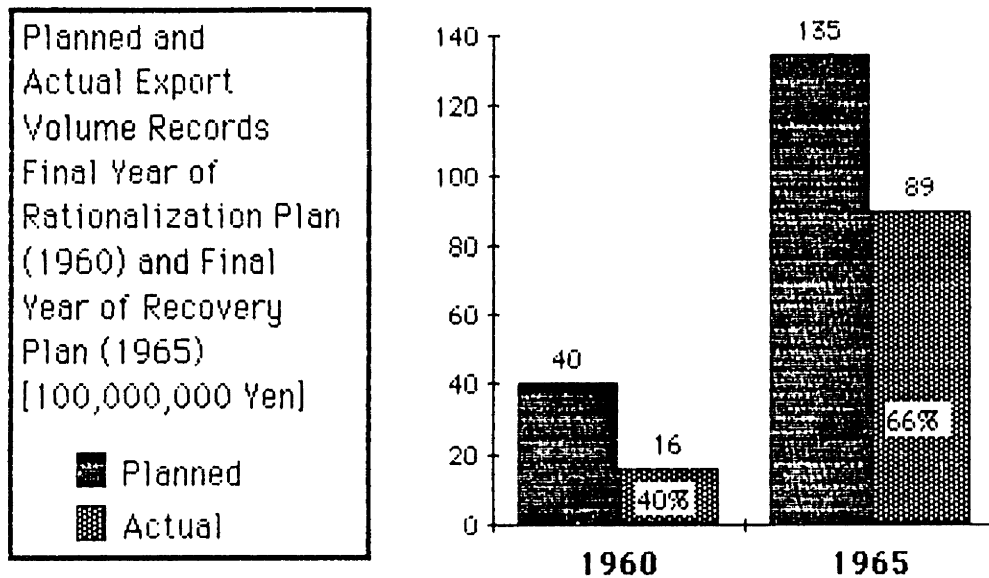


Data from *Hahanaru no Kikai*, page 121.

MITI's export goals in the Rationalization and Recovery plans also went unfulfilled; exports were to have been ¥4 billion by 1960 and ¥13.5 billion by 1965. But as Figure 3.4 shows exports in 1960 were just 40% of the planned amount, and in 1965 they were only 66%.

Figure 3.4

Planned and Actual Export Volume Goals, 1960 and 1965

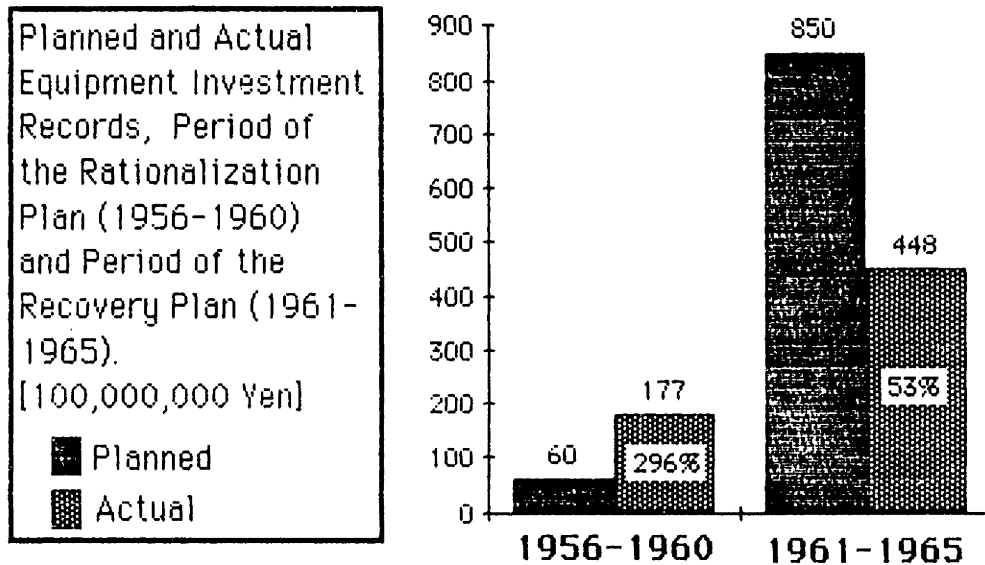


Data from *Hahanaru no Kikai*, page 121.

Next, both sets of plans established investment targets for machine tool firms. Their goals were set as investment volume in designated, or preferred tools and for other tools for the full five years of each plan. The total for 1956-1960 was to have been 6 billion yen, and for the period 1961-1965, 85 billion yen. Once again planning goals were at wide variance with what nominally "regulated" firms achieved. Investment was 296% of the plan in the first period, when economic conditions were relatively good, and only 53% of the target in the second period when production volume and demand declined. Figure 3.5 illustrates the poor relationship between investment goals and actual industry activity.

Figure 3.5

Planned and Actual Investment Targets, 1956-1960 and
1961-1965



Data from *Hahanaru no Kikai*, page 65.

Finally, in the field of product technology as well targets were not effective in inducing responses among machine tool firms. The Recovery Plan had stipulated "efficient" lot sizes for specific types of machine tools; optimal lathe lot size production, for example was set at 50 units. A survey by the **gyokai** in 1967, a full two years after the plan had expired, indicated dismal compliance with recommended lot size production goals. The results of the survey are shown in Figure 3.6.

Figure 3.6

Compliance With Recommended Lot Size Production Targets, 1967

Machine Type	Lot Size	Number of Firms	Firms in Compliance	Percent Compliance
Table Boring Machine	300	7	2	28%
Ordinary Lathe	50	22	6	27%
Turret Lathe	50	8	1	12.5%
Automatic Lathe	50	10	5	50%
Standing Boring Machine	50	9	2	22%
Milling Machine	30	12	3	25%
Radial Boring Machine	20	13	3	23%
Bed Milling Machine	20	13	3	23%
Cylinder Grinder	20	8	2	25%
Surface Grinder	20	14	3	21%

Data from *Hahanaru no Kikai*, *Shiryo* section, pages 25-26.

Only in the case of automatic lathes did even 50% of the total producers achieve the planned goal; overall, an average of just 24% of the surveyed firms were building machines in "appropriate" lot sizes. A similar study by MITI, also in 1967, showed that even among the five largest firms, just 60% of production (15 types of machines out of 25 surveyed) was occurring in what the bureaucracy thought to be efficient lot sizes.³⁰ Thus, production technology regulation was a manifestly ineffective tool for prompting changes in machine tool company behavior.

There is not a single instance, then, in which the objectives set forth in the first two five year plans of the Machinery Promotion Law came close to realization. Since the planning documents were the basis for bureaucratic regulation during 1956-1965, it is difficult to claim that the machine tool industry was effectively managed by MITI. The record

suggests instead that MITI's planning system was both inaccurate in its assessments of the market and weak in its ability to compel business compliance.

The failure of the plans can be partially explained by carefully considering how MITI actually generates industry goals under legislation like the Machinery Promotion Law. Proponents of the statist view argue that MITI staff are the "best and the brightest" of Japanese society, developing comprehensive strategies which are enforced through legislative sanctions or by "administrative guidance"--the notion that Japanese firms and lending institutions obey whatever the government asks them to do even if they are not legally compelled to follow bureaucratic requests. This view seems to have developed from studies of industries composed of very large firms in oligopolistic markets like steel, oil or autos. In these cases, the number of firms subject to MITI regulation is small. Further, notoriously underpaid MITI officials routinely retire to large firms, a well noted process called **amakudari** (the descent from heaven), and build a cadre of former bureaucrats for regulators to contact. The conventional view imagines that through this network of former bureaucratic officials, the current MITI staff can supplement its direct planning authority with effective behind the scenes persuasion.³¹

Even in the oligopoly cases there are problems with the conventional view and dissenting opinions.³² It has yet to be shown whether **amakudari** increases the power of the bureaucrats or the firms they are supposed to be regulating. The development of government contacts by large enterprises is common to all industrial countries; with the change in an administration in the US, for instance, there is often a "fire sale" of former cabinet officials. Few would argue that the placement of these officials increases *state*

control; rather, it provides the enterprise involved with a potentially useful pipeline affecting policy decisions. The same is almost certainly true of Japan; large enterprises may find that their **amakudari** appointments pressure them to comply with what the bureaucracy wants, but it is inconceivable that these same employees do not lobby regulators on behalf of their new employers.

But even if large-firm dominated, oligopoly industries provide a context in which it is possible to imagine that MITI rationally plans and influences enterprise activity, the large majority of manufacturing industries are composed of smaller, constantly shifting firms. Given this structure, it is difficult to see how MITI can operate as it is said to do in more concentrated sectors. The number of different manufacturers MITI is supposed to regulate is huge, as the fact that there are almost three times the total number of manufacturing firms in Japan as in the US suggests. And the economic bureaucracy is internally divided into divisions that compound the problem; MITI's Industrial Machinery Division, which handles general machinery sectors (including machine tools) is responsible for a whole gamut of enterprises from those that build large-scale plant equipment to makers of extremely small, precise, medical or scientific tools. This includes firms making equipment for auto, food processing, textiles and chemicals industries involving such materials as cloth, food, paper, steel and plastics.

Thus, the regulatory load placed on the Industrial Machinery Division is extensive; the general machinery sector alone accounts for nearly 1/10 of all Japanese manufacturing establishments and value added, or 63,000 firms in 1982. Even in 1956 there were nearly 20,500 machinery firms in Japan. Managing all of these firms in selected sectors was all but

impossible.³³ For instance, the Machinery Promotion Law of 1956, itself only one of several industry bills, designated 33 different sectors for the type of planning effort discussed above in the context of the machine tool industry.

The large constituency for which small bureaus in MITI are responsible raises acute problems of obtaining intelligent information let alone actually making policy for a particular industry. In the usual, non-oligopoly sector case, there is no network of former officials from which to draw 'trusted' observations, nor can MITI try and utilize former bureaucrats to influence company behavior. There are no **amakudari** placements in any of Japan's machine tool firms; veteran **gyokai** officials could not recall that there had ever been one in the history of the industry.³⁴ Indeed, the small-scale, fragmented nature of Japanese manufacturing also precludes the bureaucracy from trying to guide sectors through secondary actors like leading contracting companies or banks: unlike autos and oil, machinery finance is dispersed among a large number of banks and other lending institutions while central, dominant firms are non-existent.³⁵

Staffing problems and employment practices within MITI itself further impede planning. The Industrial Machinery Division occupies a cramped space and is staffed with about 30-40 people. The professional members of the staff number about 20. Many of these are new entrants, whose long work hours in support of senior directors and duties such as answering telephones are essentially those of a secretary. The number of seasoned bureaucrats in the bureau may number between 10 and 15. These bureaucrats have the responsibility for developing plans applicable to scores of industries and thousands of firms.³⁶

But even experienced bureaucrats are not, in most cases, able to develop independent expertise in specific industrial areas. Emulating practices in many Japanese organizations, MITI regularly moves employees between totally unrelated jobs. All of its staff are scheduled to be rotated to new divisions every two years. The members of the machinery division may find themselves in sections like the International Information Bureau, a PR post, just as they begin to settle into the job of machinery regulation. Of course, in special cases, bureaucrats in the midst of important projects may be retained to complete their work; some will remain for much longer and provide a degree of continuity. But the two year transfer generally affects all staff, and is in fact the focus of promotional politics in MITI for individuals usually move up or down the hierarchy during the job rotational period.³⁷

As a consequence, staff in MITI bureaus frequently do not have autonomous expertise concerning any given industry, nor do they retain a comprehensive memory of the history of policies applied to a specific case. For instance, in interviews with members of the Industrial Machinery Division, the younger staff were completely perplexed by questions about machine tool strategies dating from the 1950s to the 1970s; middle-level staff could sometimes recall the measures but generally got the details wrong and the contribution of senior staff was to supply me with the names of former employees who might know what I was talking about.³⁸

MITI officials therefore face huge obstacles in regulating a particular industrial area. In the case of legislation like the Machinery Promotion Law, which mandates regular, published plans, successive documents are composed by ever-changing staff that have only general knowledge of the industries they are supposed to regulate. Consequently, the officials have

to rely on the **gyokai** for basic information, and they are forced to apply extremely simplistic techniques to obtain figures for their planning papers.

Both MITI and the **gyokai** confirm that the machine tool industry organization was the source of the ideas and data used in the Rationalization and Recovery Plans.³⁹ All product specifications and other statistical data were compiled by the **gyokai**. These were transmitted to MITI at a number of discussion groups; in turn, the Industrial Machinery Division wrote up the reports into a final document.

Members of the Industrial Machinery Division did attempt to argue for specific objectives in discussions and in the plan itself. But they employed crude, methodologically unsound planning techniques to arrive at the numbers that they generated. One technique was to simply extrapolate from periods of successful development what the future should be; if the industry had grown, say, during a three-year period in the past with investment running at 5% of income, then this 5% figure was used as a baseline for preferred investment over the five-year plan. Linear extrapolations of this type are fraught with problems, as product mixes, technological change and management capacities would each affect the preferred ratio of investment to income or output. A second method was to look at the largest, or what MITI considered to be the leading firms in the industry for clues as to what output growth, investment or exports should be like. The percentages and rates of growth recorded by these firms would then be applied across the entire industry.⁴⁰ Again, this technique overlooked differences between firms that arise from product differences or distinct market positions. Even the definition of "leading firm" and the choice of product specifications to list was problematic since one company might offer a

better machine in a particular product line, while another might be stronger in a different niche.

Moreover, reliance on the **gyokai** did not ensure that accurate data would be obtained, or that intelligent planning goals would be set. The **gyokai**, like prewar cartels, was always the scene of intense competition between member firms for market advantage. In a number of cases, the surveys that the **gyokai** used to establish baseline figures for company investment or other strategic information were ignored by the majority of its constituents because of fears that revealed information might lead to a competitor's advantage.⁴¹ Furthermore, the wide variance in **gyokai** company size, links to other firms, percentage machine tool specialization and other economic measures made it extremely hard to generalize from past experience, let alone plan for the future. Compounding the problem was the fact that the **gyokai** represented at best 75% of the industry; fully 25% was not part of its interaction with MITI at all.

When the constraints placed on the formulation of industry plans are considered, it is difficult to argue that MITI can, in fact, plan at all. The capacity to identify concrete goals and then to carry them out authoritatively is central to the notion of "plan rationality" advanced by Johnson and to others that advocate the statist argument. Yet, when planning experiences are examined in detail, Japanese practices reduce to little more than guesswork. Apparently detailed industrial targets had little or no validity; whatever the value of the numbers that eventually found their way into planning documents, MITI had no way to insist on their realization. Thus industrial goals were unrelated to industrial performance. The two essential elements of centralized bureaucratic guidance, the creation of valid goals and the authority to implement them were lacking in

the machine tool Rationalization and Recovery Plans of 1956-1965. Though machine tool and other machinery firms apparently accepted formal MITI authority as the price of obtaining promotional legislation, in practice this authority was not exercised. One reason was the reliance of MITI on the **gyokai**; another, as we shall see, was that private firms were adept at forestalling compliance with initiatives while securing material benefits in conjunction with various policies.

Financial Support and the Machinery Promotion Law

Next we will consider the effects of financial support provided in conjunction with the Machinery Promotion Law. The government provided financial assistance through the Japan Development Bank and the Small and Medium Enterprise Finance Corporation, supplemented by small research grants. Firms in designated industries were permitted to apply for loans.

Analysts who believe that MITI's policies shaped industrial outcomes argue that financial support had two consequences for Japanese development. First, it is thought that MITI directed capital to industries in the 1950s and 1960s that were short of financial options; by providing public support, the bureaucracy in effect nurtured the firms until they were seen as a better risk by private lenders. Thus, MITI's financial assistance produced early, initial growth that enabled successful postwar sectors to make future strides with private assistance. Second, it is frequently claimed that MITI "picks" industrial winners by targeting them for government financing. Private lenders realize that such sectors are to be promoted, and they seek to lend to selected firms because they know risks will be reduced through state intervention. Thus, even if the amount of

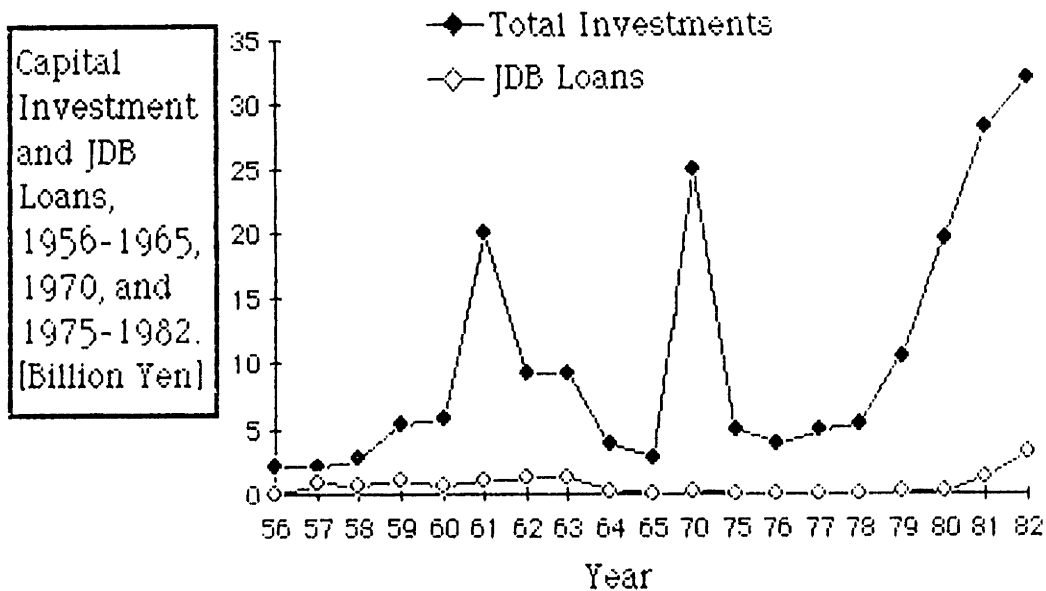
MITI's support is low, its effect is to guide financial institutions towards preferred industries.⁴²

Let us consider at the outset the notion that government loans produced early or consistent growth in supported industries. One way to evaluate this claim is to compare total investment to government assistance and to the record of expansion or contraction in a particular industry. If government support is a large percentage of total investment, or if periods of assistance correlate with growth, the statist argument would be confirmed. But we will show that government backed loans provided machine tool firms under the Machinery Promotion Law were only a fraction of total investment, and that they did not produce growth but rather correlated with recession.

Figure 3.7 presents total investment by machine tool firms against the value of JDB loans, which accounted for over 90% of all government support to the industry, for the periods 1956-1965, 1970, and 1975-1983.

Figure 3.7

JDB Loans And Total Investment, Machine Tool Industry



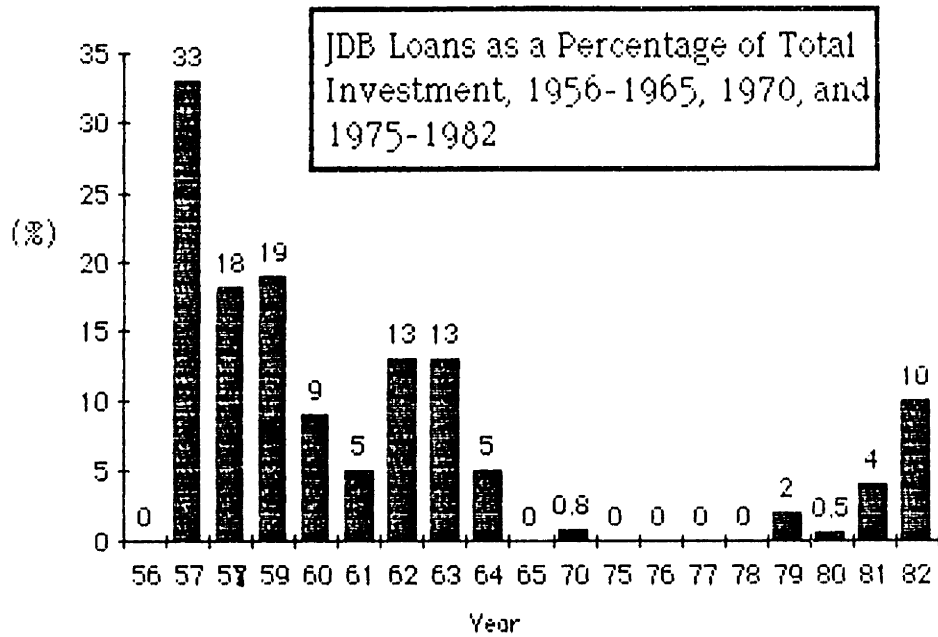
Investment data was calculated from the "Investigation of Imports of Metal Cutting and Metal Forming Machine Tools Under Section 232 of the Trade Expansion Act of 1962" submitted by Wender, Murase and White to the International Trade Administration, Department of Commerce, 1983, page 104; JDB loans from confidential data supplied to the author by MITI's Industrial Machinery Division. [Break in the data is due to lack of investment statistics for 1966-1969 and 1971-1974.]

Public loans were not a major component of total investment. In 1956-1965, during the Rationalization and Recovery plans, the total value of all government loans was just 11.51% of the total value of investment by machine tool firms. Then, government loans fell off to practically zero, recovering to just 3-5% in the early 1980s.

This pattern is highlighted in Figure 3.8 which depicts the running percentages of JDB loans as compared to total investment.

Figure 3.8

JDB Loans as a Percentage of Total Investment



Source: Same as Figure 3.7

Only in 1957 did government funds rise above 20% of capital needs in the machine tool industry, and even in that case only 12 firms of 40 in the **gyokai** and 303 in the industry as whole were recipients.⁴³ The averages fell until 1965, when JDB loans were 0% of the total, and only rose again in the 1980s. The period of heaviest support was in 1956-1965.

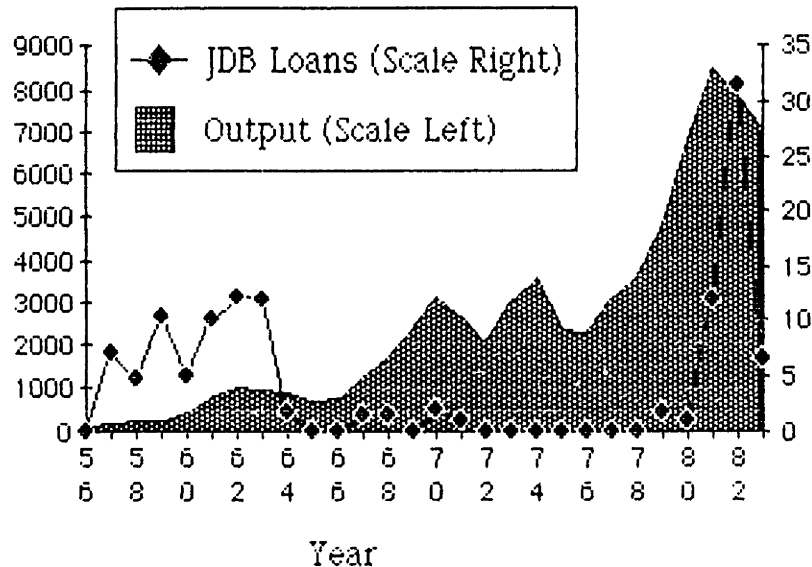
But it is clear that JDB loan support was heaviest in the 1950s when the machine tool industry was still mired in its postwar slump. Is it true that this government assistance enabled the industry to start its recovery and to begin to achieve its subsequent successes?

One way to evaluate this claim is to compare the degree of annual government assistance to industrial performance. If periods of heavy loan support correlate with growth, then the statist argument would be strengthened. Figure 3.9 illustrates the history of JDB loans to the machine tool industry relative to annual output.

Figure 3.9

Industry Output and JDB Loans, 1956-1983

JDB Loans and Total Output, 1956-1983 [100,000,000 Yen]



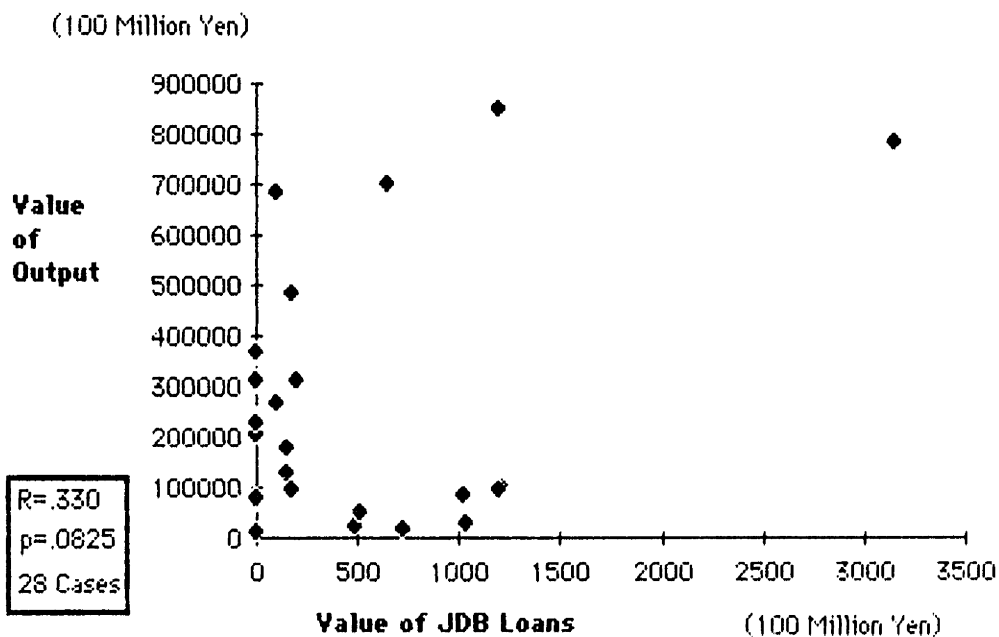
JDB loan data from MITI Industrial Machinery Division, *op cit.*; Output data from *Hahanaru no Kikai*, *op cit.*, page 121.

The patterns revealed in Figure 3.9 suggest that government loans do not associate with periods of rapid economic growth. The highest level of JDB outlays were recorded in the 1957-1963 period. Output was miniscule in the same years, although it did rise slightly. But this extremely modest success, if indeed it was, was quickly overshadowed by the fact that immediately following the outlays of the 1950s and 60s the industry went into a prolonged slump from 1962-1966. Apparently government support did not create a foundation for future expansion. In fact, machine tool recovery came only in 1967, when no JDB loans were made, and in the spectacular growth years of 1975-1980 there was almost no government support at all. Thus, the financial incentives provided by the Machinery Promotion Law not only failed to induce compliance with MITI's five year plans, but also were ineffective in stimulating general economic development.

These observations can be strengthened with statistical measures of the relationship of government investment to changes in machine tool industry output. In Figure 3.10, JDB loans are correlated with the value of machine tool output for the period 1956-1983. A high correlation coefficient (R) and a low probability value (p) would suggest that JDB outlays played a large measure in industry performance; a low coefficient and a high probability measure would mean that government assistance played almost no role.

Figure 3.10

Correlation Between JDB Investment and Industry Performance 1956-1983



As the scatterplot and related statistics make clear, there is no significant correlation between government assistance and industry development. The coefficient is very weak ($R = .330$) and the probability measure, $p = .0825$ is quite high, indicating that the observed connection between JDB outlays and annual production is close to random. If we stagger

the relationship between the timing of JDB support and output changes on the assumption that the effects of investment might lag behind annual results, the correlation coefficients actually *weaken*: the results for a one year lag are $R=.223$; for a two year lag $R=.158$. These observations support the claim that government financial assistance to the machine tool industry was ineffective.

Thus the claim that early industrial support led to long term growth is unconfirmed for the machine tool case. MITI authorized a modicum of loan assistance, but even when government activity was at its height (1957-1964) private lenders accounted for 88% of machine tool industry capital investments. And government loans failed to produce growth; during the period of sustained expansion government loan assistance was zero.

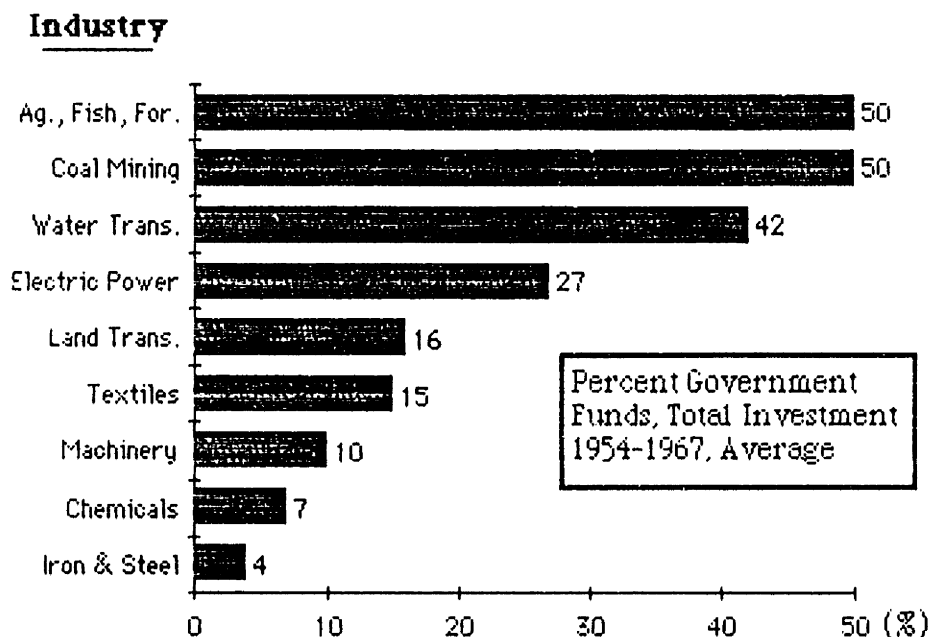
Next let us consider the idea that when an industry is authorized to receive funds from the JDB or other government lenders it is sanctioned in the eyes of private banks as a priority, low risk investment. If this were true then government finance may have made it possible for machine tool firms to receive private funds in the period of recovery more readily than otherwise would be the case. A crucial bit of evidence in support of this argument would be proof that the government only directed JDB loans to special, high growth sectors. This would suggest that the state selectively applied its support to induce private lenders to enter chosen fields.

However, if the sectors receiving JDB loans are examined we find that there is no case of a manufacturing sector which did *not* receive government financing. More significantly, the industries most heavily involved with government lenders were generally those that were left behind in the Japanese miracle--economic losers. Figure 3.11 graphically

illustrates the percentage of government funds in total investment for major industries between 1954-1967.

Figure 3.11

Percentage Government Finance in Investment, 1954-1967



Data was originally compiled by Akiyoshi Horuchi, "Economic Growth and Financial Allocation in Postwar Japan" (University of Tokyo research paper 84-F-3, August 1984) page 43 from the Bank of Japan, **Economic Statistics of Japan and Economic Statistics Annual**.

The industries with heaviest support, exceeding 50% in two cases, were agriculture, fisheries and forestry, coal mining and water transportation. Each of these sectors were chronic industrial problems in the postwar Japanese economy. In contrast, iron and steel, chemicals, machinery and land transportation had the lowest level of support, between 4% and 16%. These industries were the core of Japan's rapid industrialization.

If JDB and other government loans had acted as indicators of preferred investments, then Japan would have become an agricultural power rather than a manufacturing economy. But as we can see government support cannot have resulted in a shift of funds to high-growth sectors because finance was supplied across the board; private banks would not

have been able to distinguish between preferred sectors and others that were also receiving support. The pattern of state finance does not support the view that MITI was able to use JDB loans as rational, indicative policy tools. Rather it suggests that private interests induced MITI to provide funds when needed; unable to resist political pressures in sagging sectors, MITI was brought to authorize huge outlays for struggling industries. In contrast, growth sectors like machinery obtained a small, marginal portion of total public outlays which fell as their economic position improved. Politics, not planning, determined how government finance authorized under legislation like the Machinery Promotion Law was distributed.

To conclude our evaluation of the role of government finance in the machine tool industry's growth let us look at the program of experimental subsidies. As indicated above, support for company research dropped dramatically after the passage of the Machinery Promotion Law. Indeed, from 1965-1977 only 16 firms received subsidies totalling ¥455 million, or about \$1.8 million.⁴⁴ As compared to total capital investment, research subsidies amounted to less than 1%. The insignificance of this program can be further appreciated by comparing it to just one of several machinery research programs operated in the United States by the Department of Defense such as the Manufacturing Technology Program, or ManTech. ManTech's budget for the 1977-1981 period was \$745 million.⁴⁵

Experimental subsidies deserve additional discussion because even this fairly small funding program cuts against the view that MITI directed industrial activity. In fact, although the subsidies were one of a very few set of financial resources MITI had authority to disburse directly, it usually was not able to decide which firms and which proposals received funding. Rather, as a general rule, experimental subsidies were distributed at the

request of other government institutions, like localities, which were acting on behalf of the eventual recipient. For example, Riken Seiko, a small manufacturer of spark discharge and milling machines based in Niigata twice received developmental subsidies from MITI. The firm never had direct contact with the bureaucracy. Rather, it first negotiated with the Niigata prefectural government for assistance under a regional policy of subsidizing the technical advancement of local firms. Then, in an effort to offset proposed outlays made to Riken Seiko, Niigata officials decided to apply under MITI's assistance program. Eventually, MITI was induced to split the cost of the subsidy with Niigata.⁴⁶ The distribution of development funds, then, was not made according to plans drawn up in the central bureaucracy, but was part of the politics of regional support in Japan. Again, this example contradicts the idea of bureaucratic domination inherent in the statist view.

As it developed, a good deal of the research undertaken by machine tool firms was accomplished by the **gyokai** itself. Between 1956 and 1963, the **gyokai** funded a number of studies aimed at developing domestic manufacturing capability of tools produced by other countries; this effort was called "Joint Research for Achieving International Standards." The studies were undertaken at either a special research lab, or by universities. This joint research activity was not in any way the product of MITI's guidance; indeed, it was listed as a goal in the five year plans only because MITI was told in advance of the machine tool association's intent.⁴⁷

Nor did the research incidentally promote centralization. The results were published in the public domain, available to **gyokai** members as well as 'outsider' firms. Because many firms could take advantage of the **gyokai**'s studies free of charge, it may well be that their overall effect

was to increase the potential for new entrants in the market, or for product shifts by member firms. Consequently the research activity carried out by the **gyokai**, and the results of government subsidized studies acted against MITI's overall wish to centralize production.⁴⁸

MITI was powerless to implement its goals in the first ten year period of the Temporary Measures Law. It could not arrive at objectives that remotely bore a relation to the machine tool industry's actual market circumstances. Further, in the disbursement of funds, MITI did not have the ability to affect payouts according to its wishes, while the amount actually provided was at best marginal and had no correlation with periods of sustained growth. MITI officials, when asked to describe their recollections of the period smiled wistfully and suggested that they just paid out money while specifying fanciful goals taken from, as one official put it, "thin air."⁴⁹ Taken as a whole, the 1956-1965 period fails to confirm the statist hypothesis.

Cartels, Production Restraints and Machinery Promotion

If financial support was the only concrete outcome of machinery policy in 1956-1965, government and industry interaction subsequently underwent a sea change. For 9 of the 13 years between 1965 and 1978 the value of government disbursements was zero, and the *total* amount of JDB loans in the period as a whole never equalled the *annual* average level of 1956-1965. With the third extension of the Machinery Promotion Law in 1965-1970, and the passage of a new promotional measure called the Temporary Measures Bill for the Advancement of Designated Electrical and Machinery Industries [**Tokutei Denshi Kogyo Oyobi Tokutei Kikai**

Kogyo Shinko Rinji Sochi Ho] enforced during 1971-1978, the economic bureaucracy began to focus explicitly on changing the structure of the machine tool industry. Long dormant provisions regarding "concerted action for rationalization" in the Machinery Promotion Law and much stronger language concerning "rationalization cartels" in the later Electrical Machinery Law were repeatedly stressed by MITI as it urged, or threatened to force firms to centralize through mergers, cartels and product specialization.

Machinery policy entered a structural phase in which the bureaucracy pushed hard for centralized, scale production. Nor was the machine tool industry alone in this development; rationalization plans or merger schemes were rampant throughout the Japanese economy, including steel, autos and oil, to name a few key sectors. The precipitating cause of this transformation in industrial policy was capital liberalization in the aftermath of Japan's 1964 entry into the OECD. Reorganization concerns began to emerge as early as 1959-1960 as MITI anticipated the potential threat of foreign incursions into the market in its discussions with industry groups in its **shingikai**. These fears began to peak by the mid-1960s when many OECD member countries, led by the US, pressured Japan to comply with the terms of the agreement. The focus of this foreign pressure was on Japan's direct foreign investment and capital ownership restrictions, limitations that were authorized in surviving prewar legislation such as the Emergency Capital Regulation Act. By 1967 Japan began to relax restraints for selected industries.⁵⁰

Although the first liberalization measures were widely perceived to be cosmetic, the problem of foreign capital investments in the internal Japanese market led to profound anxiety; as Johnson succinctly observed,

"The very thought of capital liberalization struck terror into the hearts of MITI officials and Japanese industrial leaders."⁵¹ The reasons were complex, but essentially amounted to the belief that direct foreign investment would lead to increased foreign power in the economy, either through displacing domestic firms or in the purchase of Japanese companies by rapacious American-led investors. Capital liberalization was thought to be the leading edge of an American dominated flood of world producers into Japan, a development MITI believed would overwhelm what it perceived to be smaller, vulnerable domestic firms. Thus MITI bureaucrats, for whom economic nationalism was (and is) the basic justification for pursuing regulatory programs were appalled at the thought they might preside over the dilution of Japanese business in the implementation of relaxed capital investment laws.

The bureaucracy's response was to seek to centralize and increase the scale of enterprises throughout the economy through mergers or cartels. Their idea was that companies with capital links to larger firms, or enjoying price advantages conferred by mutual agreements with competitors would be less vulnerable to capital takeovers from abroad. Moreover, as in the prewar years MITI constantly measured the strength of individual firms or whole sectors by comparing Japanese plant scale with the size of American or European operations. It was believed that in order to compete with huge foreign firms, particularly American enterprises, Japanese companies would have to attain rapidly the same levels of capitalization, scale, and output in their operations. Capital liberalization therefore induced a "company scale panic" among MITI bureaucrats; the mid-1960s witnessed intense struggles between the government and a variety of industries as MITI repeatedly attempted to force mergers and consolidation.

The cartelization and merger policies MITI adopted have assumed primary importance in studies emphasizing the importance of the bureaucracy in fostering and guiding the Japanese economy. Scholarly proponents of the statist thesis and industrial leaders of trade-impacted American industries see these strategies as part of a grand state sponsored scheme to reduce production costs by forcing firms to increase scale while assuring them of cartel profits to be used for additional investment. A group of Japanese and American scholars has recently argued that the cartels and other informal devices MITI used to induce consolidation in various industries permitted affected firms to expand faster and with less risk towards efficient production levels. One study, widely quoted in Japanese literature, contended that there were over 1000 postwar cartels authorized by MITI and took this as evidence of the scope of the bureaucracy's control.⁵² Other academics view the cartelization and structural schemes of the 1960s as a consolidation phase following the nurturing activities of the 1950s and early 1960s; the government is seen as managing the trajectory of firms towards "maturity."⁵³ Finally, American and European industrialists excoriate what they see as cartels in the 1960s and 1970s as unfair trade practices conferring competitive advantages through collusion among Japanese producers.

Machine tools provide an excellent case for evaluating whether these arguments are correct. From 1965, members of the **gyokai** were under direct pressure to merge, form cartels, restrict output to promote product specialization, enhance scale economies and to reduce interfirm competition. Moreover, machine tools are explicitly cited by studies which advocate the centralization hypothesis; Johnson contends, for instance, that the 1966 Nakayama Committee report, which called for "mergers or

cooperation" among seven industries including machine tools as a response to liberalization, was the basis for MITI's "very successful efforts to link the electronics and machine tools industries."⁵⁴ Since the fusion of electrical control devices and cutting tools led to the rapid growth of NC equipment, the claim is that the credit for NC development must be given to MITI and its reorganization schemes. Yamamura states that there were 17 cartels authorized in machine tools in support of his claim that MITI-inspired collusion was both widespread and effective in promoting Japanese high speed growth.⁵⁵ And, of course, the Houdaille petition against imported Japanese machine tools simply referred to the industry as a "cartel" run and guided by the state.

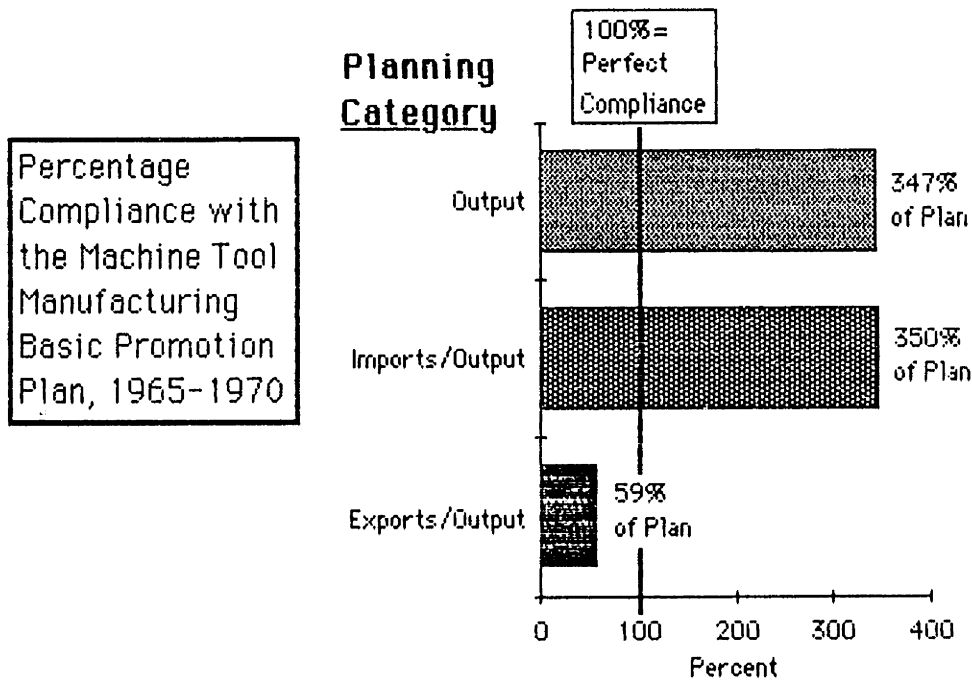
We shall see that these claims seriously misinterpret the nature and development of machine tool industry reorganizational measures. Indeed, we will see that even to apply the word 'cartel' to the machine tool case is incorrect; the **gyokai** emphatically rejected plans to impose so-called "recession cartels" which Yamamura maintains assisted in the accumulation of low-risk capital in postwar Japanese industry. Indeed, the explicit purpose of the "groups" the **gyokai** did set up was to *subvert* MITI's plans for consolidation. Further, we will demonstrate that both public and private structural plans were utterly ineffective, and that in particular they had no influence at all on NC development. The actual institutions that did result from MITI's reorganization efforts were weak, so much so that they rarely lasted for more than two or three years as formal, let alone operating, bodies. As in the prewar, and the earlier application of the Machinery Promotion Law, politics sharply attenuated bureaucratic initiatives.

Structural policy debate in machine tools began when the Machinery Promotion Law of 1956 was extended for the third time for a five year

period beginning in 1965. As before, submissions from the **gyokai** and individual firms were consolidated into a five year plan entitled the "Machine Tool Manufacturing Basic Promotional Plan." Part of the new plan resembled its successors in setting output, export, import and investment goals and in calling for various technical improvements like low cost NC machines or the creation of export organizations. For instance, production was to have been 90 billion yen while exports were targeted to rise and import dependence was to have been reduced to 22% of output by the end of the plan. But the chronic problems of the 1956-1965 planning periods still obtained so that MITI's effort was no more effective in the third attempt; as Figure 3.11 illustrates, firms either fell short or exceeded all of the targets by wide margins.

Figure 3.11

Degree of Compliance, Third Promotional Plan, 1965-1970



From *Hahanaru no Kikai*, page 67.

But the plan put unprecedented emphasis on structural consolidation [**taisei seibi**] as it attempted to utilize the "concerted action" clauses of the original Machinery Promotion Law. The Basic Promotional Plan called for cooperation among producers of similar machinery to promote proper production scale. It also suggested that "groups"--a term that we will discuss in detail below--should be the locus of efforts aimed at centralizing the industry through cooperation leading eventually to joint ventures and mergers.⁵⁶

The 1965 plan was updated in 1968 as the capital liberalization panic reached its peak. In July, MITI published a Basic Promotional Plan for the Metal Cutting Machine Tool Manufacturing Industry [**Kinzoku Kosaku Kikai Seizogyo Shinko Kihon Keikaku**] as part of an attempt to build a

comprehensive strategy in response to the elimination of foreign capital restrictions. Under the plan all companies would halt manufacturing machines for which their market share was less than 5% of total **gyokai** production in the appropriate category of equipment (i.e. lathes, mills, etc.) and which amounted to less than 20% of their product mix. The intent of this policy, which was known as the 5%-20% rule, was to force firms to specialize in the production of only major types of machines, enhancing their scale of production and reducing overlapping competition. This would eliminate the perceived problem of many companies making machines in low, uneconomical lot batches to gain a market footholds against more established firms. In addition, the 1968 plan reiterated the earlier call for "group" cooperation and individual firm collaboration as a means of increasing scale and centralization.⁵⁷

After the Machinery Promotion Law was finally allowed to lapse 15 years following its enactment in March, 1956 the trend towards structural policies was continued under the Electrical Machinery Law of April, 1971. The law affected a much broader set of firms and industries as it included electrical sectors with the previously regulated machinery industries. Its overall objective was to promote the use of electrical components in machine design to bring about pollution and cost reductions as well as promoting the development of manufacturing "systems" of unified, computerized production. The law was particularly concerned with the development of electrical machines that would themselves create technical or manufacturing advances in other industries.

The provisions of the law were similar to the Machinery Promotion Law in calling for MITI to draft industry plans for the producers of designated machinery. NC tools were among the set of equipment that

received special status. In comparison to the Machinery Promotion Law, however, the "concerted action" clauses of the Electrical Machinery Law were strengthened. A system of "rationalization cartels" was created for the advancement of designated machinery sectors. The insertion of a cartel clause reflected the concern MITI still retained regarding capital liberalization and its search for policy tools to meet the perceived crisis.⁵⁸

The explicit mention of rationalization cartels was a step beyond the vague "concerted action" phrases of the earlier legislation. Rationalization cartels were the major policy tool under which MITI authorized joint action by industries in the postwar period. They were to be permitted in individual cases when MITI felt an industry's structure needed to be repaired or "rationalized;" the very vagueness of the term permitted MITI to try and expand its power by interpreting the conditions for authorization as broadly as possible in a bid to centralize the economy. Indeed, Yamamura has argued that their development in the 1950s was a systematic effort to strip the American-sponsored Japanese antitrust laws, permitting rapid growth among designated firms by maximizing their market stability and income. We will see that this is probably what MITI thought it was achieving, but that industry opposition transformed the cartels into much weaker bodies that actually were designed to thwart the centralizing intent of the initiatives.⁵⁹

Financial support was to be provided to designated industries, but - there were no loans to the machine tool sector of any consequence between 1971-1978. Two other organs were set up, one to advance loans to producers of "system" engineering or integrated machine tool production in 1971, and another to provide long term leases to purchasers of safety or energy saving equipment in 1972. Overall, however, financial support was

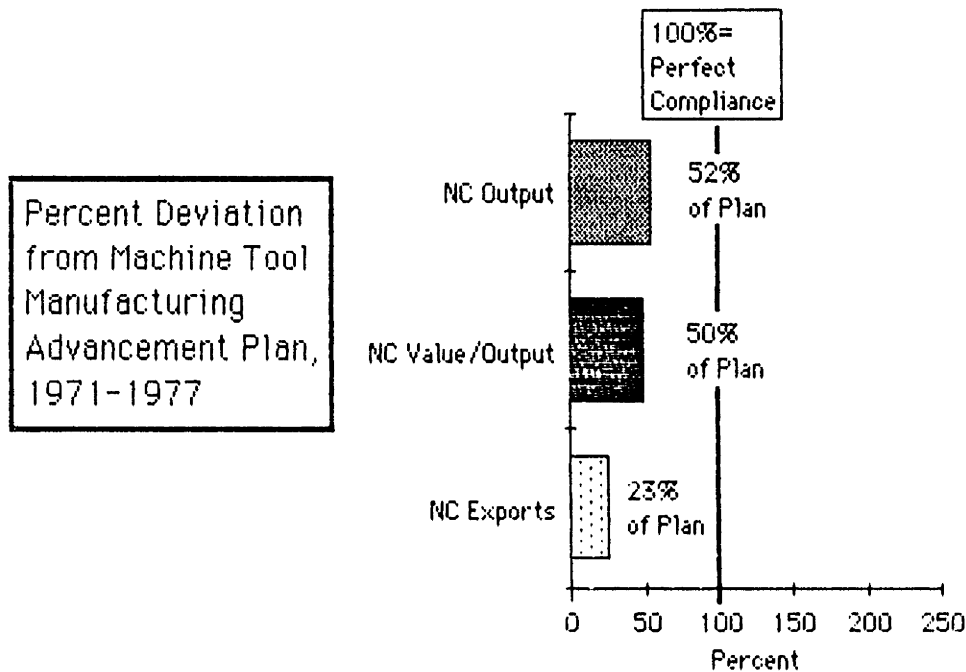
even more negligible under the Electrical Machinery Law than the Machinery Promotion Law.⁵⁰

In accordance with the law, and after the usual round of consultations with and submissions from affected industries MITI published a plan for the machine tool sector entitled The Machine Tool Manufacturing Advancement Plan. 'Advancement' [**kodoka**] in this context meant the stimulation of more sophisticated products. The plan first established various performance targets for the industry's production of NC equipment. It called for NC tools to amount to 50% of the value of total production and for NC output to be 151 billion yen with NC exports of 15 billion yen by 1977.

As before, the planning targets were wide of the mark. Figure 3.12 shows that the value of NC output and the ratio of NC tool value to total output was only half the target while NC exports were only a quarter of the planned amount.

Figure 3.12

Compliance With the Machine Tool Advancement Plan, 1971-1978



From *Hahanaru no Kikai*, pages 67-68.

The plan also set a 1977 deadline for the development of a nine unit manufacturing system.⁶¹ This system would link such NC tools as lathes or machining centers to a central computer. In fact, the attainment of this system was trivial; more difficult was application of a nine unit manufacturing 'cell' to actual production needs, a problem that is still the focus of work in most machinery producing countries.

Finally, echoing the explicit desire to centralize and consolidate the machine tool firms that was first expressed in the 1965 Promotion Plan, the Advancement Plan called for further specialization to increase scale economies. It also sought joint activity in such areas as production, exports and technology; once again the idea that "groups" would assist in reaching these goals was suggested.⁶²

The references to cartels and cartel-like arrangements found in legislation and plans throughout Japanese industry are the main source of the belief that Japan's economy is centrally directed. The intensity of the Japanese government's push for consolidation in sector after sector, and the apparent blessing given these efforts with the regular passage of authorizing legislation in the postwar era seems to provide overwhelming evidence that the structure of Japanese manufacturing enterprises was regulated and fostered by the bureaucracy. Indeed, in the case of machine tools, MITI's relentless effort to promote product specialization and joint coordination of production, its apparent authorization of "group" activity by machine tool firms, and the establishment of concrete manufacturing volume targets--the 5%-20% rule set up in the 1968 Basic Promotion Plan seems to suggest that a machinery "cartel" deliberately fixed production to enhance scale economies, and then orchestrated an export blitz which succeeded due to the resulting low cost of Japanese tools.

This argument and the statist, centralization perspective it supports is not without some validity. It accurately describes what MITI itself thought it was achieving; since the late 1920s, the economic bureaucracy had consistently attempted to push domestic manufacturers into ever larger production units, authorizing cartels or other joint activities to foster this aim. At the same time, as we saw in the prewar market restraint schemes by large firms, portions of affected industries have been willing to cooperate, or even instigate cartel-like arrangements provided that they were of benefit given their individual corporate positions. Although this frequently meant that a given firm wanted cartels just so long as it could run them, it cannot be denied that private interests were often as eager as the bureaucracy to try and implement consolidation programs.

But we cannot assume that MITI efforts, even coupled with the ambitions of politically powerful companies resulted in actual structural transformations. The prewar cartels and specific industry laws, even under wartime emergency conditions were miserable failures in inducing the consolidation and market stability sought by both the bureaucracy and the larger firms. We will show that, for many of the same reasons, postwar structural transformation policies were no more effective.

Let us examine two related arguments about the consolidation effort of the mid 1960s and 1970s. One is the notion, central to the statist thesis, that cartels or cartel-like activities were devised and imposed by MITI on the industries it sought to regulate. The other is the belief that cartelization, whatever its source, in fact led to consolidation or transformation as envisioned by the bureaucracy.

The history of the machine tool industry provides unequivocal evidence that neither claim is true. Manufacturing plans in both 1965-1970 and 1971-1978 arose from **gyokai** production schemes that predated MITI's concern with reorganization by 10 years; moreover, the schemes were failures. Later, the references to "groups" and to percentage production targets such as the 5%-20% rule do not reflect bureaucratic guidance; rather, as we will see in detail later, they were a cosmetic attempt to respond to MITI's pressures--and obtain state support during a recession--while much stronger MITI control proposals were rejected out of hand. Again, none of these "group" or production specialization schemes worked, especially with respect to the development of NC tools; markets and market shares of machinery firms were extremely volatile in the period of apparent cartelization. Careful analysis therefore shows that postwar centralization policies were as empty as those in the prewar.

The politics surrounding the cartelization schemes of the mid 1960s capital liberalization disruptions are rooted in much earlier machine tool industry measures initially undertaken without MITI knowledge or design. As early as 1957 the **gyokai** attempted to institute a production restraint program. As we have seen, machine tool producers were still experiencing a deep recession; demand was so depressed that even the Korean War boom, which was the catalyst for postwar growth in industries like automobiles failed to lift machinery producers from their economic stagnation. The problem of lagging demand seemed intractable because companies could not secure a stable enough return to make investments in new equipment or research.

The members of the newly-formed **gyokai** thus had incentives to find a way to stabilize their markets while increasing their return. In many respects their concern was identical to what large firms had faced in the prewar license scheme and in **toseikai** groups in trying to fight off competition from smaller producers. The larger members of the **gyokai**, all of whom were prewar veterans, were suffering from competition at the hands of smaller, new market entrants and from their fellow members who would switch to new products at the first sign of economic promise. Competition was so intense that firms often had to sell at a loss to maintain a market presence; established firms believed that this unfairly cut the profit margin on their products. They argued that whatever limited-demand did exist should be concentrated in a few companies rather than spread out among several small scale uneconomical producers.

In the prewar, the solution had been to try and standardize equipment and then to limit the pool of possible producers through licenses. The postwar response was similar. Machine tool firms tried to reduce

competition by promoting specialized production and limiting entry into market segments already occupied by **gyokai** members. The first step towards building a regulatory apparatus for dealing with these concerns was taken in August, 1957, when a "production field discussion committee" was set up as one of the special standing bodies of the **gyokai**. Its initial task was to survey the current types of machines produced by member firms, and to develop baseline data on company market shares as well as import penetration.⁶³

But divisions among **gyokai** members over how to create restraint measures made it extremely difficult to develop a system to which all the machinery producers could agree. Three years passed without a plan. Finally, in March, 1960, under the leadership of a new chairman, the committee proposed a draft strategy for encouraging specialization and discouraging competition. Its central concept was to "not produce machinery that was not currently under production, and to concentrate production only on the main types of machines rather than subsidiary types among a firm's product mix." Each company would voluntarily provide the **gyokai** with a statement of its representative types of machines which would then be compiled into an "agreed machine type list." This list would be the basis for determining which types of tools a firm might produce or concentrate on.⁶⁴

Though substantial progress was made towards an agreement, some **gyokai** members again balked. Depending on a firm's product mix, especially whether a company had already moved into growth fields or was saddled with outdated products, a restraint system based on previous production records could be either beneficial or a threat to future stability. After more negotiations, the proposal was later watered down to read that firms would "endeavor not to expand into fields for which they had no actual

production records," and was adopted as a formal agreement [**moshiawase**] in November, 1960.⁶⁵

The 1960 agreement was not in any way a product of MITI's planning or influence. Although the Machinery Promotion Law of 1956 expressly provided for "concerted action" and set up a system of applying to MITI for authorization, the **gyokai** never based its agreement on the terms of the law. It never submitted any documents to MITI for approval; indeed, as we will discuss later, it tried to have its agreement retroactively authorized under the Machinery Promotion Law in 1968 to ward off pressure from the Fair Trade Commission and possible foreign criticism. In Industrial Equipment Division discussion groups MITI was, of course, aware of the machine tool industry's activity. But officials recall MITI's role was that of a cheerleader, urging the participants on while having no direct influence on the application or definition of the restraint scheme.⁶⁶ It quickly developed that MITI had little to cheer about. All of the collective action problems that bedeviled prewar cartels returned, compounded by the problem of new **gyokai** entrants and competitive pressure from "outsider" companies.

Inter-company mistrust was the primary obstacle to pushing forward with production restraints. As markets shifted, firms would try and move into areas that they were supposed to be prohibited from entering, while companies in profitable markets would argue that their own production records entitled them to exclusive production rights. In addition, the **gyokai** had difficulties with new products. Under the terms of the agreement, a firm contemplating a new tool would have to notify the **gyokai**, but whether that meant it then had exclusive production rights was undetermined. In fact, the definition of a new tool was problematic; when a

piece of machinery was only slightly modified, did it fall into a new or existing production category? **Gyokai** members argued both ways according to their individual interests. The fact that all reporting and production notification was completely voluntary deepened mistrust since one firm might suspect another was modifying its reports to leave its market options open.⁶⁷

New entrants in and leavers from the **gyokai** further confused matters. New members had to establish what their main and subsidiary products were and then be appraised of relevant production limitations. Departing members would be free from whatever constraints might have once existed on their product plans and possibly disrupt orderly development in certain machine tool classes. 1957-1965 saw one of the most active periods of member movement; membership rose from 63 to 105 firms while 14 left the **gyokai**.⁶⁸ This unsettled climate precluded effective production management.

Then there were the "outsiders" with no connection to the **gyokai**, thus under no obligation to observe the restraint agreement. Theoretically MITI might have been able to compel all machinery producers to follow the agreement's terms under the provisions of the concerted action clauses of the Machinery Promotion Law. However, the bureaucracy clearly did not have a basis for invoking the clauses since the measure was not in any way linked to the law. Moreover, like the prewar MCI in the case of the Important Industries Control Law, MITI was politically constrained from using its authority; there is no example where outsiders in any of the machinery industries were forced to obey a **gyokai** policy though MITI's activation of its regulatory authority.

Consequently, outsiders could produce and price as they pleased. Their influence varied from sector to sector, but in some areas of machine tools outsider firms were the largest single manufacturers. A good example is Mori Seki, which joined the **gyokai** in 1983 only after trade friction prompted it to enter an emergency export control program due to US complaints. In 1981, still an outsider company, Mori Seki controlled 22% of the NC lathe market, the largest share of any Japanese firm, and was among the top three machine tool companies overall.⁶⁹ Clearly, attempts to regulate prices and competition in specific product niches were frustrated by the influence of outsider machinery makers not subject to the provisions of **gyokai** agreements.

The myriad difficulties involved in the establishment of a production agreement led the **gyokai** to completely revamp its operation a scant 2 1/2 years after the initial agreement. In 1964, the "production field discussion committee" was abolished and a new "enterprise structure committee" was set up in its place. The new committee proposed to do away with voluntary report submissions and base decisions about which firms could produce what products on the basis of prior production records. It sponsored a series of studies of member firm output dating from 1962, compiling the results into a large chart with company names on the vertical axis and machine types on the horizontal axis. Special markings were then used to indicate whether a firm had prior records in the case of a certain machine, and to show whether the machine was a major type or a subsidiary subject to production restraints.⁷⁰

The new proposal had considerable support because the machinery industry was in the midst of a prolonged slump lasting from 1962-1966. In November, 1964, a new pact was approved as the "Agreement Concerning

Concentrated Production" [**Shuchu Seisan ni Kan suru Moshlawase**]. Its objectives were to enhance the growth of member firms to the "appropriate scale" by reducing price and product competition through specialization. This scheme was called "product field regulation " [**Seisan Bunya Taisei**]. Companies were asked to concentrate production only on those tools for which prior notification of production had been made to the **gyokai** between 1962-1964. Production of machinery for which prior notice did not exist was prohibited. The agreement also called for (but did not set up any system for achieving) domestic production of Imported products, cooperation in technical matters and technical tieups with foreign firms.⁷¹

Again, the new product field regulation agreement was not in any way associated with MITI or the Machinery Promotion Law; it was a policy conceived and directed by the **gyokai** members themselves. Later it would become the major model for discussions and debate about industrial reorganization between MITI and the **gyokai**; during the period of capital liberalization, a modified version of the agreement was placed in the 1968 supplemental plan discussed above. However, the eventual insertion of the **gyokai's** internal production restraint scheme into a bureaucratic document does not represent a triumph for MITI; indeed, the political history of regulation from 1965 shows that MITI was forced to accept what the **gyokai** itself had developed as the only form of reorganization policy acceptable to machine tool companies. To see how this is so, we must examine what the bureaucracy sought in the midst of the capital liberalization crisis and the response of the machine tool industry.

The fallout from Japan's entry into the OECD hit the machine tool industry just as economic conditions were weakening the **gyokai's** position relative to the bureaucracy. From 1962 to 1965, the value of total machine

tool production fell 30%, from 100 to 70 billion yen. 13 firms in the **gyokai** went bankrupt, or about 12% of its membership at that time.⁷² The prolonged slump led the machine tool firms to petition MITI for various demand stimulation measures; in 1964, for instance, a petition was submitted calling for the restrengthening of the "scrap and build" policy by which capital goods markets were to be stimulated by providing write-offs to machinery purchasers.⁷³

For its part, MITI regarded the machine tool industry as among the "sick men" of the Japanese economy. Growth was unremarkable and unstable; imports were, as of 1965, still at 20% of domestic production, one of the highest levels of import dependence in any manufacturing sector.⁷⁴ Fear of foreign takeovers and increased market penetration were at their peak.

MITI's response to the **gyokai** was to make the provision of demand stimulation measures conditional on the consolidation of machine tool firms. The bureaucracy wanted to force firms to merge, counteracting a structural fragmentation it thought was the real root of the industry's problems and which seemed especially vulnerable to the harmful effects of capital liberalization. It announced that it would not move ahead with any action designed to support the slumping machinery industry until mergers were carried out.⁷⁵

But weakened though it might be, the **gyokai** flatly rejected any idea of merging: as one president of a major manufacturer who was active in the 1960s period put it, "they told us to form into larger companies. We told them 'the hell with that' and refused."⁷⁶ MITI countered with a proposal for the imposition of "recession cartels," a policy device that, as we have

described above, it had used in other sectors to try and foster joint production and pricing collusion.

Again the **gyokai** refused. It answered with a special 'white paper' called "The Current Situation and Countermeasures for the Machine Tool Industry" [**Kosaku Kikai Kogyo no Genjo to Taisaku**]. It reviewed the machine tool industry's slump while reiterating the need for government support to stimulate demand. The bulk of the document was dedicated to a point-by-point rejection of recession cartels. The major reasons provided by the report were that the wide number of products and uncertain demand for machine tools meant that such cartels would not be effective; the actual reason was that **gyokai** members were no more interested in recession cartels than in mergers. In place of either cartels or mergers, the document argued for loose federations of firms that would share in certain daily operations such as public relations, joint use of specialized machinery, and eventually even in the joint production of similar machine types. Eventually, the report suggested, these sorts of joint arrangements might lead to the kind of mergers and controlled markets that MITI felt were desperately needed to defend against foreign capital.⁷⁷

The position of the **gyokai** staff itself seems to have been that MITI's objectives were generally in the right direction but were too much too fast. They also wanted to build a basis for future consolidation, but as the difficulties of the production restraint agreements indicated, member firms were adamantly opposed to any arrangement that would reduce their own corporate independence.⁷⁸ However, continuing recession and the hope for government demand stimulation meant that the vague ideas about joint action mentioned in the 1965 white paper had to be translated into some form of concrete action to satisfy the bureaucracy. The **gyokai**'s solution

was to borrow an English word to distinguish the joint action they contemplated from MITI 'cartels'; it called for the formation of a series of "groups" [**gurupu**] among member firms each composed of a select set of companies.

The idea of groups and their overall purpose were defined entirely by the **gyokai**. The notion was that if companies producing the same machinery were consolidated into cooperative organizations, then joint research, joint production, coordination of sales and marketing might be achieved. These groups would thus be able to foster the kinds of production controls and scale economies MITI sought, while building the basis for future coordination that **gyokai** staff wanted. At the same time, member firms would not lose their corporate identity to the groups they joined.⁷⁹

Thus, even as originally contemplated the notion of "groups" was a far cry from what MITI sought. But achieving even this modest consolidation goal turned out to be difficult. First, negotiations between machine tool firms considering group affiliation were conducted. No one knew which group was best or what the groups would actually lead to, so suspicion was high; last minute plans for various affiliation schemes were proposed and fell through in what one trade journal described as resembling a "noisy marriage whirlwind."⁸⁰ The problems were complicated by MITI pressure; representatives from the Industrial Machinery Division would attend meetings and call for various group schemes, usually involving the subjugation of a number of small firms behind a large group leader like Toshiba or Ikegai.⁸¹ MITI wanted to use a large company as a capital buffer and consolidation focus for smaller firms, a strategy it also tried to apply in other sectors like autos. Its entreaties were ignored. Finally, on December 13, 1965 a breakthrough was made: the "**Dai-ichi** [first] Group"

was formed. In response, other machine tool firms joined up and by May 17, 1966, 9 more groups were organized. Figure 3.13 illustrates the groups and their members:

Figure 3.13

Groups Formed in the Machine Tool Industry, 1965-1966

<u>NAME</u>	<u>DATE FORMED</u>	<u>PARTICIPANT FIRMS</u>
Dai-Ichi Group	December, 1965	Hamai, Hitachi, Ikegai, Toyoda, Tokyo Tosemitsu, Kashifuji, Japax
Tokyo Group	February, 1966	Makino Mill, Mitsui, Toshiba, Niigata
Central Group	February, 1966	Enshu, Okuma, Osaka, New Japan, Nippei
Automatic Lathe Group	March, 1966	Towa, Kondo, Taiyo
Standard Group	March, 1966	Takizawa, Yamazaki, Yoshida, Roku Roku, Washino
Osaka Group	March, 1966	Greater Japan Metals, Nomura, Osaka, Nishibeya, Kiwa, Wakayama
Kansai Group	March, 1966	Anda, Ooya, Japan Grinder, Marufuku
Eastern Japan Group	April, 1966	Ikegai Machinery, Okamoto, Sanjo, Shoun
Tobu Lathe Group	May, 1966	Hamatsu, Ogawa, Kyoba, Tosei
Automatic Lathe Research Group	May, 1966	Fuji, Bori, Nomura Seiki, Funemoto, Toyo Seiki

From *Hahanaru no Kikai*, page 72.

The ten groups that were formed in 1966-1967, and two others that were organized by 1969, were the only cartel-like activities undertaken by the machine tool industry. They were invented and organized by the **gyokai**; groups emerged only after MITI plans for mergers and cartels failed. As a result it is impossible to interpret the development of groups as a victory for the bureaucracy, or as an example of effective guidance. Nor did the actual implementation of the groups meet any of the objectives

MITI, and certain **gyokai** staffers, sought. In several respects their operation was problematic.

The most basic problem was the fact that the members of each group did not, as a rule, possess sufficiently similar machine types to permit consolidation for scale production. The plan as drawn up by the **gyokai** staff had been for makers of lathes, mills, or other types of machines to join with each other and collaborate on research, production and marketing. In this way direct competition could be limited, permitting capital accumulation and stable manufacturing. Furthermore, the path would be paved for future integration leading to mergers, which would satisfy MITI.

Instead the major groups were composed of firms who did not compete with each other, or whose product lines were so dissimilar as to make integration unthinkable. Members of the Dai-Ichi Group shared more in their historical development than in terms of the products they made; they were for the most part very large prewar licensed firms such as Hitachi and Toyoda or their affiliates.⁸² For example, Hamai had long had a capital and technical tie-up with Hitachi.⁸³ Industry sources claim that the overriding objective in setting up the Dai-Ichi Group was to show MITI that large firms were willing to go along with the scheme. It was hoped that later groups affecting production more directly would be stimulated by the example of the leaders.⁸⁴

But the second group to be established, the Tokyo Group, was composed mainly of **zaibatsu** or other larger enterprises like Niigata whose share of the machine tool market was large even though machinery was but a fraction of their overall manufacturing interests. These companies resembled each other only in their relation to outside capital; their product mixes were utterly distinct. And added almost as an afterthought was

Makino Milling, a much smaller independent specialist producer whose presence among the giants was accounted for by the political ambitions of its president. Since Makino was unable to get into the first group, its management sought at all costs to become part of the second and thus be associated with the forefront of the reorganization effort.⁸⁵

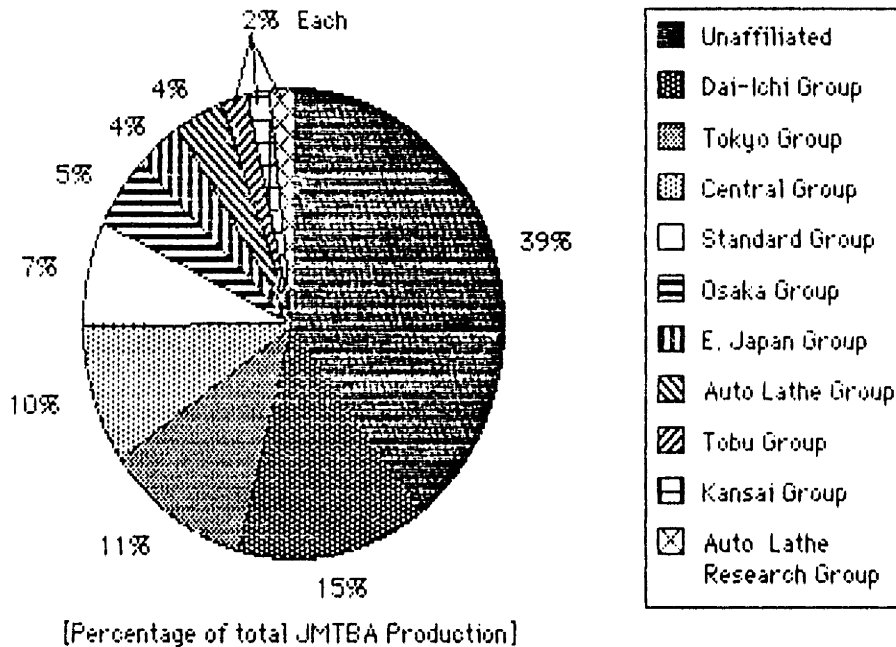
Paradoxically, when the firms in a group actually did share machinery or technology in common, the effect of their tie-up ran against the goals MITI and the **gyokai** staff sought. The groups were supposed to lead to mergers and centralization. But in cases like the Tobu, Automatic Lathe or Osaka groups, very small firms were able to share technical, marketing or research costs and thereby ensure their own individual survival; groups were being used to preserve the very small firms that MITI wanted to dissolve.⁸⁶

There is a certain symmetry between the way small producers twisted the groups and the response of smaller firms to the prewar license laws and wartime **toseikai**. In both cases, smaller producers were the target of efforts to have them consolidate or to wipe them out entirely and make them parts of larger firms. The response of prewar firms was to gain entrance into the major allocation networks set up partially to oversee their elimination, while in the postwar small firms made use of groups to economize during recessions. If the large firm groups were not organized to promote scale economies in individual machine classes, the smaller groups were perversely twisting the intent of the effort away from centralization and consolidation.

Group composition was not the only problem with the machine tool industry's capital liberalization countermeasures. Another major difficulty was that a large number of firms never were involved in any group at all.

Figure 3.14 shows the relative shares of the major groups as compared to total **gyokai** production:

Figure 3.14
Production Shares of Machine Tool Groups, 1965.



From "Kosaku Kikai Gurupu no "Ayumi" to Genjo," *News Digest*, (Tokyo: Seisanzai Marketing, January 1970, ["The Current Condition and "Development" of machine Tool Groups"]) as reprinted in *Nihon Kosaku Kikai Kogyokai, Ni-ju Nen no Bijaku*, [JMTBA, **Twenty Years of Growth**] (Tokyo: Seisanzai Marketing, 1972) page 490.

Within the **gyokai** itself, firms in groups represented at most 60% of the value of total output. If outsider firms are counted, over half the industry was unaffected by the group program. Plans to consolidate production and control competition were obviously hampered by the fact that for every unit of production to be controlled in groups another was not subject to any regulation whatsoever.

The fact that the groups were primarily designed as a halfhearted response to MITI in exchange for market stimulation measures was well recognized. The major machinery publication in Japan, **Seisanzai**

Marketing ran a special article in 1970 reviewing the activities of the groups four years after their creation. It found that instead of consolidation, firms had used groups to bolster their own competitiveness:

...To anticipate our overall evaluation [of the groups], in reality the effort to promote the structural adjustment of the **gyokai** through the use of groups was, regrettably, extremely weak. With the recovery that began in 1966, the rationale of the groups moved away from one based on structural adjustment. It shifted instead to an attempt by firms, through the groups, to try and improve their individual international competitiveness. In this respect, the overall evaluation of the groups cannot be said to be good.⁸⁷

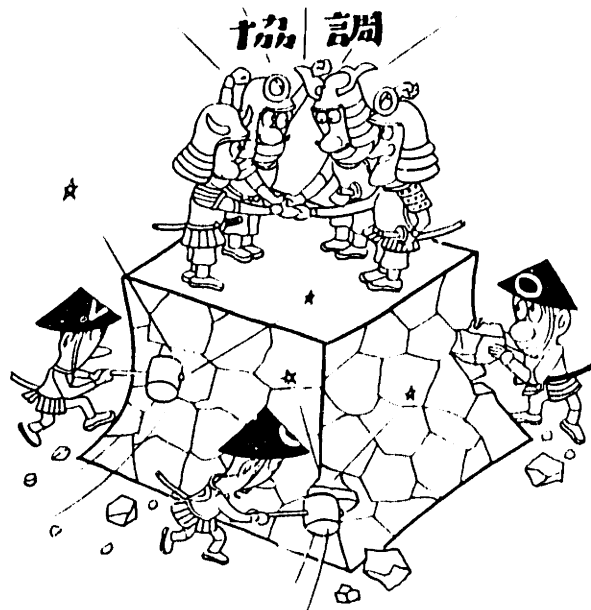
The article also presented comments from machine tool company managers illustrating the degree of latent competitiveness and political calculation that went into the groups' creation. Some observed that the groups were "just something to put before MITI's face," and "an empty shell carrying with it no real substance."⁸⁸ Others did state that they felt their companies' competitiveness was enhanced by group membership.⁸⁹ But negative observations like the one below from a member of the Eastern Japan Machine Tool Group clearly suggested the degree of interfirm mistrust that prohibited real consolidation:

"I'm not sure how I should interpret the internal nature of the groups. In one respect, everyone shakes hands in the spirit of reconciliation; on the other, the hands are cold and hard. Which attitude is the real one?"⁹⁰

An outsider manager was even more blunt in assessing the political significance of the groups and the problems of cartel-like coordination:

"The purpose of the groups that have been announced is far from that of "real" groups. Rather, they serve the purpose of achieving such things as merely creating diversion for other groups, or making a gesture to MITI."⁹¹

symbolizing the state of affairs in the
The article concluded with a cartoon
group effort. On top of a pedestal
machine tool firm managers,
portrayed as warriors were loudly
swearing "**Kyocho**"--"cooperation"
or "harmony"--while beneath them
lesser ranking soldiers, company
employees, were busily tearing the pedestal apart in pursuit of individual
gain.



During interviews, company officials who participated in various
groups and **gyokai** staff active during the group program indicated that the
groups were not utterly without effect. Many said that there apparently
were examples of useful cooperation in technical and other business areas.
But no one could suggest how the groups systematically affected the
tangible position of the participant firms. **Gyokai** staff, who were perhaps
the industrial actors most receptive to the idea of coordination seemed
especially eager to try and link the emergence of groups to a concrete
market outcome. But they ended up offering the weak suggestion that
perhaps the group episode deepened the feeling of friendship or common
destiny among the JMTBA members.⁹²

All agreed, however that the groups did not promote centralization
and that they were designed explicitly to avoid that outcome.⁹³
Consequently, in the planning and operation of the groups--which were the
only manifestation of anything resembling a government cartel in the
postwar machine tool industry--there is little to support the statist thesis.
The groups did not escape the pitfalls of collective action problems and
were not, in any case primarily designed to promote coordination. They

were instead a device for pacifying MITI during a recession in exchange for government support. The groups never achieved the objective of centralization MITI and certain **gyokai** members sought. Strong reorganization schemes were rejected out of hand by the **gyokai**. And, at most, 50% of total machine tool output was accounted for by all the groups put together.

That groups were built only because a temporary recession made government market assistance seem attractive is illustrated by the fact that they were abandoned as the market recovered. Machine tool output recovered in 1967, doubling from 70 to 129 billion yen, and the perceived need for government demand stimulation diminished rapidly; the political conditions which had temporarily strengthened MITI's position relative to the **gyokai** were shattered by the recovery.⁹⁴ The machine tool builders abandoned even the presumption of organizing in groups; by 1970 the groups existed in name only. Absent compelling need to negotiate with the bureaucracy, the reorganization effort died out.

But MITI's fears about the potential damage created by capital liberalization--which we shall see were all but complete fantasy due to the ability of domestic firms to set up foreign technology links and thus control the introduction of overseas products themselves--did not. In February, 1968, Industrial Machinery Division staff met representatives from each of the groups to try and evaluate whether or not the consolidation objectives were likely to be met. Its findings were unequivocal: "we have lost hope that structural adjustment can be accomplished through the group program." The reasons for MITI's pessimism were that individual companies used the groups for their own purpose, and that overall the groups had little effect on the production or management strategies of member firms.⁹⁵ The

government pushed hard for a reorganization of the groups or, once again, for actual cartels. But with market pressure greatly reduced, machine tool firms had little incentive to negotiate with the bureaucracy. The restrengthened group plan was rejected.

From 1967 to 1970 there ensued a period of negotiation between the **gyokai** and MITI amid bureaucratic pressure to set up a strategy for the machine tool industry's centralization. These efforts resulted in the supplemental "Basic Promotional Plan for the Metal Cutting Machine Tool Manufacturing Industry" of 1968 discussed above. The focal point of the reformulated plan was its production target specifications; the manufacture by any firm of products that amounted to less than 20% of its product mix or less than 5% of the total industry output (in the relevant category of products) was to be stopped. With this "5%-20%" rule, MITI had given up on explicit consolidation measures, hoping instead that by promoting specialized production it would create comparatively noncompeting firms of greater unit scale operations.⁹⁶

With the promulgation of the 5%-20% rule it once again appeared that MITI was directing the machine tool industry. Indeed, the rule represents the first incorporation of the "concerted action" powers into a plan explicitly based on the Machinery Promotion Law. But as we shall see, the 5%-20% rule was established as part of a subtle, ultimately unsuccessful attempt by **gyokai** to protect itself from complaints filed by the Fair Trade Commission while appearing to cooperate with MITI's liberalization panic program. It was neither developed nor actually enforced by MITI. Furthermore, the rule's scope was so limited by **gyokai** members that it only applied to old types of machines for which no growth was expected; NC

and other tools that were the core of the industry's miraculous advance were explicitly excluded.

The 5%-20% rule developed after the breakdown of the group program as MITI applied continual pressure on the **gyokai** to come up with another way to defend against expected advances by foreign manufacturers. The **gyokai** offered its still effective "concentrated production agreement" of 1964, as a possible replacement; the agreement, as we have discussed, urged member firms not to produce machines for which they had no prior production records to enhance market stability and specialization. What the **gyokai** suggested was that the agreement, an internal program, be retroactively based on the Machinery Promotion Law as a capital liberalization countermeasure.⁹⁷

This move was made with a number of calculations in mind. One was the fact that the production restraint agreements weren't working well; they had to be continually revised, and the problem of which firms had the right to make new machines--indeed, the definition of what a "new" machine was had yet to be resolved.⁹⁸ The members of the **gyokai** that were most congenial to production restraints, large producers whose markets were threatened by new entrants, thought that they could enlist the bureaucracy as an ally in keeping out potential new manufacturers in their own market niches. At the same time the firms that were threatened by restraints wanted to set up the weaker program already in force as the basic countermeasure to avoid possibly stronger initiatives.⁹⁹

The second was that the Fair Trade Commission was cracking down on cartels and informal production restraint agreements throughout the economy in conjunction with GATT and OECD compliance. While the American-built FTC was certainly weaker than its model agency in the US,

its influence in the capital liberalization episodes was not insignificant. In several cases, autos and steel among them, concern about FTC responses prompted both MITI and the regulated firms to redesign or scrap cartelization schemes.¹⁰⁰ Machine tool firms were worried that their production restraint agreement could lead to the kind of well-publicized, sensationalist uproar that had affected steel and they wanted to blunt possible FTC sanctions. By retroactively placing their agreement into the context of "concerted action" activity as specified in the Machinery Promotion Law, the **gyokai** could use MITI as a shield against reprisals from other agencies.

Discussion then ensued over the content of and possible revisions to the 1964 agreement. MITI wanted production restraints to be stronger; **gyokai** members were badly split on what tools should be affected and which firms would retain production rights. Eventually the **gyokai** itself developed the 5%-20% rule to satisfy MITI, but only after important limitations were made on its application. Then, the 1964 agreement was modified to reflect the new rule, retroactively authorized in the 1968 supplementary plan, and administered by the **gyokai** in a Special Structural Reform Committee from January, 1969.¹⁰¹

The most important part of the revised agreement was the limitations it put on the 5%-20% rule. Member firms wanted to preserve the largest measure of market flexibility for themselves, particularly where new growth prospects were high. There was strong resistance to the idea of placing any restrictions on market entry or production of types of machines for which potential future expansion prospects were high. As a result, member firms agreed to apply the 5%-20% rule to only 12 types of standard

machines, like ordinary lathes, ordinary grinders, and ordinary milling machines for which no future growth was expected.

All NC machine tools, machine tools to which NC equipment might be attached, machining centers, and all "designated machine tools"--tools which the **gyokai** had identified as "underproduced" in Japan-- were explicitly excluded from the production restraint agreement in Section 5. New machines, or those being developed in joint ventures with foreign firms--a category that we shall see was quite large--also were exempt.¹⁰²

The exceptions to the rule were thus extremely broad. NC tools, of course, achieved the most rapid growth from 1970 onwards. Tools that could be adapted to NC use included virtually all of the machines that were nominally under the restraint agreement. Designated equipment referred to unconventional versions of the 12 machine types that were to be subject to the 5%-20% rule; for instance, ordinary lathes with a feed of between 400 and 1000 mm were subject to the rule, but lathes with feeds less than or in excess of these feed specifications were not.¹⁰³ The designated machine tool reservation thus cut into the set of tools which came under the provisions of the agreement. Finally, because whether a tool was new or produced under license from a foreign firm was a difficult determination, additional flexibility was added to the agreement.

The effect of the large number of reservations and limitations was to gut the agreement of any real power. Though agreement did urge members to act as if the restraints applied to excluded tools as well as the small set of 12 target machine categories, this admonition had no effect on product stability, nor did it lead to an orderly machine tool market.¹⁰⁴ A firm could enter a restricted market under several pretexts based on future NC

applications, new design features or the 'special' nature of the machinery to be built.

Even in its truncated form, the 1968 "Concentrated Production Agreement" survived only until January, 1971, an effective period of less than two years from its inception in April, 1969. It was repealed in March and replaced with a voluntary reporting scheme in which member firms were asked to inform the **gyokai** of any new tools they were thinking of producing.¹⁰⁵

The immediate cause of the abolition of the agreement was pressure from the FTC, which had issued a cease and desist order in 1970, unimpressed by the retroactive link of the agreement to the Machinery Promotion Law.¹⁰⁶ In the **gyokai** itself there was substantial pressure to either abolish or further amend the agreement; of 68 firms replying to a survey, 16 called for outright repeal of the agreement, while the rest urged either continuation or continuation with adjustments.¹⁰⁷ After consultations with MITI, the **gyokai** scrapped the whole program. It retained only the new machine tool reporting clause, an idea that had been a part of all production restraint schemes since 1960.

Thus, the passage of the Electrical Machinery Law in 1971, even with its strong cartelization clauses, coincided with the final chapter in the effort to reorganize machine tool firms. From the grandiose attempt to merge the industry, MITI had retreated to the group scheme, then to the limited 5%-20% rule, and lastly to the plaintive position that firms should seek market niches by staying away from the areas indicated in new product reports. Even the final program, the new product report scheme, was a **gyokai** invention, carried forward from the 1960s. Six years after the

capital liberalization crisis brought structural adjustment to the head of the bureaucracy's action list, nothing had been accomplished.

Our account of the development and application of the cartelization phase in machine tool production strongly contradicts conventional arguments. The bureaucracy neither conceived the plans that were adopted, nor was able to enforce them to achieve its goals. Further, we can see how common claims such as Yamamura's that machine tool "cartels" permitted orderly, low risk scale expansion greatly misinterpret the way that industry organizations operated in Japan. Yamamura's machine tool cartels, the "groups," were totally ineffective and designed to be that way; they cannot be called "cartels" at all. If they had any effect on the industry, it may have been to permit smaller producers to economize on research or marketing costs so that they could resist further consolidation schemes.

Nevertheless, we must additionally investigate evidence of actual consolidation or diversity to establish that the reorganization effort was ineffective. It may be possible that despite the failure of formal institutions both of government and **gyokai** invention, machine tool firms were still able to run a cartel informally. The Houdaille petition, for instance, contended that the new product reporting scheme adopted after the repeal of the 5%-20% rule enabled the **gyokai**, which it refers to as "the cartel," to continue its coordination. Machinery producers, in this view, organized themselves in such a way as to specialize by machine type, which increased their scale, lowered costs, and adversely affected US manufacturers.¹⁰⁸

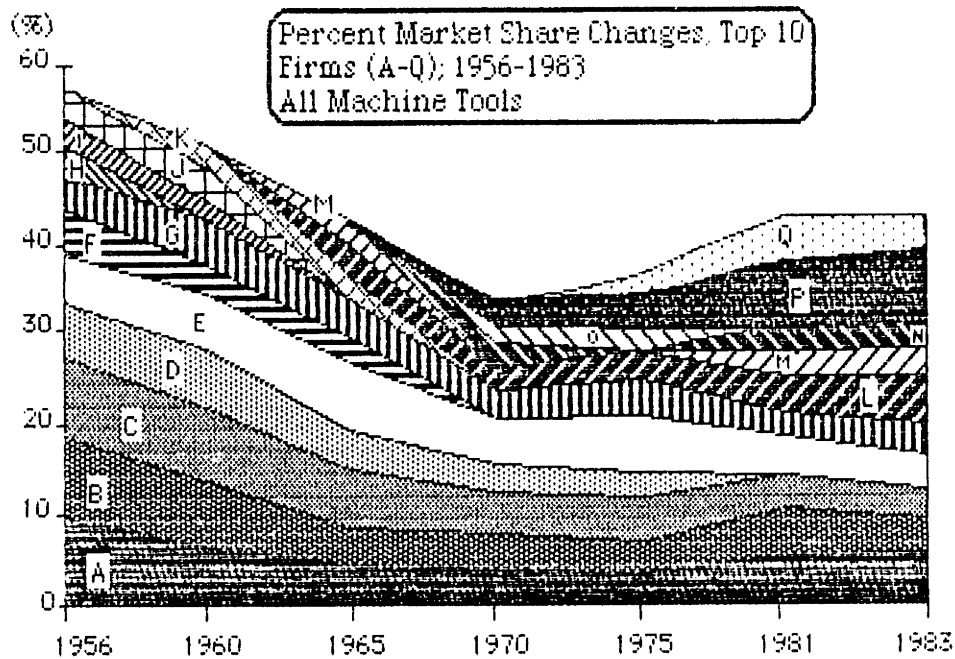
One way to test these claims and to amplify our argument that consolidation efforts failed is to look at market share data by firm and by machine tool type. If the conventional view is true, we should see that in

any given machine tool market the number of firms fell, or remained stable as companies built scale economies through production restrictions. Conversely, evidence of shifts by firms into new markets or of growing fragmentation in specific machinery segments would strongly contradict this picture of the market in Japan.

Let us look first at the market share movements from 1957-1983 of the top ten producers in Japan for all machine tools. In a cartelized setting, we should expect that the major firms in the 1950s and early 1960s would also be leaders in the 1970s and 1980s, and second, that market shares between firms would remain stable. But as Figure 3.15 shows, five of the top ten firms in 1956 were not in the top ten in 1983, while new entrants accounted for the largest machine tool industry shares by the 1980s.

Figure 3.15

Market Shares of Top Ten Firms, 1957-1983, All Tools



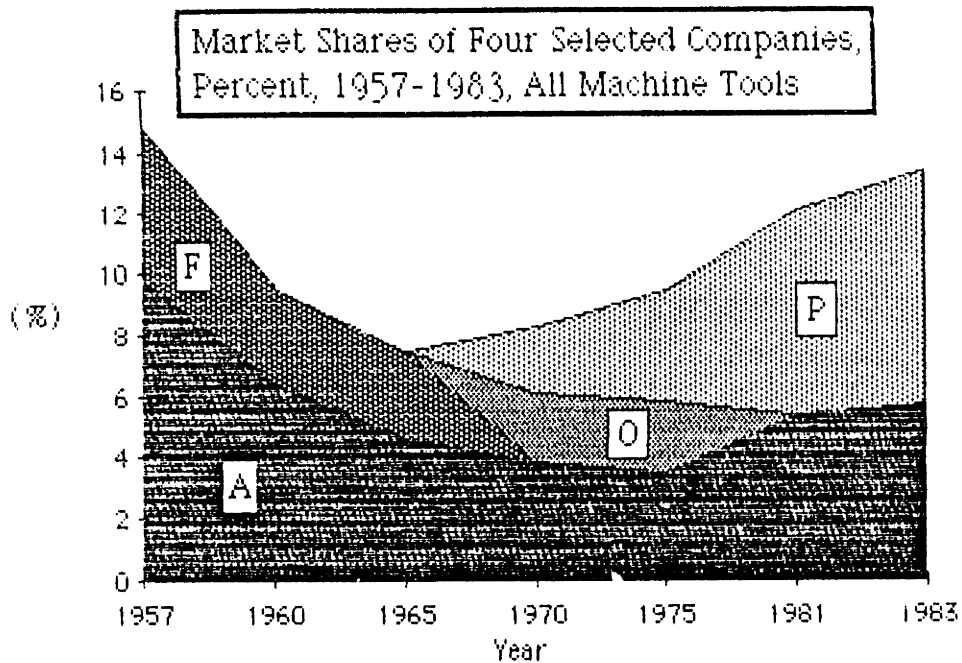
Market share data is normally reported to the FTC and to MITI under the strictest secrecy to protect reporting firms' industrial position. The data above were supplied to the author by the Industrial Machinery Division through the courtesy of the then section Director in January 1984. Individual companies were not named to protect confidentiality; they were identified by letters as in "A," "B," etc.

Moreover, the top ten machine tool companies' share fluctuated greatly, falling in 1957-1970 from 57% to just 33%, and rising again to about 42% by 1983. A major factor in this movement was the entry of new firms as older companies fell out. The pattern is the opposite of what a cartel should have produced.

We can see how market shares shifted in better detail by isolating four kinds of companies in the aggregated data presented in Figure 3.15 above. The isolated firms are presented in Figure 3.16.

Figure 3.16

Four Selected Cases, Market Share, All Tools, 1957-1983



Sources same as for Figure 3.15

Company A is an example of an older firm whose market share steadily eroded until 1975, when it made a partial recovery in the NC era. Significantly, Company A's greatest loss occurred in 1960-1970, when structural consolidation schemes were at their height. Firms like Company A are found in the lower left of Figure 3.15. Company F illustrates a case of an older leading firm finding itself completely eliminated from the top ten by 1970, again in the period of the most intensive market preservation and stabilization efforts. These firms failed to move into NC production; they are found on the upper left of Figure 3.15. The third set of firms, represented by Company O, emerged in the top ten during the period of NC transition around 1970. They then disappeared again because they did not take advantage of the NC movement to create sustained growth. This form of development can be observed in or around the center/right of Figure 3.15.

Finally, firms like Company P were the big winners in the postwar machinery industry. They rode the NC wave to preeminent status, growing steadily from 1975 until they dwarfed the older firms which had actually participated in and administered the reorganization schemes of the 1960s. These firms are concentrated in the upper right of Figure 3.15.

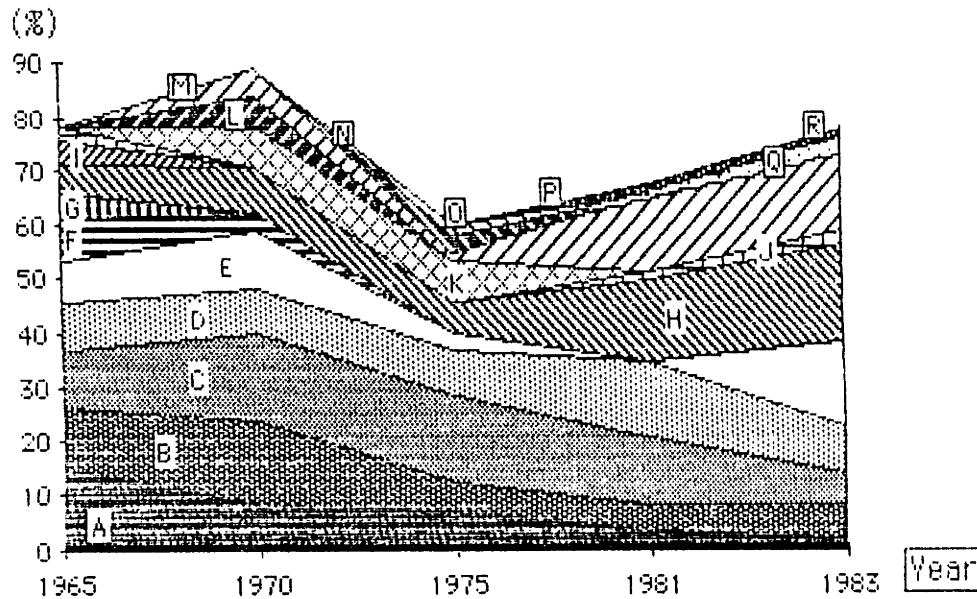
The market share data amplified in Figure 3.16 does not tend to support the idea that the **gyokai** successfully operated a cartel-like production agreement. First, shares vary widely over time; the purpose of the various production restraint schemes was precisely to freeze market shares to permit stable growth. Instead, companies displaced each other. Next, new entrants were crucial in growth in the 1975-1983 period, but preventing market entry was also a key aim of MITI and **gyokai** plans. Finally, overall market share fell for the top ten producers from nearly 60% to just 33% in the period of restraint agreements, 1957-1970, recovering only slightly thereafter. Other firms took a greater share of production away from the top ten. But the intent of the production agreements was to spur scale economies in the largest firms, not promote relatively small advances by many firms.

Next let us examine market share data for separate machine tool segments. Figure 3.17 shows ordinary lathe market share data for the top ten firms from 1965-1983. Recall that ordinary lathes were explicitly subject to the **gyokai**'s first restraint agreement in 1960, and to the 5%-20% rule promulgated in 1968. If cartelized market behavior should be observed at all, it would be in the case of targeted equipment. But as Figure 3.17 demonstrates, shares varied widely in contradiction to the goals of restraint and production agreements.

Figure 3.17

Market Shares of Top Ten Producers, 1965-1983, Ordinary Lathes

Top Ten Ordinary Lathe Makers, (A-R), %, Selected Years



Sources same as for Figure 3.15

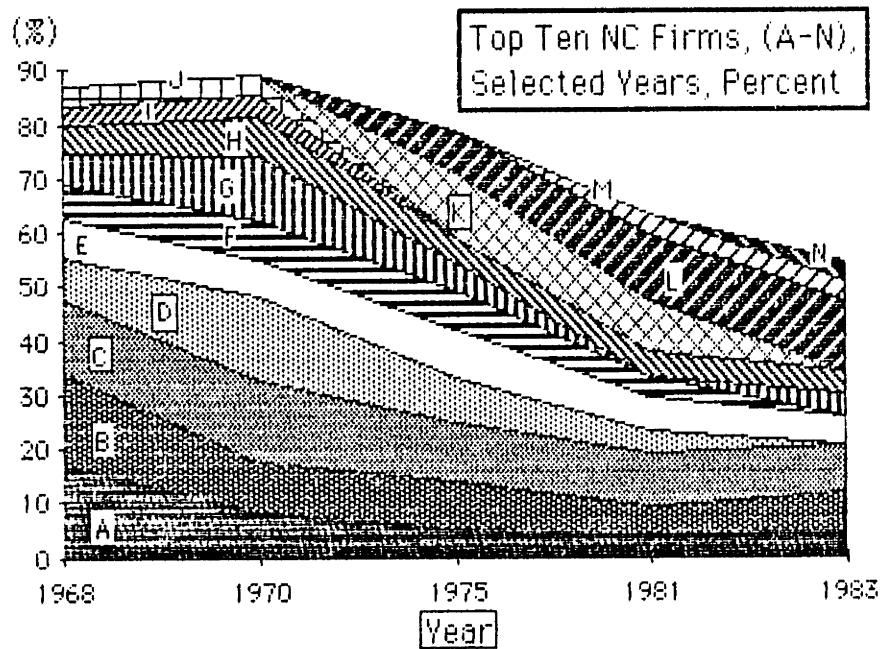
The four biggest firms in 1965 (A-D) experienced declines in their share of ordinary lathe production from about 45% to about 22% by 1983. Another, Company E, experienced huge shifts in its share, even falling out of the top ten in 1975. Only company H among the original top ten firms in 1965 registered increases. Meanwhile, as in the overall machine tool case, new firms displaced older companies as illustrated in the patterns from the upper left to the upper right of the graph; if the consolidation schemes had worked, there should have been straight, horizontal lines across the graph. Instead there is considerable fluctuation. Thus, even for a declining, low growth product specifically targeted for control there is no evidence of overall cartelization and restraint.

The same is true of NC machine tools. Of course, NC tools were explicitly exempted from the production agreements, but it is important to

determine whether an informal cartel did operate. Market share data for all NC tools is shown in Figure 3.18; once again there was enormous market variance in NC production from 1968, when the 5%-20% rule was issued. A cartel-like policy would have produced more horizontal patterns in market shares.

Figure 3.18

Market Shares of Top Ten Firms, NC Tools, 1968-1983



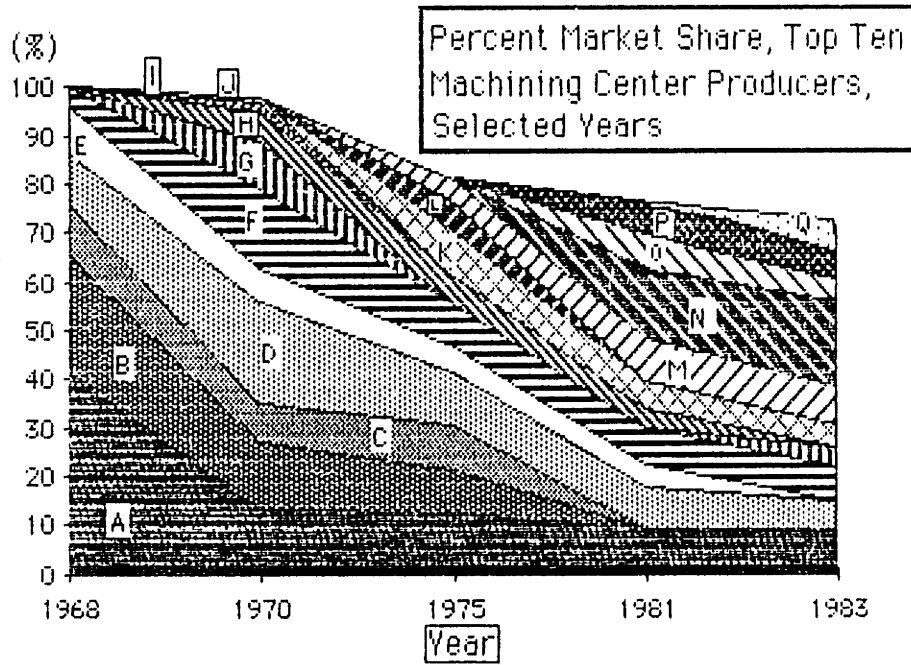
Sources same as for Figure 3.15

We can see that the largest firms in 1968, A-E, saw their share steadily erode from 60% of all NC production to just over 30%. Meanwhile, new companies entered the market, squeezing the older firms. Overall, the top ten firms took 87% of the market in 1968; their share was only 59% by 1983. With expansion came market diversification, not consolidation.

Individual NC machine tool records agree with the patterns exhibited above. In Figure 3.19, top ten machine tool firm shares in machining centers are illustrated, and in Figure 3.20, NC lathe shares are presented.

Figure 3.19

Top Ten Firms' Shares of Machining Centers, 1968-1983

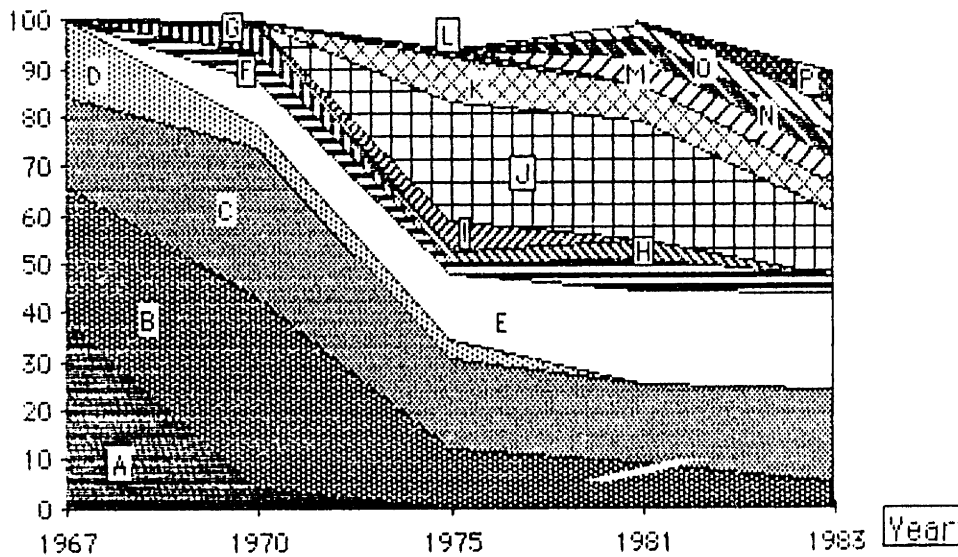


Sources same as for Figure 3.15

Figure 3.20

Top Ten Firms' Shares of NC Lathes, 1968-1983

Top Ten NC Lathe Firm (A-P) Market Share, %, Selected Years



Sources same as for Figure 3.15

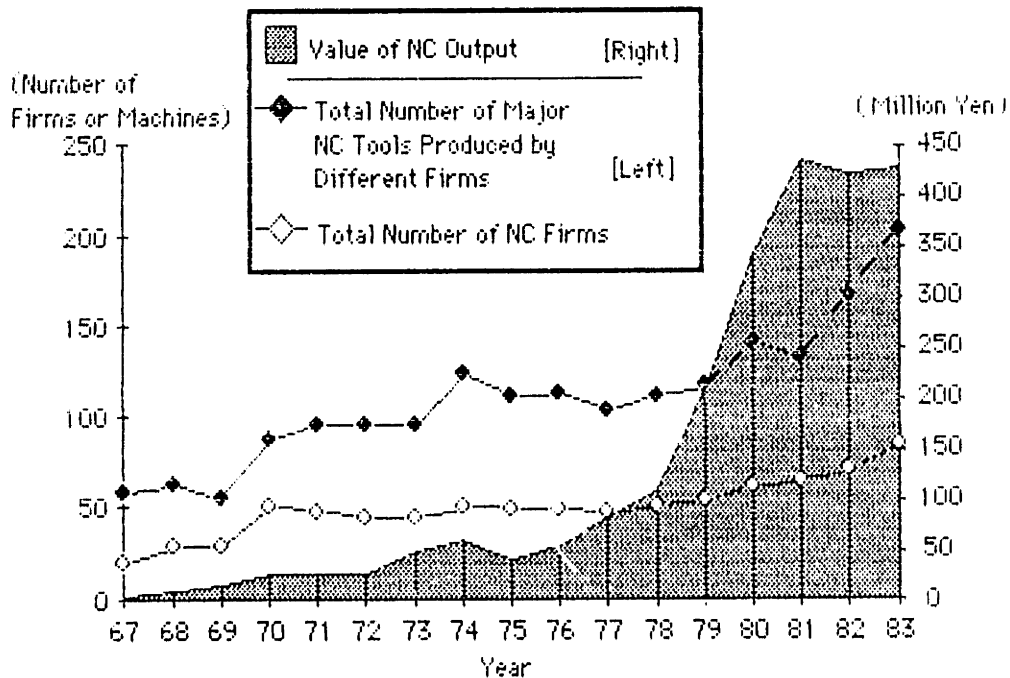
Both graphs demonstrate market share behavior that is considerably at odds with the view that successful consolidation of the machine tool industry took place. As in the previous examples, older leading firms show dramatic drops in their percentages of overall production from 1968-1983. New firms--independently and without the assistance of older companies--entered the market and begin to displace the previous leaders. Overall, total concentration fell. In no case is it possible to observe the horizontal, static market share behavior that would be characteristic of an effective production restraint policy.

Other measures establish that consolidation does not associate with NC expansion. First, in Figure 3.21 increases in the total number of NC producers in the **gyokai** and the types of machines they built are shown together with total NC output from 1968-1983 are presented. If

consolidation as MITI or Industry leaders envisioned had taken place, the number of types of NC machines and the number of NC firms in the **gyokai** should have remained level while production rushed ahead. Output would thus have grown as firms expanded their unit manufacturing scale. However, as Figure 3.21 illustrates, the total number of firms, tools and value of output rises more or less at the same time, although in the peak production years output does outstrip the number of new firms and products.

Figure 3.21

Output, Number of Firms and Machines, NC Tools, 1968-1983



NC output data from *Hahanaru no Kikai*, op cit., page 133; NC firm and machine type data collected from annual "Suchi Seigyo Kosaku Kikai Sangyo Jisseki Nado Chosa" [Survey of Aspects of the Current NC Machine Tool Industry] published in the *Kosaku Kikai News*, July 1975, 1979, 1984.

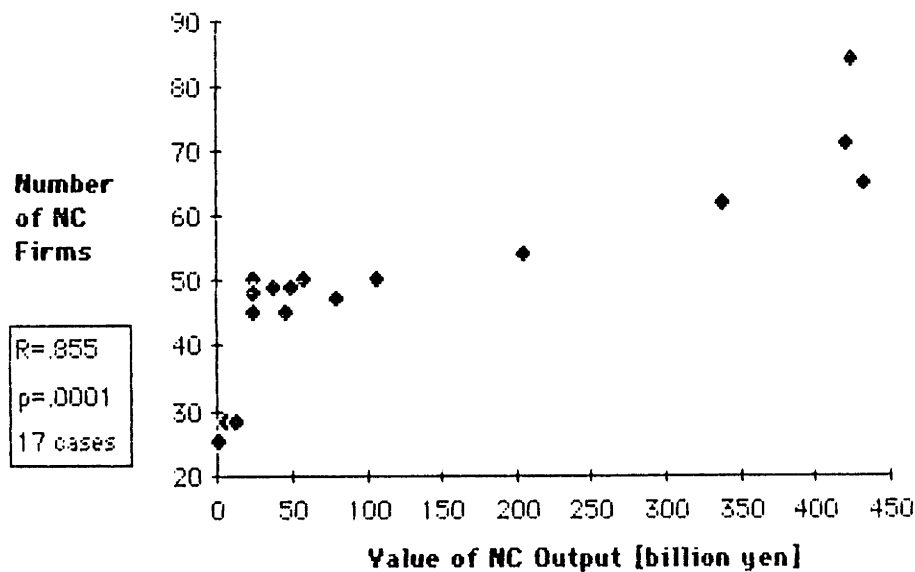
Consequently, rises in NC output were not achieved by boosting unit output of a fixed number of machines or machine tool firms. Rather, with output increases, the number of kinds of machines increased, as did the number of firms making the tools.

Figure 3.22 presents a statistical measure of the relationship between firm entry and NC output in a scatterplot. If consolidation strategies had been successful, the scatterplot would either have appeared random, with a low correlation coefficient (R) as output rose with no corresponding firm entry, or negative as companies fell out to permit increased scale production by only a few firms. Instead, the relationship is strongly positive, $R=.855$ and $p=.0001$, a very high probability index.

Figure 3.22

Scatterplot of Company Entry and NC Output, 1968-1983

Scatterplot of NC Output, Number of NC Producers, 1967-1983



Raw Data Sources Same as for Figure 3.21

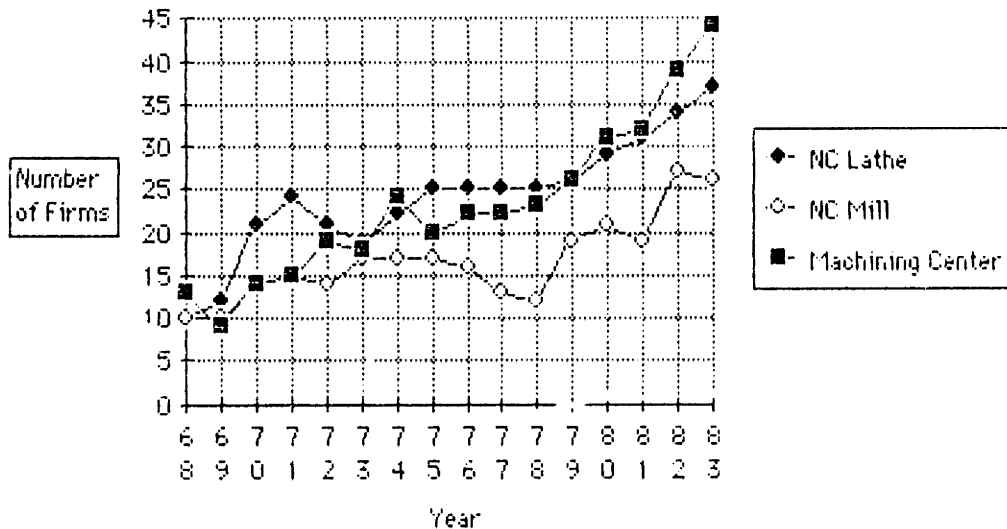
Although the plot is not perfectly linear, it is clear that as output increased, the number of firms rose. A plot of the number of different types of machine tools yielded a very similar pattern with $R=.843$ and $p=.0001$. Again increases in output associate very strongly with increases in the different types of machine tools produced. This data supports the argument that consolidation did not take place; unit scale increases were not achieved by sacrificing market entry or machinery diversity.

One final bit of information additionally enhances the contention that production agreements did not restrict entry into NC production. In Figure 3.23 increases in the number of firms producing NC lathes, machining centers and NC mills is recorded. In each case steady increases are shown. When markets heated up, Japanese firms rapidly retooled to enter them unimpeded by formal or informal restraints.

Figure 3.23

Increases In Number of Firms Producing NC Tools, 1968-1983

Number of NC Manufacturers, By Machine Type, 1968-1983



Sources Same as Figure 3.21

The number of NC lathe producers rose from 10 to 37 firms, the number of NC mill makers from 10 to 25, and machining center specialists increased from 14 to 45 companies in 1968-1983. There is no evidence of cartel like regulation in this pattern of NC development.

Thus, by 1978 as the Electrical Machinery Law expired explicit cartelization efforts ended in failure. For close to two decades the **gyokai**, then MITI, then both the **gyokai** and the bureaucracy struggled with each other and with machinery producers to consolidate the industry. In the

history of the postwar machine tool industry *there is not one instance of a MITI plan being adopted*. The programs that were established were exclusively formulated by the **gyokai** and these, often created with ulterior political motives, also were ineffective. In particular they failed to consolidate or coordinate machine tool production. Even when political and market circumstances maximized MITI's authority in the 1960s, the **gyokai**'s "group" response proved to be a cynical mockery of centralization goals. If the financial support era, 1956-1965 provided initial evidence of MITI's inability to either plan for or influence the machinery industry, the structural consolidation efforts of 1965-1978 strengthens the case against the statist argument.

Exports, Imports and Centralized Authority

To round out our consideration of consolidation schemes and the role of the state we will examine Japanese export and technology policy. The belief that Japan is a centrally organized economy has nowhere been more strongly advanced than in the field of international trade. Indeed, with growing import pressure, the American version of the Japanese **gyokai**, the National Machine Tool Builders Association (NMTBA) mounted a concerted effort to show that trade reversals were the product of unfair practices. Its president, James Gray strongly echoed the tenor of the Houdaille petition, which was sponsored by the NMTBA:

...While the association has long been a proponent of free trade and has one of the most active international trade promotion efforts in the trade association field, we cannot stand idly by while key segments of the American machine tool industry are decimated by targeted sales of foreign machine tools. Frequently assisted by subsidies and a variety of preferential programs sponsored by their respective governments, foreign builders have come to dominate certain key sectors of the domestic machine tool market, a fact we

find inconsistent with our vital national interests. America is the defender of the industrial west and machine tools are the foundation of our industrial defense preparedness.¹⁰⁹

Leaving aside the obvious irony that an extremely conservative industrial leader should implicitly be linking state intervention with remarkable foreign economic successes, the NMTBA view identifies many beliefs about Japanese export policies that are consistent with the broader statist view. In particular these are the notions that Japanese export successes were due to targeting, and to explicit state promotion. US firms could not compete with a flood of cheaper imported goods that drove them from the market.

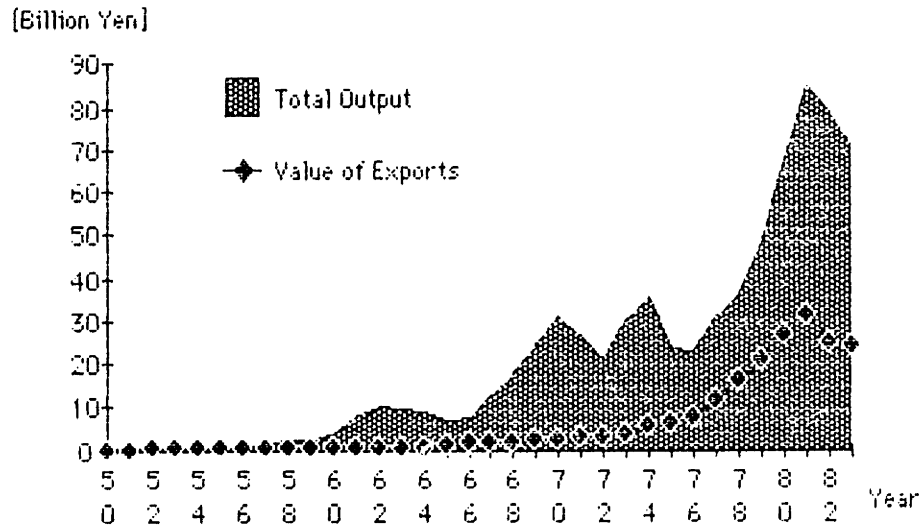
We will argue instead that Japanese export growth in machine tools was due to the development of a new product, small, general purpose NC tools, that US firms simply ignored. Government strategies for export promotion actually were little more than the recognition of efforts planned and conducted by the **gyokai**. These promotional efforts were largely unsuccessful until NC tools were developed and in any case never amounted to more than a market survey and PR campaign. In turn, the advance into US markets occurred because of a gap in American tooling supply; the Japanese machinery makers, like those in electronics, autos and other markets, filled unexploited market niches earning enormous rewards.

New products also help explain the decline in imports as a percentage of total production. While it is claimed that excessive restrictions cleared the Japanese markets of foreign competitors which permitted the rapid attainment of scale economies, in fact imports were quite high until the NC era. Then, as demand shifted in Japan as in the US to smaller NC tools, the ratio of imports to total output fell, but the actual level of imports stayed fairly steady or even grew.

Finally, we will show that import declines were matched by increased licensing of products or technology by overseas firms. It was not policy that led to a reduced foreign presence, but rather the strategic calculations of non-Japanese producers who evidently felt that they could earn more by providing technology for a fee than by selling their products directly in Japan. We will see how the government was used by Japanese firms to sometimes obtain better license terms, but beyond that neither **gyokai** nor MITI efforts can account for the Japanese machinery producers' foreign technological contacts.

Before the political and regulatory background to the machine tool export expansion can be discussed, the performance of Japanese manufacturers needs to be clarified. In Figure 3.24 we present the history of Japanese exports as compared to total production from 1950 to 1983. It shows that exports did not become important in the machine tool industry's growth until about 1975; as late as 1973 they were but 11% of production. Then overseas sales steadily rose to a peak of 44% of production in 1978.

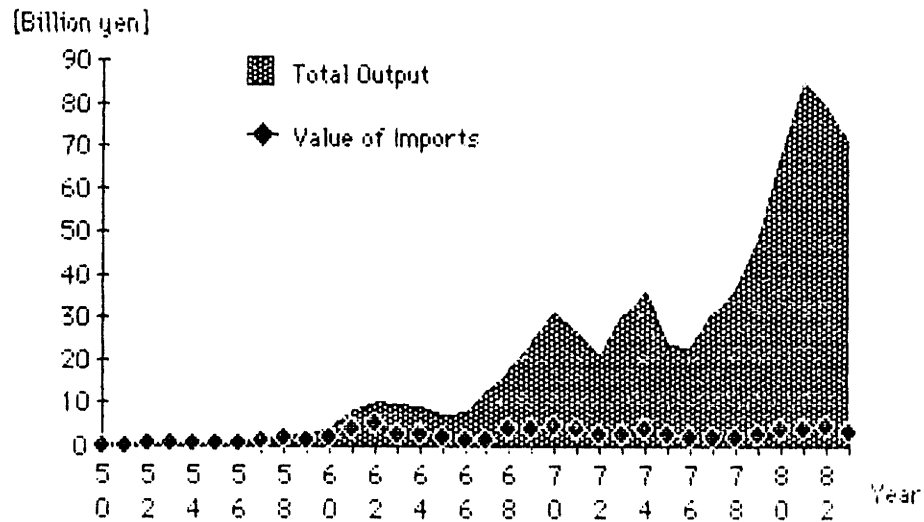
Figure 3.24
Exports and Total Output, 1950-1983



From *Hahanaru no Kikai*, page 121.

In contrast, Figure 3.25 depicts the record of Imports during the same period. Unlike other industries, especially autos in which foreign presence had been crushed by the prewar Industry Control Laws as described above, imports were quite high in machine tools. Throughout the 1950s, foreign firms accounted for between 30-50% of the market, and even well into the 1960s the percentage was running at 20%. By the 1970s, however, imports were but 11% of total production, and fell to a low of 5% by 1983.

Figure 3.25
Imports and Total Output, 1950-1983



From *Habanaru no Kikai*, page 121.

It is tempting to argue that there is a crossover relationship between imports and exports. As the percentage of imports fell, exports advanced dramatically, suggesting that once foreign firms were driven out of Japan, Japanese manufacturers then had a base from which they could attack overseas domestic markets. Indeed, as Figure 3.26 shows, dramatic declines in the percentage of import penetration do associate with export growth.

Figure 3.26
Imports and Exports, % of Total Production, 1950-1983



From *Hahanaru no Kikai*, page 121.

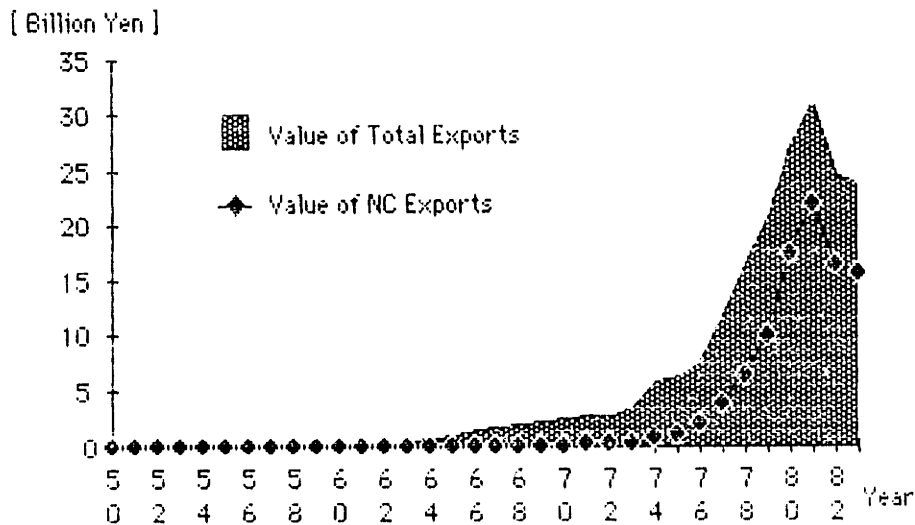
But for the pattern in Figure 3.26 to be the result of an actual crossover effect, it would have to be the result of domestic expansion and import retrenchment in similar machine types like lathes or mills. If this were true, then there would be some grounds for believing that import restraints coupled with overseas targeting led to Japanese successes. But, as we shall see, it was the market shift to small NC tools that explains the relationship. The absolute volume of imports remained steady and even increased in the late 1970s, while the types of machine imported by Japan were also very stable over 1950-1980. Import demand, as we can see in Figure 3.25, was more or less constant. In the 1970s, however, NC output and exports exploded, driving up both overall production and the volume of overseas sales. Measured against traditional tooling, imports fell slightly

in the postwar period to about 15%; but measured against NC output, the bottom seemed to fall out of imports.¹¹⁰

The importance of NC tooling in export advances is illustrated by Figure 3.27. Up until 1974, the machine tool industry had recorded extremely cyclical growth in which overall production and export volume increased slightly on average, but far below that of other sectors in the Japanese economy. As late as 1977, exports to the U.S. and Europe were just 37% of Japan's total; Eastern Europe (20%), the Far East (26%) and South America were the crucial markets to which standard machines were shipped.¹¹¹ Then, as NC machinery reshaped the industry, a truly "miraculous" increase began; from 1974, NC machine tools accounted for nearly all of the changes in machine tool export volume as the American and European market for high quality products amounted to over 70% of Japanese exports by the 1980s.¹¹²

Figure 3.27

NC Exports as Compared to Total Exports, 1950-1983



From *Hahanaru no Kikai*, page 121.

Between 1974-1983, the area of the graph that is above the broken line representing non-NC tooling export volume remains almost constant; the lower NC portion accounts for almost all of the increases and decreases. Statistics confirm this observation. The correlation of export growth to NC export growth after 1974 is $R=0.973$, or 94% of export volume changes are accounted for by NC tools.¹¹³

It is necessary to keep the above statistics in mind when analyzing the growth of Japanese exports. What needs to be evaluated is the degree to which the government, or the **gyokai** acting with government authorization, planned and targeted increases in *NC exports*. It was only with the development of NC equipment that Japanese machine tool firms exhibited the overall growth and export gains associated with the economic 'miracle.'

As we shall see, there is little evidence of a concerted export drive by either public or private authorities.

Trade restraint and export promotion policies were at their height in 1956-1977. Before then, we have already seen that very early trade policies actually were import subsidies. Machine tool and other machinery firms were provided with matching funds and write-offs to buy foreign tools necessary for rebuilding their manufacturing operations. This policy, effective from 1952 to 1955, helped drive imports to 57% of domestic production by 1955.¹¹⁴

Both MITI and the **gyokai** had pushed hard for import relief through tariffs but machinery-using firms scuttled initial attempts to increase the cost of machines they needed to buy from overseas suppliers. By the late 1950s, however, a series of tariffs was approved. Machines that were not produced at all in Japan were subject to a 10% rate, those that were just entering development received a 15% rate and tools considered essential to the industry's and the Japanese producer's future growth were subject to a 25% tariff. The intent was to limit access to machine tools crucial to domestic machinery manufacturers' markets while permitting relatively free purchases of equipment unavailable from Japanese producers.¹¹⁵

But no sooner had the tariffs gone into effect than the OECD capital liberalization panic hit. Planned tariffs were rolled back on 96 of a total of 99 machine tool categories in 1964, and by 1970 all tools were "liberalized." Actual tariff rates are difficult to assess, but the post-liberalized rates ranged from 4%-7.5%. This level was not particularly high; comparable tariffs in the US were 5% to 6%. In 1983, all tariffs were removed.¹¹⁶

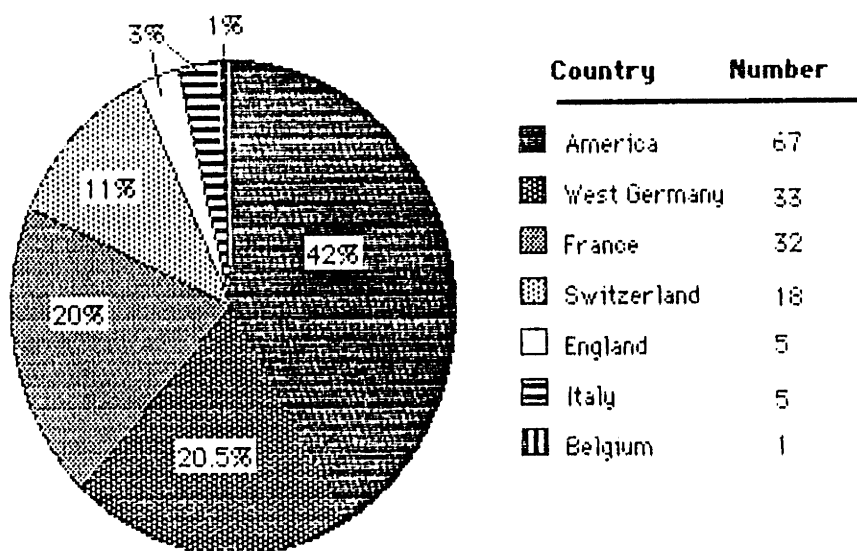
Precisely gauging the effects of tariffs on trade in Japan, as elsewhere, is impossible. Factors affecting the relative decline or increase in machine tool imports are too varied. There were non-tariff barriers, in this case not so much the safety or equipment compliance requirements that US auto firms point to than the "buy Japan" instinct of machinery users and sellers. Given a choice, it is beyond serious doubt that Japanese firms would rather deal with other Japanese producers. Next, there was the attitude of foreign sellers, for whom Japan was always a minor market. Most Japanese imports resulted from Japanese firms actively seeking tools they needed; overseas firms did not mount the kinds of concerted marketing efforts that accompanied Japanese export drives. Finally, there was the influence of cross licensing arrangements. Almost all of the Japanese machinery producers had a technical or marketing agreement with a major overseas firm. Apparent displacement of imports as a result of tariffs was instead often the transformation of an import good into a domestically-produced licensed good in which the overseas originator of the design still retained a significant financial stake.

Proponents of the statist argument frequently point to the fact that MITI had the right to review all foreign contracts in the postwar era as evidence of central direction. Based on the Foreign Capital Law first promulgated in the 1930s, the bureaucracy had to approve foreign tieups ostensibly as part of its effort to regulate the balance of payments.¹¹⁷ In fact, in certain cases such as IBM's creation of a Japanese affiliate, this review policy was used to partially thwart foreign entry, and to ensure that Japanese interests retained a majority ownership in any venture.¹¹⁸ But, aside from these well publicized events, the review policy was not enforced in a systematic way by the bureaucracy to promote technical development in machinery.

There were over 160 foreign tieups in the machine tool industry alone between 1952-1981, or more than one for every company in the **gyokai**. In addition, Japanese firms set up close to 70 related technology licenses including those for NC controllers. Figure 3.29 depicts the breakdown of domestic machine tool technology foreign licenses as shown by country of origin.

Figure 3.29

Machine Tool Technical Licenses. # of Firms, 1952-1981



Total Technological Tieups: 161

From *Hahanaru no Kikai*, pages 86-90.

Historically, Europe, especially France, formed the first pool of licensors in the 1950s. But gradually with advances in electrical controllers, the US became the largest source of technical tieups. The nature of these tieups was usually a license arrangement; the Japanese firm either made the licensed equipment to the specifications it was provided with, and paid a fee on sales, or it incorporated the foreign technology into its product and provided remuneration on some predetermined basis. Usually after the

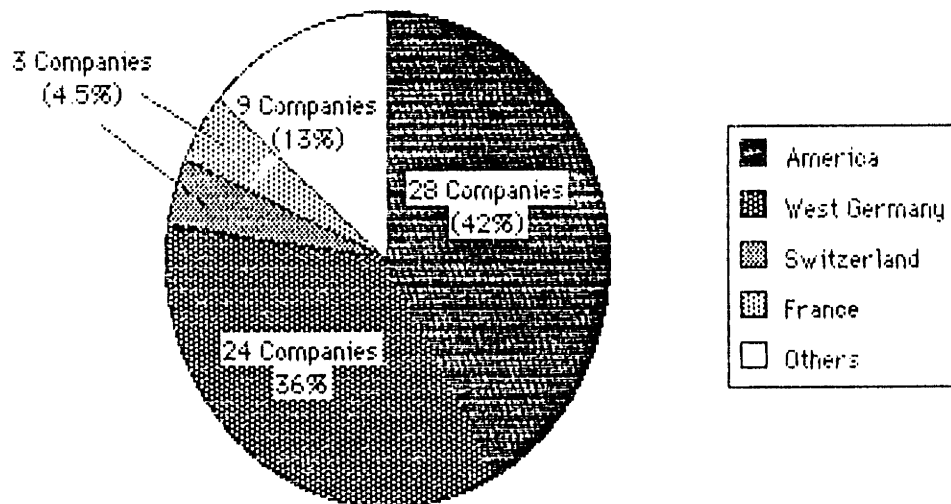
expiration of the agreement the Japanese firm would retain all of the rights to the technology in a specific market like the Far East or Africa.

Related machinery technology tieups included those for NC controllers, specialty steels used for cutting tools, and servo motors used to move NC machine components according to computerized instructions. These kinds of linkages flourished in 1970-1981 when Japanese firms eagerly sought the necessary expertise to build NC equipment. Again, America was the source of most of this technology; Figure 3.30 illustrates the source of related technology contracts by country.

Figure 3.30

Related Technology Contracts, # of Firms, 1970-1981

Technical Tieups for Machinery-related Items (Including NC Controllers), 1970-1982.



Total Number of Machinery-related Technical Tieups: 67

From *Hahanaru no Kikai*, page 91.

Despite the fact that promoting the machinery industry had been viewed by MITI as a major objective in its overall effort to enhance the competitiveness of Japanese manufacturing, the bureaucracy's influence in affecting the nature of technical tieups was marginal; machine tools, one of

33 industrial groups in the "general machinery" classification alone, had over 220 tieups. It would have been impossible for the bureaucracy, or the Industrial Machinery Division, to have controlled the terms of all of these agreements. There existed no plan for technology imports; individual companies decided how and when they should seek foreign contracts.

Privately, Japanese firms and international lawyers admit that MITI is sometimes used as a bargaining device to extract favorable terms from prospective partners. The Japanese side can claim that license fees, or the right to use technology or other aspects of a contract will not be approved by the bureaucracy. In some cases firms will argue that they are legally prohibited from contracting to certain terms.¹¹⁹ But in a small industry like machine tools, as long as the capital input of the foreign enterprise was limited to less than 50%-- a requirement formally dropped in 1973 but still a subject of concern for the nationalistic bureaucracy--MITI would approve the license as a matter of course.

A good example is the case of Fanuc, the largest producer of NC equipment in the world. Fanuc's dominance of the Japanese controller market has sometimes been interpreted as the result of conscious policy. In fact, Fanuc is one of the few companies in high-cost technical fields that has not once made use of JDB loans or experimental subsidies.¹²⁰ Instead, it utilized foreign licenses to obtain the technology it needed, then supplied this technology to the machinery industry in the form of customized controllers. Fanuc's development provides a good instance of why experimental subsidies played such a minor role in technical development in Japan after 1955; instead of carrying out their own basic research, Japanese machine tool firms found willing foreign partners who sold them the technology they needed.

Fanuc's first NC controller was produced for Makino Milling as the result of an almost whimsical challenge. In 1956 an Indian machinery delegate at a machine tool exhibition asked Makino when the then lagging Japan would be able to make NC machines. Makino, the president of Japan's export association took offense and promised Japan would have an NC mill by 1957. He sought the help of an electrical engineer, Inabe Seiumon, who then was the head of a laboratory in the electronics giant, Fujitsu. The two firms set up a joint research venture to rapidly build an NC machine.¹²¹

Their method of technical development was to copy as closely as possible the NC mill specifications developed by the MIT Servo Labs in conjunction with a military project. Inabe later called the MIT papers his "bible."¹²² Eventually, the venture succeeded and Makino Mill had its new NC machine. Fujitsu, impressed with the market potential of the NC controllers, spun off an independent company, Fujitsu Fanuc, with Inabe in charge. For a variety of reasons, including the fact that Fanuc was the only specialists NC controller producer in Japan, and the need for machine tool producers to offer a standard controller to its myriad smaller producers for whom learning a new system was both difficult and expensive, Fanuc's products soon became the industry standard.

In order to build the equipment on a mass production basis, Fanuc formed a number of technical links. These became more important after the first oil crisis because customers resisted the use of the then standard oil servo motors; they wanted air pressure servos which would not be affected by possible oil embargoes. In 1974, Fanuc became a licensee of the American firm, Geddys, a specialist in DC servo motors¹²³. Then to produce smaller NC equipment, it imported technology from the German giant, Siemens.¹²⁴ Another American company was added in 1976 to assist in stop

placement switches.¹²⁵ This equipment was essential to provide the NC controller with information that the part to be moved had reached its destination; it was critical to the feedback loop necessary for accurate automatic machining. Later, the ties to Geddys and Siemens were renewed a second time.

Fanuc's early reliance on foreign technology willingly supplied by overseas firms was typical. Through various technical discussion groups, such as the "NC Machine Tool Specialist Committee" set up in the **gyokai** in 1977, foreign technical developments were discussed among machinery companies. When a firm learned of foreign technology that it was looking for, it would try and arrange a tieup. For instance, Fanuc's main competitors, Yasukawa Electrics, Okuma and Toshiba all had technical license agreements with the American NC controller firm, Bendix.¹²⁶

The acquisition and distribution of technology contradicts the idea of a planned, centrally directed attempt to build the industry. MITI had little or no influence on contracts; when it did interfere, it was at the bidding of the Japanese licensee. Foreign firms were only too eager to license Japanese manufacturers and gain a stake in a difficult market at little initial cost. Indeed, foreign contacts actually prevented the industry from centralization; as we have noted, tieups with foreign firms were one of the excluded categories in the production restraint agreements. And the entry of firms into machining center, NC lathe and NC mill markets, a process partially made possible by foreign technical ties, was dramatic. Even in the case of controllers, Fanuc's dominance was short-lived. In 1983 and 1984, its share fell to under 50% of the market as Yasukawa and other producers took over a large chunk of the market.¹²⁷

More generally, export policy does not confirm centralization arguments. Analysis of the relation between import restraints and tariffs contradicts the idea that the government was able to plan and mount a drive to stop foreign sales, bolstering the domestic industry.¹ While the percentage of imports as a fraction of domestic production fell, the absolute value of foreign goods underwent shifts randomly associated with tariff barriers. Between 1955 and 1960, as tariff rates were finally imposed across the board on imported machinery, import sales actually rose from 4 to 38 billion yen. From 1960, as tariff rates were progressively lowered, import volume sharply fell to just 7 billion by 1966. When liberalization was applied to all tools by 1970, import volume again skyrocketed to 44 billion yen. Then, with constant tariff rates in the 1970s, imports showed a very erratic pattern; they fell to 13 billion yen in 1976, and rose again to 43 billion by 1981, before sagging again in 1983 as all tariffs were completely removed. Tariff increases therefore associate with import volume increases, while tariff decreases occur with import volume decreases, the opposite of what should be observed. In periods of stable tariffs, imports showed huge swings. As a result, it is highly improbable that the government's tariff policies were a major factor in determining import demand.

MITI's export strategies, in contrast, were even more diffuse, limited to setting volume targets undifferentiated by country or machine type for the duration of various 5 year plans. As we have shown above, the export targets set for the three plans developed under the Machinery Promotion Law and the basic plan of the Electrical Machinery Law were never remotely achieved; they represented a shot in the dark estimate at best, having no related subsidy or other program to assure their realization.

The only effective machine tool export promotion program was conceived and directed by the **gyokai** itself. In May 1962 the **gyokai** set up a 'sister' Japan Machine Tool Export Promotion Association [**Nihon Kosaku Kikai Yushutsu Shinko Kai**]. Its staff was entirely made up of **gyokai** member firms and officers. In August the export association opened offices in Chicago and in Dusseldorf. Their major tasks were to affiliate with trade shows in Europe and the US so that Japanese machines would be represented, conduct surveys of foreign markets, and develop general PR handouts for distribution to overseas customers. The Export Association never actually carried out sales of tools itself, nor arranged financing. Its activities were confined to general publicity and research. It was abolished in June, 1978, as machine tool firms began to pursue their own marketing strategies; the **gyokai** permitted the general research functions of its US offices to be funded by the Japanese External Trade Association (JETRO).¹²⁹ Though JETRO was set up by MITI to promote Japanese trade, the incorporation of the research offices into the organization did not signal growing state control. Rather, the **gyokai** was able to obtain funding for the weak research activities it was conducting by inducing JETRO to become their sponsor. And later, as we shall see, JETRO actually became the center of a state effort to *restrain* Japanese exports in response to foreign criticism. Thus, the Export Association's period of activity does not coincide, until the very end, with export increases. In fact, the percentage of exports to total production actually fell from 1965 to 1972 after the organization was established, while volume increased only slowly. NC gains occurred only after the Association was disbanded. On this evidence, it is hard to link concerted action to export gains.

Two other facts undercut the notion that machinery exports were planned and targeted. The most important was the strength of outsider firms. Mori Seki, an outsider that was the second largest NC producer in Japan by 1981, was exporting over 60% of its products, or 10% of the *total* value of Japanese machine tool exports.¹³⁰ But the firm was entirely beyond the scope of **gyokai** influence and not a party to the Export Association. Rather, as in the several other cases, Mori Seki had formed a technical link with an American entrepreneur, who then supervised exports to the US.

The second fact is that, in general, machinery exports were accomplished in an extremely eclectic manner. Firms like Mori Seki, or in the **gyokai**, Shizuoka sold overseas to individual companies or affiliates with whom they had long term links. In the case of Shizuoka, the company had an arrangement with a small US shop to provide knock-down standard milling equipment to be assembled abroad. The US side noted that the equipment was suitable for NC retrofitting, which led Shizuoka to try and design a full NC mill for export through its American affiliate. It first copied a German NC mill, and then designed its own equipment. The American affiliate liked the design, bought the rights to market it in the US and expanded output. Meanwhile Shizuoka maintained contact with the American company to advise on afterservice or new products.¹³¹

Other companies, such as Hamai, built license links with overseas firms and used them as distributors. Hamai was licensed to build a machining center by Pratt and Whitney which it sold in Europe under the Japanese name. In exports to the US, Pratt and Whitney had the right to use its name on the tool even though it was made in Japan.¹³²

Finally, most firms, in lieu of direct overseas dealer contacts sold their machines through a commercial broker. One with a long term

relationship with the smaller tool makers was Yamazen, around whom a short-lived "group" had been founded in 1967. Other firms associated with different commercial houses; companies like Mitsubishi or Mitsui, for example, tended to market through their old **zaibatsu** affiliates.

Because machine tools and NC equipment were exported through a variety of channels it would have been extremely difficult to target markets. Rather, intense demand for Japanese NC tools propelled greater numbers of US and Japanese entrepreneurs into the market. The degree of competition between them may well have fostered additional increases by reducing prices. But in any case it is unlikely that importers as different as American engineers, US machinery makers, Japanese trading houses and small firm co-ops might have been centrally directed by either the **gyokai** or MITI.

The limited nature of **gyokai** promotional efforts, the diversity of both exporting companies and their access to overseas markets, and finally the absence of a coherent, effective import/export policy by the government does not support the idea that machinery exports were planned. The final irony is that the only export group ever set up with any regulatory power whatsoever was intended to *restrain* trade. And, as we shall see below, the fact that the government had to resort to this strategy to try and stem exports suggests the degree to which overseas sales were not under its control in the first place.

As trade friction with the US grew, criticism from abroad mounted. Several industries feared that their access to the US would be threatened if exports continued to hurt the American economy. However, each industry claimed that the irresponsible parties were found in other sectors, and a period of recriminations took place. Industrial papers like the **Nihon**

Keizai Shinbun which once heralded export industries as national heroes turned to producing dour articles in which it fingered "greedy" sectors in the act of making trade advances. Machine tools, registering unbelievable export gains in the late 1970s and early 1980s, frequently received unwelcome top billing. In response, the government began to urge a number of industries, including machinery, to cut back on sales. It wanted to establish a quota system so that an orderly export arrangement could be set up.

In December, 1977, MITI issued a preliminary draft of a regulation program to control exports of machine tools to the US, and in March, 1978, it established a "North American Trade Requirements Rule" under the Export/Import Commercial Law. Then, in an unprecedented move, it extended the rule's scope to outsider firms, the first time in Japanese history that machinery laws were enforced across all classes of producers. This extension was the product of several factors. Machine tool firms for their part believed that some form of response to U.S. criticism was necessary or they might lose their most lucrative market; consequently, even outsiders like Mori Seki joined the **gyokai** explicitly to support a generalized restraint scheme.¹³³ Additionally, pressure from other business sectors and political and industrial leaders had mounted so that MITI was strengthened in a bid for control--indeed, machine tools may have been singled out precisely because in contrast to autos or electronics the **gyokai** was weaker and thus more susceptible to bureaucratic pressure. In any case, the development of the rule was explicitly cited as evidence of a cartel in the Houdaille petition, which was one of the ironic highlights of its submission: the new export law was not designed to foster overseas sales, it was instead intended to slow them down by forcing firms to respect certain floor prices for specific classes of machines.¹³⁴

Unfortunately for future trade relations, MITI's enforcement of overseas price floors was no more effective than its other policy efforts. Even those companies that had supported the principle of some kind of response failed to agree on how to proceed; no system of compliance or penalty was enacted. From 1978 to 1981 exports doubled, and the proportion of exports that went to the US rose from 25% to over 51% of the Japanese total.¹³⁵ MITI extended the rule for 1981, but again to little effect. Its main utility was as evidence that Japan was attempting to curb unrestrained exports in response to US objections .

Why did the US market prove so lucrative? The answer is found in the technical and marketing relationships between Japanese and US firms, market positioning, and to global economic conditions.

First, Japanese licensing patterns had been in a long term shift from Europe to the US as NC technology was more advanced in America. Most of the overseas NC users Japanese firms had direct contact with were located in the US. As a result, since these license contacts were often the basis for marketing agreements, it was natural to concentrate on US users first.

Next, the fact that American manufacturers ignored the small, job-shop NC market was crucial; Japanese firms were selling a product that was in a distinct niche from the US norm, much like the smaller, economical cars that had led to advances in automobiles. In Europe, Italian and German machinery producers had long experience with the small scale user market, though their NC development lagged. In head to head competition, Japanese firms had to deal with political and market opposition. But in the US, they were selling to firms who had no other source for small scale equipment as American NC production was concentrated on larger, specialty markets.

Finally, America was the single most opulent market for Japanese NC tools. They were, for all their 'small' size quite expensive compared to ordinary tools; the cheapest might run about \$50,000. Further, as sophisticated equipment, NC tools required a knowledgeable pool of users for their success. The only markets with both the requisite know-how and ability to pay were Europe and the US, but Europe had been in a long term slump where the US was headed for recovery. In particular, policies followed by the Reagan administration fostered capital investment and--by increasing the strength of the dollar--Imports. Consequently, the production of Japanese NC tools coincided with favorable conditions in the US, producing an export boom.

Whether these factors are exhaustive or not, there is little evidence of concerted export activity as the statist argument imagines. **Gyokai** endeavors were not associated with export expansion. MITI policies were also ineffective in either fostering or hindering overseas sales. What does explain Japanese successes is the development of NC tools and their subsequent popularity. Thus, it took a production break with traditional tools, equipment that had been the target of government and **gyokai** consolidation efforts for two decades, for export breakthroughs to occur.

We have completed our survey of prewar and wartime machine tool industry policy and have found that conventional arguments regarding the regulation of the Japanese economy are unsupported. Based on the statist view we expected to see that the government had built economies of scale in prewar machinery industries, nurtured their recovery in the immediate postwar, consolidated production to permit enhanced scale economies in the 1960s and then directed the movement into NC technology. Japan, guided by the economic bureaucracy, should have built a more efficient, consolidated

industry than in the US, an advancement that accounted for its competitive success. Instead, every policy and planning effort appears to have been ineffective; the machine tool industry decentralized, and in particular policy initiatives had no apparent relation to NC breakthroughs. Indeed, even if we try to accept the "private" centralization thesis put forward by conservative critics who reject the statist vision, the record of new entrants and diversity in the industry belies the notion that **gyokai** direction was any more effective than MITI guidance.

Moreover, we have uncovered a pattern of government and industry interaction that is quite at odds with conventional wisdom. In Japan, a "strong state," the bureaucracy is supposed to be preeminent. Instead, in an unbroken record of failures stretching back to the late 1920s there is not one example of the adoption, let alone the success, of a MITI or MCI initiative; even the small, fragmented machinery sector blunted, twisted and ignored what the MCI and later MITI wanted. Funds were appropriated and used by machine tool firms without any adherence to the objectives for which they were initially authorized. If we think of a strong state as one that sets goals and then manipulates financial or other incentives to achieve its ends, Japan appears to be extremely *weak*: the government was forced to provide its incentives but could not insist that its goals be met in exchange for support.

Evidence From Additional Cases

But is this pattern unique to the machinery industry? Or does the same evidence of weakness recur in other industries? A cursory glance at three different industrial groups, autos, banking, and oil indicates that

machine tool industry experiences are typical throughout the Japanese economy.

First, let us consider the case of automobiles. Among our examples, the auto industry is the closest in kind to the machinery sector: traditional **zaibatsu** influence was low in the prewar; the industry only flowered in the late postwar; exports were a part of the sector's growth from the late 1970s; automobiles are complex goods whose production involves shaping and combining metals, plastics and other components. Unsurprisingly, the development of automobile industrial policy mirrors the machinery industry case.

As we have seen, prewar policies began with the industry specific law of 1936 in which Toyota and Nissan utterly dominated the MCI. Indeed, Nissan was able to play on military contacts to receive additional support, and both firms made unrestrained use of opportunities in other license schemes such as machine tools to obtain funding. In the war, the automobile sector possessed its own **toseikai** administered by the firms themselves.

Postwar support initially took the form of financial assistance; as in the machinery case, a small fraction of overall capital costs was defrayed in part by government sponsored loans. Though some have claimed that these loans were the source of postwar automobile recovery, it is clear that only the Korean War, which brought windfall American truck orders, lifted automobile manufacturers from their recession.¹³⁶ Japanese automotive firms then utilized the cash this development provided to expand their operations.

The most important evidence of the shape of government/industry interaction in the automobile sector occurred in connection with the capital liberalization panic of the 1960s. After emergency laws providing MITI

with statutory authority to force mergers in various industries were conclusively defeated in the mid 1960s, the bureaucracy turned to promoting consolidation in the auto sector by other means. Its efforts were identical to the push that resulted in the cosmetic "groups" in machine tools; it wanted to enhance scale economies and ensure that domestic producers could not be purchased by foreign interests through mergers of auto manufacturers.

To accomplish consolidation, MITI set up a special loan fund in the JDB to reward auto firms that merged according to plan.¹³⁷ Several centralization schemes were proposed. First, there was a two firm concept in which all auto companies would be consolidated behind Nissan and Toyota. Severe opposition from the auto firms and their leading banks killed the proposal. Next, MITI attempted to gain approval for a three firm concept in which Toyota, Nissan and a third new company, an amalgum of Toyo Kogyo, Fuji and Isuzu would make up the entire Japanese auto industry. Once again interfirm politics and banking interference led to the abandonment of the scheme. Finally, new combinations of companies making up the "third firm" in the three group plan were discussed, although all of them failed because no one could agree on who would be the dominant force in a consolidated industry.

Because the auto industry is so important in any economy, the structural reorganization schemes occupied center stage in 1960s Japan. They proved to be MITI's greatest embarrassment. In 1966, Nissan bought up struggling Prince Motors, a company whose product line was not compatible with Nissan's mix of automobiles. Indeed, a Nissan/Prince merger was opposed by MITI on the grounds that it would not lead to real integration as the consolidation program envisioned. But the bureaucracy was trapped by

the terms of its program; it was forced to authorize a \$11.1 million loan to Nissan in 1966 to "reward" the consolidation.¹³⁸ Thus, though many have argued as if the Nissan/Prince merger was evidence of state control, it was actually a defeat for the bureaucracy, reminiscent of prewar private firm manipulation of the government. After the abortive episode with Nissan, the JDB loan scheme and merger policy were abandoned without leading to enhanced industrial consolidation; in fact, new entrants such as Suzuki and Honda actually further fragmented the auto industry.

Nor were mergers the only area where auto firms completely dominated the bureaucracy. In trade policy as well auto company recalcitrance helped foil MITI initiatives. One of the objectives of the capital liberalization countermeasures was to prevent, at all costs, the linkage of domestic firms with foreign concerns. But in 1969 Mitsubishi Motors stunned MITI by announcing that it would open a new auto manufacturing facility jointly with America's Chrysler. Though the bureaucracy delayed its approval until 1971, Mitsubishi's action led to a large number of overseas contacts throughout the economy and to a hasty "redefinition" of what was proving to be non-existent MITI guidance strategies.¹³⁹

Thus auto firms contributed to the rolling back of trade policies in pursuit of which the nationalistic MITI had exerted its strongest efforts. Yet, even here the bureaucracy was soundly defeated. Further, the Japanese auto industry continued to decentralize to the point where the fastest growing firms were the smaller producers; the total industry was composed of nine major companies where there were just three in the US.

Banking provides another look at supposed central direction. In particular we will focus on developments in lending in the 1960s, when

structural reform and recovery policies were at their height. According to some observers, Japanese banking regulation in this period was a conscious attempt to direct loans to "key" industries chosen by the bureaucracy to foster growth. Private banks followed the lead of the bureaucracy because they had expanded outlays so rapidly that they were forced to draw additional funds from the central Bank of Japan (BOJ). This condition was referred to as an "overloan." Because a bank with an overloan at the BOJ would be vulnerable to pressure regarding repayment beyond legal ratios, the reasoning goes, the Ministry of Finance was able to manipulate private banks through the BOJ towards a lending pattern sought by the bureaucracy.

But overloan politics and actual planning belies these assertions. Consider the position of the bureaucracy relative to overloans. If excess outlays by the BOJ were the source of influence over banks, and if this power was what the bureaucracy sought to control finance, we should expect to see that overloans were actively promoted. However, from 1960 when the economy entered its high speed growth period, the Ministry of Finance attempted time and time again to end overloans because they were viewed as destabilizing and inefficient. Thus, in 1962 a new bond financing system was introduced to do away with overloans; the BOJ would float public debentures to raise necessary capital. Overloans persisted, however, both for structural and political reasons. Structurally, there was no other way for the Japanese economy to provide flexible credit than for the BOJ to adjust its loan ratios. Thus, in a period of high investment, overloans would occur as banks extended more credit. Moreover, overloans were a convenient, cheap source of capital for private lenders; in effect, above a certain level the government was providing public funds to private banks for their own loans. Hence, overloan politics do not confirm the view that they

were desirable instruments of state control since the bureaucracy wanted nothing more than to eliminate them.¹⁴⁰

Next is the work of the Investment Finance Committee of the 1950s-1968 and the Industrial Finance Committee (IFC) of the 1967-1970s, the latter a subgroup of the Industrial Rationalization Council (IRC) set up by MITI in the mid 1960s. The IRC is often cited as evidence of MITI guidance; under its auspices, industrialists, bankers and bureaucrats submitted plans for investment or growth that were to be coordinated. The IFC and the earlier Investment Finance Committee were supposed to be bodies in which bankers would match lending plans to industrial requirements as indicated by expansion goals. Yet, as we have seen in the private and public planning cases in machine tools, the existence of a planning agency says nothing about its effectiveness; private firm rivalry, mistrust or erroneous estimates usually rendered planning ineffective.¹⁴¹

The Investment Finance Committee also experienced difficulties. The Investment Finance Committee was run by the Ministry of Finance between 1955-1968, when it was abolished. Like the machine tool Industry's five year plans, it was to have produced investment planning goals, though its plans were stipulated for just one year periods. Still, they bore no relationship to actual outcomes. For instance, in 1961 the average degree of variance for several industries was nearly 6% and in some cases 11% (cement) and 21% (paper.) In 1962 industries for which planned investment targets were missed by over 10% include petroleum, petrochemicals, ammonium sulfate, electronics, and paper, while in 1963 average variance again was close to 6%. The committee's targets, though short range 12 month periods, were nevertheless ineffective.¹⁴²

The same was true of the Industrial Finance Committee. Though MITI intended it to coordinate funding, it quickly developed that IFC "planning" was really nothing more than forecasting, a function duplicating effort in the Economic Planning Agency and the JDB, among other groups. In fact, if MITI spotted discrepancies between "planned" investment and actual outlays, the amounts on the *planning* documents were changed to reflect reality.¹⁴³ Thus, the committee's documents could not have been effective influences in directing investment. And banking, as the auto and machinery sectors suggest, was not controlled by a central authority.

Finally, let us consider the case of oil. Energy in general and the oil industry in particular are sectors that provide acute problems for statist arguments. Japan, usually viewed as an energy poor "strong state" actually has less public presence in oil and other related industries than any other major industrial power except the US. Indeed, it resembles most the American industry, long an example in comparative literature of a "weak state" structure since private interests prevail. Despite the strategic importance of the oil industry, which has prompted heavy government intervention in Europe, Japan retains an extremely fragmented, privatized petroleum sector.

The reason, of course, is politics; government initiatives for a public oil firm have been thwarted by private companies since the prewar period. Petroleum firms were the first group affected by the industry specific laws of the 1930s, and as we have seen they utilized government authority for their own advantage. Even during the war the crucial oil industry resisted consolidation efforts while receiving heavy subsidies. Thus prewar petroleum policy, though shaped by the oligopolistic nature of the industry

(eight firms predominated) nevertheless resembled developments in the much more fragmented machinery sector.

The attempt by MITI to create a state oil company stands out as one of the great policy failures of the postwar era. It was marked by private company opposition resulting in a series of setbacks for the bureaucracy, and ultimately for additional oil firm support. Initial efforts in the 1950s, conditioned by complicated political maneuvering involving oil firms, the bureaucracy and finally, interests trying to move into the oil sector like the redoubtable Ayukawa of Nissan, bore results in 1955 when JAPEX was created. However, as a state firm JAPEX was severely restricted in its scope. It accounted for less than 2% of total Japanese demand, and its output was 50% of targeted amounts. Ultimately Japanese oil firms, shareholders in the venture, abandoned their stake in an effort to further cripple JAPEX's possible encroachment into their market.¹⁴⁴

Between 1961-1967 a number of plans for a state company were discussed in connection with a Petroleum Industry Law, which was meant to be a reincarnation of the prewar legislation. But again private firm opposition and even reservations voiced by other branches of the bureaucracy led to difficulties: the law was eventually passed only after plans for a state company were shelved. Then, in an effort to implement some of the powers of the new authorizing legislation, MITI sought to extend government influence in the industry by creating equity institutions. These would hold shares in private firms, leading, it was hoped, to centralized state control. Both the Ministry of Finance, seeking to preserve its turf, and the affected firms vetoed several proposals; as one scholar notes, "MOF was willing to increase the JAPEX budget in the 1960s but it refused to accept the creation of a new public agency. Private industry was

willing to accept new public funds but it resisted new public controls."¹⁴⁵ Private companies welcomed government intervention just so long as it was of benefit to their own interests.

Out of all this came the Japan Petroleum Development Corporation in 1967. This firm was constrained to do nothing more than provide exploration or drilling support for private firms; it was utilized by existing companies for their own private purposes.¹⁴⁶ Thus, the state ultimately was forced to actually reduce investment risks for the very firms it wanted to consolidate and control. Again, as in autos, banking and machine tools, apparent state influence is revealed as government weakness.

These examples show that the statist view profoundly misinterprets the way that the Japanese economy developed; scholars often mistook MCI and MITI initiatives for effective policies, and the motives of the bureaucracy for actual outcomes. More significantly, both the statist and the "private" centralization positions are wrong in their basic belief that it was through scale economies, consolidation, coordination and centralized authority that Japan achieved its high growth rate. Instead, we have seen that in almost any sector Japan is more deconcentrated than the U.S. economy, and that constant efforts to merge firms, whether mounted by MITI or industry groups, never materialized. The economy does not appear to be a supercharged, centrally guided, advanced mass production machine as conventional views attest.

It is possible to speculate in some detail as to reasons for the bureaucracy's weakness and to try and reformulate a new picture of how the Japanese state actually functions; indeed, the urge is to try and replace the "strong" state theory with a newer, more accurate candidate. But to do so would obscure the extent to which our test of conventional wisdom reveals

widespread differences in the nature, operation and the structure of Japanese industry. We have found that Japanese firms built smaller, sophisticated NC tools than elsewhere. We have seen how market entry and diversification were extremely important in this development, something inexplicable in conventional perspectives. Further, traditional ideas provide little clue as to why Japanese interest in new NC tools translated rapidly into market successes where US firms either ignored them or could not adjust production to make smaller equipment. Finally, we have seen that neither bureaucratic forces nor industry groups were able to counteract the intensity of independent, new market entry and coordinate industries.

Taken as a whole, the evidence we have uncovered differs so significantly from the conventional picture that it calls for a dramatic reinterpretation of Japan. It is impossible on the strength of the findings presented above to once more salvage the overall notion of Japanese efficiency by trying yet again to fit disparate political, market and strategic features of the machine tool industry into its scope. Instead, in Chapter Four, we will claim that the general patterns unearthed in the test of the centralization thesis can be better understood by abandoning traditional analysis altogether. What is significant about Japan, we will argue, is the way that several related, but distinct developments throughout the economy brought industrialists towards a hybridized manufacturing system in which mass production and its opposite, flexible specialization, co-existed. In the apparent failure of conventional arguments, then, we have the basis for an entirely new approach to interpreting Japanese and comparative economic development.

¹c.f. Johnson, Nakamura, Okimoto and Vogel, *op cit.* Chapter One.

²See John Dower, **Empire and Aftermath: Yoshida Shigeru and the Japanese Experience**, (Cambridge: Council of East Asian Studies, 1979) for the best single account of how former war criminals like Yoshida played upon SCAP's concern to counter the "communist menace" and were able to achieve impressive political power.

³See *Hahanaru no Kikai, op cit.*, page 48.

⁴See *Hahanaru no Kikai, op cit.*, page 48, and *Nihon Kosaku Kikai Kogyokai, Nihon no Kosaku Kikai Kokgyo Hattasu no Tsuten, op cit.*, pages 160-163.

⁵ *Hahanaru no Kikai, op cit.*, page 48.

⁶ *Hahanaru no Kikai, op cit.*, page 99.

⁷ *Hahanaru no Kikai, op cit.*, page 121.

⁸However, an unspecified number of firms continued operations in other fields, waiting for production opportunities to develop. See the description and statistics in, *Hahanaru no Kikai, op cit.*, page 48.

⁹*ibid.*

¹⁰*ibid.*, page 49.

¹¹The best account is by a former key staffer in the JMTBA, Sugiyama Itchiro, who was present when the **gyokai** was established. See his recollections in " *Kogyokai Hassoku ni Itaru Made o Kaiko Shite*" [Recalling the Creation of the JMTBA] in *Hahanaru no Kikai, op cit.*, pages 25-26.

¹²The record of movements by firms into and out of the **gyokai** in 1951-1981 is detailed in a chart " *Kaiin no Ido Jokyō*" [Changes in Membership] in *Hahanaru no Kikai, op cit.*, page 58.

¹³Membership figures from *Hahanaru no Kikai, op cit.*, page 58; Industry figures from Tsusasho (MITI), *Nihon no Kogyo Tokei* [Industrial Statistics of Japan] years specified.

¹⁴ *Hahanaru no Kikai, op cit.*, page 50.

¹⁵ *Hahanaru no Kikai, op cit.*, page 53.

¹⁶The entire document is reproduced in the industry's historical yearbook, *Hahanaru no Kikai, op cit.*, "shiryo" section, pages 10-15.

¹⁷ *Hahanaru no Kikai, op cit.*, page 62.

¹⁸*ibid.*, pages 62-62.

¹⁹*ibid.*, page 63.

²⁰*ibid.*, page 68.

²¹The effects of early policy are discussed in *Hahanaru no Kikai, op cit.*, page 63.

²²The subsidies are described in *Hahanaru no Kikai, op cit.*, page 63; capital spending for the period was calculated from data supplied in "Investigation of Imports of Metal Cutting and Metal Forming Machine Tools

Under Section 232 of the Trade Expansion Act of 1962" submitted by Wender, Murase and White to the International Trade Administration, Department of Commerce, 1983 in response to the Houdaille Petition, page 104.

²³See Johnson, *op cit.*, pages 191-242.

²⁴*Hahanaru no Kikai, op cit.*, page 64.

²⁵The text of the Machinery Promotion Law can be found in Diet Records as Law Number 452 of 1957.

²⁶The details of the various plans can be found in *Hahanaru no Kikai, op cit.*, page 64.

²⁷See *Nihon Ginko Chsabu, Waga Kuni no Kinyu Seido*, [Bank of Japan Research Bureau, **Our Country's Financial System**] (Tokyo: 1976) page 347.

²⁸Confidential JDB loan data was made available to the author by MITI's Industrial Machinery Bureau in a chart, "*Nihon Kaihatsu Ginko kara no Kosaku Kikai Sangyo e no Yushi Suii*" [Changes In the Disbursement of Funds from the Japan Development Bank to the Machine Tool Industry]. The Chart covered the period 1956-1983. The relative weight of JDB financing was inferred from the ratio of support provided 1979-1982 as indicated in further MITI confidential documents which showed that the JDB provided over 90% of public machinery support.

²⁹See note 14.

³⁰*Hahanaru no Kikai, op cit.*, "Shiryo" section, pages 25-26.

³¹Johnson, *op cit.*, pages 63-73.

³²c.f. Samuels, *op cit.*, for the case of oil.

³³*Nihon no Kogyo Tokel, op cit.*

³⁴Interview, Kawashima Yuzo, Director JMTBA Technology Division, November 29, 1984.

³⁵*Ibid.*; Interview with Sugiyama Itchiro, former director and long term employee in the JMTBA, November 20, 1984, January 15, 1985.

³⁶Interview, MITI Industrial Machinery Division, October 17, 1984.

³⁷To my knowledge, the rotation of officials on a regular basis has never been discussed before in internal analyses of MITI. My observations are based on a two week period of employment in MITI as the then only foreign employee with responsibility for translations or correcting English in official documents. During that period I interviewed a number of officials informally, and from those conversations learned about the effects of the two year rotations.

³⁸Interview, MITI Industrial Machinery Division, October 17, 1984 including a senior director, and assistant director and a young staffer.

³⁹See notes 24-26 above for interview cites.

⁴⁰MITI interview, October 17, 1984, with Sunoda, Assistant Director. Sunoda provided the two examples cited above to illustrate both the poor quality of planning and why firms did as they pleased.

⁴¹Many machine tool firm leaders expressed a lack of confidence in the **gyokai**; the most pronounced was a representative from Mori Seiki, who stated flatly that "no one speaks the truth there;" interview, December 26, 1985. An example of surveys that were ignored included the data on new machine tool types discussed later; as many as 70% of surveys mandated by the **gyokai**'s own internal agreement were ignored by participant firms.

⁴²c.f. Johnson, **op cit.**, pp. 209-211; also Eisuke Sakakibara, eds., **The Japanese Financial System in Comparative Perspective**, Joint Economic Committee, Congress of the United States, March 1982, p. 21.

⁴³Number of loans was supplied by MITI Industrial Machinery Division, **op cit.**; industry data from *Nihon no Kogyo Tokai*, **op cit.**, 1957.

⁴⁴MITI Industrial Machinery Division, **op cit.**

⁴⁵See MITI, **Growth Factors of the Machine Tool Industry**, (Tokyo, 1983) pages 10-13 for details of US spending; also Wender, Murase et al., **op cit.**

⁴⁶Interview, Vice President of the Number One Division of Riken Seiko, Koike Seito(?) Tokyo, November 22, 1984.

⁴⁷c.f. *Hahanaru no Kikai*, **op cit.**, page 70;

⁴⁸**ibid.**

⁴⁹Interview, cite

⁵⁰See Johnson, **op cit.**, pages 274-281 for an excellent account of the bureaucracy's response to the capital liberalization crisis.

⁵¹Johnson, **op cit.**, page 276.

⁵²This argument has been made best by Kozo Yamamura, "Success that Soured: Administrative Guidance and Cartels in Japan" in Yamamura, eds., **Policy and Trade Issues of the Japanese Economy** (Seattle: University of Washington, 1982) page 82 where he cites over 1,000 cartels as evidence of consolidation. However, even the most fervent advocates of this view of bureaucratic influence in Japan such as Yamamura have been forced to admit that the huge majority of these 'cartels' are really organizations of small firms seeking a defensive position against larger ones. That is, the cartels in fact promote the survival of the smaller firms that were supposed to be eliminated through mergers in the first place. (page 82)

⁵³Vogel, **op cit.**,

⁵⁴Johnson, **op cit.**, page 278.

⁵⁵Yamamura, **op cit.**, page 82.

⁵⁶**ibid.**

- 57 "*Kosaku Kikai Seizogyo Kozo Kaizen Keikaku*" in *Kosaku Kikai News*, JMTBA, October 1969, page 9. ["Machine Tool Industry Structural Reform Plans," *Machine Tool News*, published by the JMTBA as their in house newsletter.]
- 58 *Hahanaru no Kikai*, **op cit.**, pages 67-68.
- 59 Yamamura, **op cit.**, page 81.
- 60 Expenditure data from MITI Industrial Machinery Division, **op cit.**
- 61 **ibid.**
- 62 **ibid.**
- 63 History is contained in "*Shuchuseisan ni Kan suru Moshiawase no Kaitei ni Tsuite*" in *Kosaku Kikai News*, JMTBA, January 1968, page 8. (Confirm Data In HD)
- 64 **ibid.** Also, interview, Sugiyama Itchiro, November 11, 1984.
- 65 **ibid.**
- 66 Interview, Sugiyama, **op cit.**; also *Kosaku Kikai Seizogyo Kozo Kaizen Keikaku*" in *Kosaku Kikai News*, JMTBA, October 1969, page 10.
- 67 **ibid.**
- 68 *Hahanaru no Kikai*, **op cit.**, page 58.
- 69 As calculated in Yano Securities, **The Machine Tool Industry** (Tokyo: 1982) page 57.
- 70 "*Shuchuseisan ni Kan suru Moshiawase no Kaitei ni Tsuite*" in *Kosaku Kikai News*, JMTBA, January 1968, page 8; also "*Kosaku Kikai Seizogyo Kozo Kaizen Keikaku*" in *Kosaku Kikai News*, JMTBA, October 1969, page 9 and 10.
- 71 "*Shuchuseisan ni Kan suru Moshiawase no Kaitei ni Tsuite*" in *Kosaku Kikai News*, JMTBA, January 1968, page 8
- 72 *Hahanaru no Kikai*, **op cit.**, page 72 and 121.
- 73 *Hahanaru no Kikai*, **op cit.**, page 72.
- 74 *Hahanaru no Kikai*, **op cit.**, page 121.
- 75 *Hahanaru no Kikai*, **op cit.**, page 72.
- 76 Interview with "Morys" Imada, President, Hamai International, October 24, 1984.
- 77 The entire text of the White Paper is duplicated in *Hahanaru no Kikai*, - **op cit.**, "Shiryō" section pages 19-21; page 21 contains the rejection of the recession cartels.
- 78 Interview with Sugiyama Kazuo, **op cit.**
- 79 *Hahanaru no Kikai*, **op cit.**, pages 72 -73.
- 80 The most comprehensive treatment of the Group scheme is found in "*Kosaku Kikai Gurupu no "Ayumi" to Genjo*," *News Digest*, (Tokyo: Seisanzaei Marketing, January 1970, ["The Current Condition and "Development" of machine Tool Groups"]) as reprinted in *Nihon Kosaku Kikai Kogyokai, Ni-ju*

Nen no Bijaku, [JMTBA, **Twenty Years of Growth**] (Tokyo: Seisanzai Marketing, 1972) pp. 489-500; quote on page 491.

81 **ibid.**, page 491.

82 Sugiyama interview, **op cit.**; ***Hahanaru no Kikai***, **op cit.**, page 72.

83 Imada interview, **op cit.**

84 Sugiyama interview, **op cit.**

85 Sugiyama interview, **op cit.**; ***Hahanaru no Kikai***, **op cit.**, page 72.

86 Sugiyama interview, **op cit.**; ***Hahanaru no Kikai***, **op cit.**, page 72.

87 **ibid.**, page 499.

88 **ibid.**

89 **ibid.**, page 498.

90 **ibid.**, page 499.

91 **ibid.**

92 Sugiyama interview, **op cit.**

93 Sugiyama interview, **op cit.**; Imada interview, **op cit.**

94 ***Hahanaru no Kikai***, **op cit.**, page 121.

95 As quoted in "Kosaku Kikai Gurupu no "Ayumi" to Genjo," ***News Digest***, (Tokyo: Seisanzai Marketing, January 1970, ["The Current Condition and "Development" of machine Tool Groups"]) as reprinted in ***Nihon Kosaku Kikai Kogyokai, Ni-ju Nen no Bijaku***, [JMTBA, **Twenty Years of Growth**] (Tokyo: Seisanzai Marketing, 1972) page 499.

96 "Kosaku Kikai Seizogyo Kozo Kaizen Keikaku" in ***Kosaku Kikai News***, JMTBA, October 1969, page 9.

97 "Kosaku Kikai Seizogyo Kozo Kaizen Keikaku" in ***Kosaku Kikai News***, JMTBA, October 1969, page 10.

98 **ibid.**

99 Sugiyama interview, **op cit.**

100 c.f. Johnson's account of the FTC and steel, **op cit.**, pages 299-303.

101 "Kosaku Kikai Seizogyo Kozo Kaizen Keikaku" in ***Kosaku Kikai News***, JMTBA, October 1969, pages 10-12.

102 See the text of the agreement in "Kosaku Kikai Seizogyo Kozo Kaizen Keikaku" in ***Kosaku Kikai News***, JMTBA, October 1969, pages 10-12.

103 "Kosaku Kikai Seizogyo Kozo Kaizen Keikaku" in ***Kosaku Kikai News***, JMTBA, October 1969, page 10.

104 **ibid.**, page 11.

105 "Shuchuseisan ni Kan suru Moshawase no Haishi to Shinseihin Todokede ni Kan suru Kijun no Seitei ni Tsuite" ["Concerning the Repeal of the Concentrated Production Agreement and the Standards for Reporting New Products] in ***Kosaku Kikai News***, JMTBA, February 1971 pages 24-25.

106 **ibid.**, page 24.

107 **ibid.**

¹⁰⁸See the Houdaille Petition, **op cit.**

¹⁰⁹James Gray in NMTBA, eds., **1984-1985 Economic Handbook of the Machine Tool Industry**, (Maclean, VA: NMTBA, 1983) pages II-III.

¹¹⁰Import data from *Hahanaru no Kikai*, **op cit.**, page 121; NC versus normal tooling data on pages 112-113.

¹¹¹*Hahanaru no Kikai*, **op cit.**, page 133.

¹¹²**ibid.**

¹¹³Compiled by author from raw data cited above.

¹¹⁴*Hahanaru no Kikai*, **op cit.**, page 63 and 121.

¹¹⁵*Hahanaru no Kikai*, **op cit.**, page 65.

¹¹⁶As presented in MITI Industrial Machinery Division, **Growth Factors of Japanese Machine Tool Industry and Industrial Policy**, December, 1983 pages 15-16.

¹¹⁷Johnson, **op cit.**, page 217, is especially impressed with this "power" though he offers no single case of its application.

¹¹⁸Johnson, **op cit.**, page 246-247; but other sources indicate that even here it is impossible to judge who really won--IBM apparently claims that it forced MITI to give in. Conversation based on internal IBM documents with Leonard Lynn, Professor of Management and Technology, Carnegie Mellon University.

¹¹⁹International lawyer specializing in Japanese/American tieups, anonymity requested.

¹²⁰MITI Industrial Machinery Bureau documents of government support records, **op cit.**

¹²¹See Nukui Ken, *Kiirōi Robota*, [**Yellow Robots**] (Tokyo: Yomiuri, 1982) pages 46-55. (Fanuc's robots are noted for their yellow color.)

¹²²**ibid.**

¹²³*Hahanaru no Kikai*, **op cit.**, pages 90-91.

¹²⁴**ibid.**

¹²⁵**ibid.**

¹²⁶**ibid.**

¹²⁷Nukui, **op cit.**, page 35.

¹²⁸The following analysis is based on tariff data presented above and on import records in *Hahanaru no Kikai*, **op cit.**, page 121.

¹²⁹*Hahanaru no Kikai*, **op cit.**, pages 70-71.

¹³⁰Yano Securities, **The Machine Tool Industry**, (Tokyo: 1979) page 14.

¹³¹Interview with Mochizuki Yutaka, Director of Business Operations, Shizuoka Machine Tool Co., December 8, 1984.

¹³²Interview with Imada, Hamai President, **op cit.**

¹³³Interview, Mori Seki, Nara, Japan, December 25, 1984.

¹³⁴*Hahanaru no Kikai*, **op cit.**, page 73.

¹³⁵ *Hahanaru no Kikai*, **op cit.**, pages 128-129.

¹³⁶ See for example the way that Toyota's former vice president of sales viewed the War as a godsend--Shotaro Kamiya, **My Life With Toyota**, (Tokyo: Toyota Motor Sales, 1976), appendix.

¹³⁷ The best account is William Duncan, **US-Japan Automobile Diplomacy** (Cambridge: Ballinger, 1973) pages 142-145.

¹³⁸ **ibid.**

¹³⁹ Johnson, **op cit.**, pages 287-288, provides an excellent account of the *failure* of the bureaucracy in this instance. Amazingly, he ties the activity to the lack of an **amakudari** placement in Mitsubishi, an incredible claim; Mitsubishi had tremendous contacts with MITI. The real reason for the company's defiance is that it stood to benefit from not going along with MITI on rejecting foreign contacts since it had no foothold in the domestic market; foreign ventures gave it a growth opportunity.

¹⁴⁰ Horiuchi, **op cit.**, pages 29-33.

¹⁴¹ **ibid.**, pages 50-53.

¹⁴² **ibid.**, page 55.

¹⁴³ **ibid.**, page 56.

¹⁴⁴ Samuels, **op cit.**, pages 20-21.

¹⁴⁵ Samuels, **op cit.**, page 23.

¹⁴⁶ **ibid.**, pages 23-24.

Chapter Four

Small and Large Firm Development in Japan and the Hybrid Economy

The purpose of this and the next two chapters is to show how Japanese manufacturing industries diverged from the development of pure mass production and instead integrated flexible producers into the mainstream of the economy. We will argue that a number of convergent factors including the strategies of large firms and small firms, the relationship between the two groups, the provision of finance to smaller producers and finally the growth of industrial regionalism reversed efforts initially aimed at the creation of a centralized mass production economy. The result was a "hybrid" economy: in addition to mass producers other firms specializing in the ability to make rapidly changing, technically superior products or parts became an important component of Japan's industrial structure. Thus, mass production and flexible production coexisted in Japan, permitting the simultaneous manufacture of both low cost standard items and highly sophisticated, differentiated components that could be rapidly altered. The marriage of these two manufacturing styles, we will claim, is what distinguishes Japan especially from the U.S. and accounts for the competitive advantages the country enjoyed in the postwar period.

To make this argument we will depart from conventional efforts in several respects. As we discussed in the Introduction, recent research has suggested that real variability beyond mere efficiency differentials between countries may result in the cumulative effects of myriad struggles

associated with the production system. Labor relations, finance, company strategies, the ideologies of large and small firms and government policies are among the many factors which taken as a whole may push an economy towards the adoption of mass or flexible manufacturing principles. Our view is thus distinguished from the conventional wisdom in rejecting the assumption that all economies are fundamentally similar in their underlying trend towards the perfection of mass production alone.

In this claim the notion of what is "political" and the basic method used to analyze particular cases is also different from that of traditional studies. The conventional effort has been to try and link national or "high" politics--the bureaucracy or the legislature--to efficiency gains. While it is undeniable that these national forces have played a role in shaping the Japanese economy, and indeed we will present evidence of at least one historical trend to that effect, this focus ignores the profound influence that politics between firms, or at the regional level exert on production decisions. We do not usually think of this sort of "low" politics as the focus of social research, or even as "politics" in the same sense as Diet deliberations. Yet, if we assume in contrast to conventional arguments that there is considerable ambiguity facing firms in deciding what to produce and how to make their products, then the ideologies and struggles of competing industrial actors to define solutions to manufacturing problems become critical. But debate over the proper choices that ought to be made is a profoundly political process. Thus, though our account of the Japanese production system will emphasize strategies and conflict at the "low" or firm level, it remains a study of political struggle in the most direct sense.

These considerations have important consequences for the method employed in research. In our view the context in which open-ended

Industrial decisions are made in each case determines the fundamental character of an economy, which may differ in kind as well as relative efficiency. This context is shaped by hundreds of factors; indeed developments that may appear initially unrelated to industrial growth--property rights in provinces, for instance, or family structure--very frequently turn out to have an effect on a nation's economy. The fact that national cases are systematically affected by the history of conflict in diverse areas means that it is impossible and misleading to try and distinguish countries on the basis of a single or few dimensions. It is impossible since any given "causal" element--finance, for instance--can account for observed outcomes only if all the other contextual variables such as ideologies, markets, and so on are explicitly brought into the explanation. Indeed, as we saw in the introduction, this is precisely the dilemma currently facing contemporary comparative research: the desire to neatly distinguish cases and provide parsimonious explanations for industrial differentials clashes with the reality of the contextual dependence of proposed causal factors. Further, the effort is misleading since the attempt to raise an isolated set of factors as accounting for observed outcomes does violence to the initial appreciation of the contextual variance of the economy that sensitized the researcher to asking new questions in the first place. If the importance of the context in shaping an economy is lost in the analysis, the extent to which the idea that background factors can reshape an industry involves a rejection of traditional perspectives about economic development is muddled.

Thus, the test of our argument is how well a wide variety of developments in the market, the companies that produce goods, the surrounding financial business climate and regulatory trends can be linked

to provide a systematic account of a national case. Additionally, the value of our claim is in its power to unlock evidence ignored or unjustifiably explained away by conventional views while leading to new questions that would not have even been asked under traditional assumptions. Our study will not be able to provide every detail of the development of the Japanese economy and its basic structure; much will of necessity be left unsaid. But in linking a diverse pool of overlooked as well as reinterpreted data together in a systematic way, it will at once provide a more compelling account of what Japanese producers actually do in the market, while highlighting the political sources--as we defined above--of these developments.

This chapter will begin with an historical study of the relationship between large and small firms and the subsequent expansion of opportunities for flexible producers in the economy. It will first consider and reject the conventional view of smaller firms based on the idea of a "dual structure" in Japan in which smaller producers were exploited by larger ones to enhance scale economies. Then we will turn to the historical development since the Depression of the relations between large and small firms. We will show how convergent--if unanticipated--trends in what large companies wanted to do in the economy and how smaller firms reacted led to the emergence of flexible practices in both the largest and most minute factories. Then, we will discuss how these strategic trends were reinforced by the politics of financial support for smaller producers, something which helped provide a favorable context for continued development of the flexible option in the economy. In Chapter Five we will examine another contextual factor, industrial regionalism, which provided a local organizational framework for small scale flexible operations. In

particular we will see how the growth of flexible firms in Japan affected the demand for NC tooling and led to new markets. Finally, in Chapter Six we will relate these general contextual findings to the Japanese machine tool market, Japanese manufacturing as a whole and compare them with the United States.

The "Dual Structure" Revisited

Let us begin with the relations between small and large firms. The starting point for our study will be to consider a well-developed argument in the Japanese literature called the "dual structure" [**ni-ju kozo**] theory which argues that smaller producers are institutionally subservient to larger ones and absorb the costs and dislocations of economic reversals. The use of this term dates from Japan's 1957 White Paper which popularized the idea that small firms were inferior in all ways to larger ones, and subject to the control of bigger producers through contracting arrangements.¹ But recognizable elements of the dual structure hypothesis can be found in Japanese literature since at least the 1920s when prewar MCI bureaucrats wanted to consolidate "backward" or "traditional" firms into "modern" factories.² Then, in the 1930s, Japanese export successes prompted foreign countries to criticize what they felt was the highly exploitative use of low wage labor in small firms to undercut global prices; intense scrutiny of Japanese small firm labor conditions led to the conviction that smaller factories were technically and managerial deficient and thus dependent on sweating for their survival. Following the war, the slack economy once again saw wage differentials grow, and dual structure analysis became a stock item in Japanese economic studies. Moreover, the

negative evaluation of smaller enterprises contained in dual structure thinking has been uncritically accepted by non-Japanese scholars or economic analysts in the popular media.

Though Japanese literature often treats the problem of the dual structure as yet one more manifestation of Japanese "uniqueness" the argument is identical to similar work arising in America and Europe.³ Large firms, it is thought, control the core, stable demand in any market. They pay high wages to retain their workforce, something which in Japan is particularly evident given the norm of permanent employment in paternalistic larger enterprises. Small firms cluster about the larger companies, and are provided with work in accordance with demand cycles. Their labor force is impermanent, and composed of low wage labor which makes them attractive to large firms for subcontracting. However, when demand turns down, orders dry up; small firms that are lucky enough to obtain orders may have payments delayed as large companies use their smaller subcontractors to shift the burden of demand shortfalls [shiwayose]. As Nakamura explains, this system would permit large companies to continue operations at the expense of their subcontractors:

When business was poor, parent firms would drop their subcontractors and postpone payment on their accounts, while in good times they would increase subcontracting. Then, citing the need for rationalization among subcontractors, they would beat prices down to low levels....The large firms got away with this sort of thing because the small companies were at a great relative disadvantage. For example, in the 1950s, the small firms could not entrust their survival to the expectation of loans from monetary institutions. During periods of monetary ease when funds were abundant banks went ahead and made loans to small businesses, but when money became tight they would hurriedly call in these loans. Needless to say, subcontracting firms were also at a disadvantage in terms of competitive ability in the marketplace.⁴

Small firms are locked into perpetual subservience to larger companies due to their enforced dependence on cyclical demand. The unstable position of smaller firms means that they can not develop the technical skills commensurate with large companies. They are forced to depend on cheap labor for their existence, while serving, as Johnson writes, as the Japanese "shock absorber" for the large, core enterprises in any given sector.⁵

If this argument were true, it would provide proponents of the centralization thesis with a way to explain the fact that a much higher proportion of Japanese manufacturing takes place in small and medium enterprises. The existence of a huge cadre of small manufacturing enterprises, it can be claimed, does not suggest decentralization; rather, it is a manifestation of the extreme centralization of the Japanese economy. Large firms have been able to sustain a large pool of cheap labor in dependent small enterprises while stabilizing their own internal workforce and market position. The low wages, technological gap and seasonal, unpredictable demand faced by small firms is evidence of the power of the large companies to set up the economy in a way most favorable to their interests.

The dual structure thesis arose from very real conditions of exploitation and hardship in the Japanese economy and elsewhere. Long working hours, low pay, and desperate dependence on uncertain subcontracting orders are the dark side of all economies. And it may be the case that exploitation was particularly acute in Japan, especially during the military buildup of the late 1930s and the immediate postwar depression. No one can or should deny that miserable working conditions were evident in Japan and in other nations.

But we will show that there are disturbing problems with the dual structure argument, difficulties that at minimum would involve a reinterpretation of the small and large firms in the economy. The rethinking of conventional ideas about large and small firms in Japan is the task of the following section. Our objective here is to present pieces of evidence in opposition to the dual structure thesis, and thus pave the way for a new interpretation.

Let us begin our analysis by examining the argument that in Japan large or parent firms force smaller ones to absorb the costs of demand shifts. A crucial test of this hypothesis is to examine the adjustment patterns of small and medium and large firms during periods of recession or depression. If the dual structure argument is correct, the cutting off of resources and the imposition of adjustment costs on smaller subcontractors should be especially apparent during economic crises. What we should see is that in the course of the downturn, employment in large firms should remain stable while it declines significantly in small firm categories. In addition, the number of large firms should be more or less stable as they retain the stable portion of demand during recessions, while the number of smaller firms should drop as markets, financing and orders evaporate.

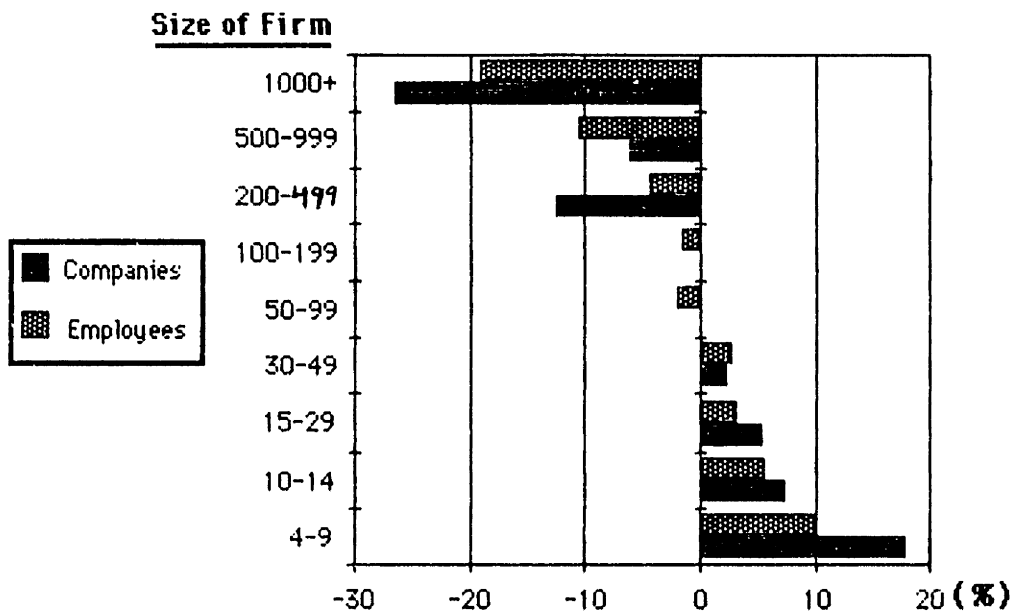
Excluding the immediate pre and post wartime period in which adjustment patterns were profoundly affected by non-economic factors, since 1920 the Japanese economy has undergone severe manufacturing industrial contractions in four periods; the Great Depression (1929-1932), the 1950s "mini recessions" (1957-1959), the first "oil shock" caused by the Arab oil embargo (1975-1977) and the second "oil shock" brought about by the Iranian crisis (1978-1980). These dates may not correspond exactly to common delineations of each of these recessionary periods; for each

sector and type of economic undertaking, service industries, banking, extraction, energy and manufacturing, the periods of contractions were different. The dates we have highlighted represent the peak and the trough of the retrenchment in *manufacturing* alone for each of the four recessionary periods. In this way, the moment of greatest stress in the economy for manufacturing enterprises may be examined to see which classes of firms suffered the most.

Figure 4.1 shows that the pattern of change in the Japanese economy during the Great Depression was precisely the opposite of what the dual structure hypothesis would have predicted. The size classes experiencing the largest decreases in both employment and number of firms are the largest categories; the number of companies in the 1000+ employee class fell by 27% and employment dropped 19%, both figures being the largest for any size class. These reductions are comparable to, or even a little less severe than those in the U.S. during the Depression. But in contrast, as company scale decreased, the effects of the Depression were less and less severe until at the 30-49 employee level, gains in both the number of companies and employment were recorded. These gains actually peaked with the smallest class of firms in the 4-9 employee category.

Figure 4.1

Changes in Employment and Number of Firms by Size Class,
1929-1932



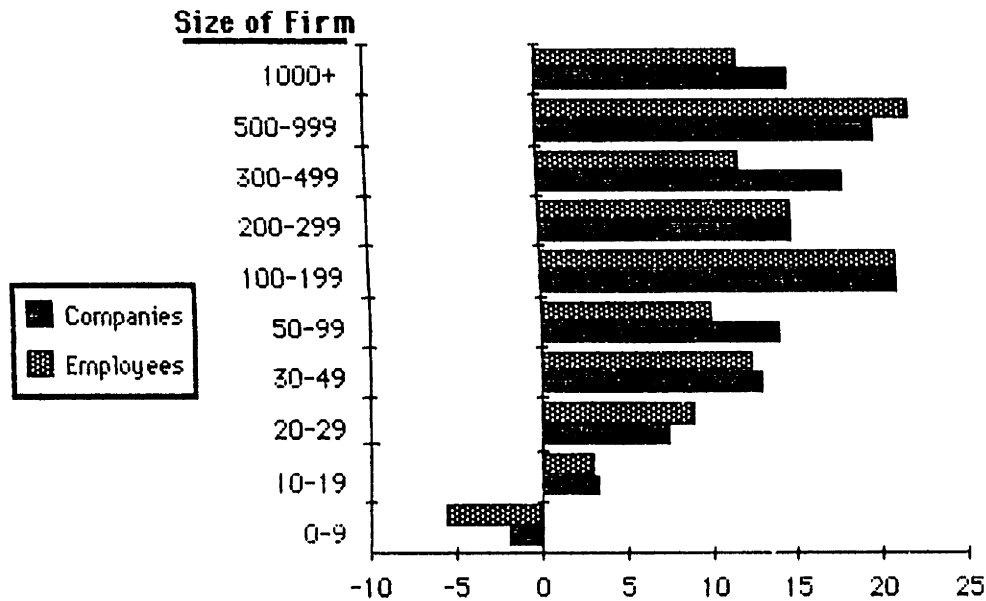
Company data compiled from MITI, *Nihon no Kogyo Tokai*, for the years indicated.

The Depression adjustment pattern clearly shows that large firms did not respond to demand shortfalls by cutting back on subcontractors, forcing them into bankruptcy. Instead, large firms themselves appear to have been the worst hit by the Depression challenging one of the basic hypotheses of the dual structure, that large firms maintained a stable workforce at the expense of smaller enterprises. Depression evidence suggests that though the *idea* of large firm paternalism dates from the turn of the century and was well-entrenched by the 1920s, large firms evidently had little problem in making wholesale cutbacks in their workforce when market setbacks required it.

Next let us look at the adjustment patterns for the period 1957-1959 when the "mini-recessions" were most severe in manufacturing. Figure 4.2 illustrates the changes by firm size during the contraction.

Figure 4.2

**Changes in Employment and Number of Firms by Size Class
1957-1959**

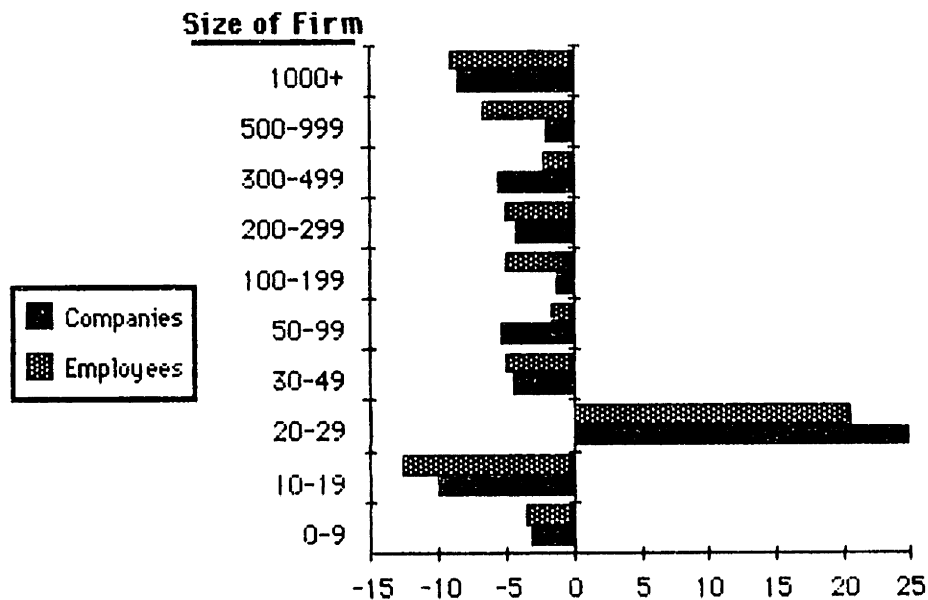


Company data compiled from MITI, *Nihon no Kogyo Tokei*, for the years indicated.

In this case, we do see adjustment reminiscent of the dual structure. Increases in employment and the number of firms are greater with increasing firm size. Indeed, almost all of the total employment and company number reductions exhibited during this period were accounted for by the smallest class of companies in the 0-9 employee range. As we shall see in the next section, the 1950s were in fact a period when the potential for the full-blown emergence of a Japanese "dual economy" was at its highest. Thus, it is no accident that the dual structure hypothesis enjoyed its widest acceptance in this period. But as adjustment data from later recessions and our study of developments in the relations between large and small firms will show, these trends were reversed as smaller firms were transformed. We will defer our account of this historical process until the next section.

Figure 4.3 illustrates company size class movement and employment data for the 1975-1977 recession, the worst manufacturing slump in Japanese postwar economic history. In contrast to the pattern exhibited in the 1957-1959 slump, adjustment is negative for all size classes (with the notable exception of the 20-29 employee category) and the magnitude is similar independent of size.

Figure 4.3
Changes in Employment and Number of Firms by Size Class
1975-1977



Sources same as Figure 4.2

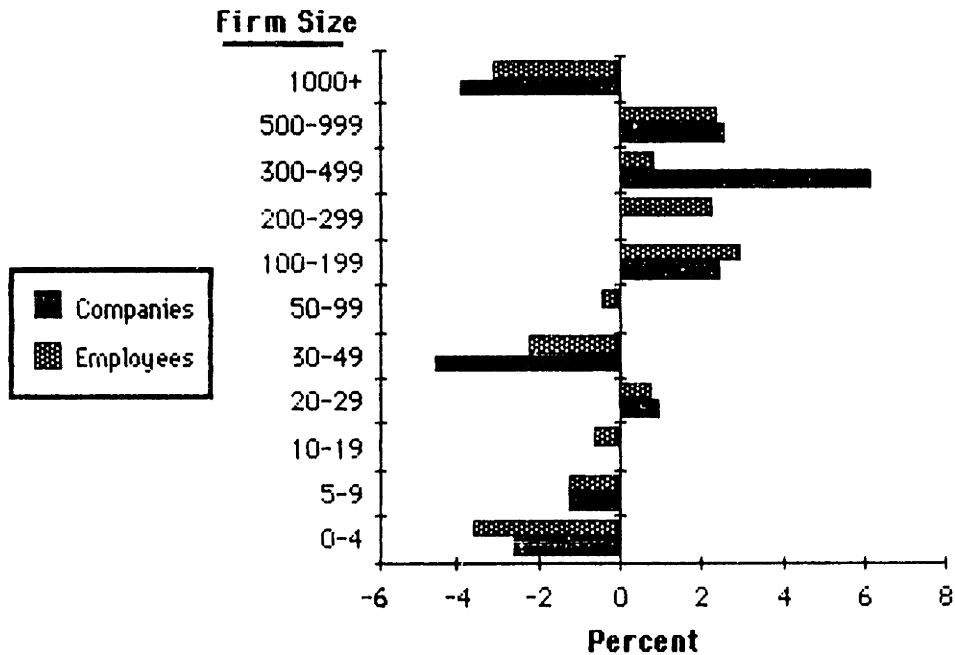
Detailed analysis shows additional differences and inconsistencies with the general expectation of the dual structure view. The top class, firms of 1000+ workers had the second highest rate of company and employment declines; it should have been the most stable. Indeed, excluding the 10-19 class which exhibits high declines, the magnitude of employment and firm reductions are either equal or slightly less for small firms as compared to large firms. Even the 10-19 size class declines are offset by the massive

increases in the 20-29 category. The figures do not indicate that small firms were sacrificed for stability in large companies. Instead, large firms had as much or more problems with the recession than smaller ones, and the greater burden of adjustment fell on the top size classes.

Finally, Figure 4.4 exhibits the adjustment pattern for 1978-1980 during Japan's "second oil shock." In this case we see a mixture of declines and growth, some consistent with the dual structure arguments, others contradicting it. Firms in the upper range of the "small or medium" category, those with 100-299 employees, and companies in the lower range of the "large" category, 300-999 employees, show considerable growth in both the number of employees and firms. Next, the very largest and the very smallest set of firms both registered declines. Then, excluding the 30-49 size group, the other categories of smaller firms show very slight declines or gains; they experienced little change.

Figure 4.4

**Changes in Employment and Number of Firms by Size Class
1978-1980**



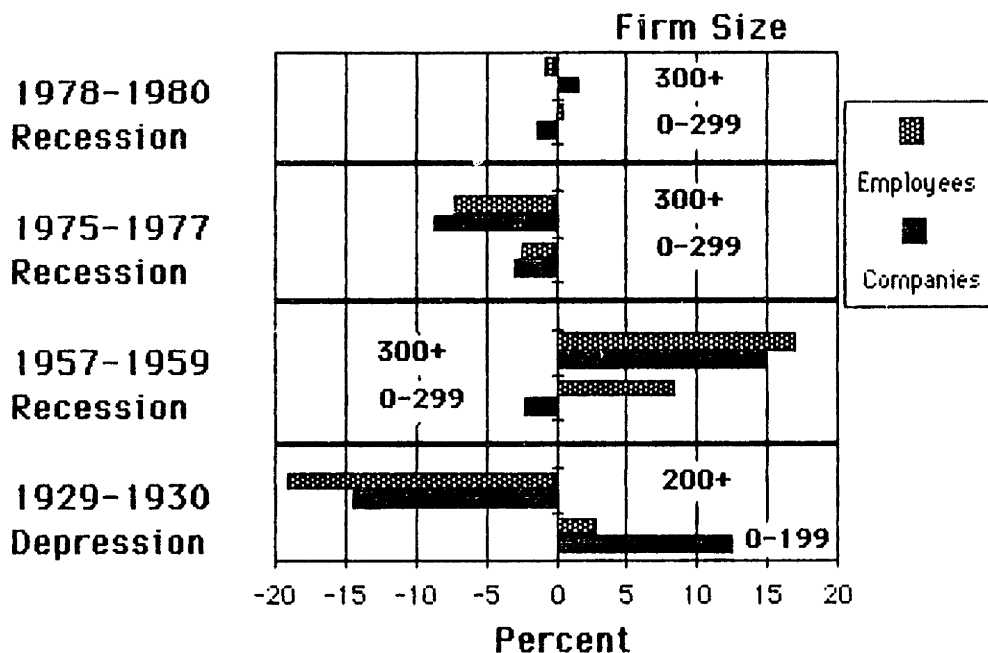
Sources Same as for Figure 4.2

The eclecticism of the 1978-1980 adjustment pattern once again fails to support the dual structure idea that small firms are the Japanese economy's "shock absorber." Both very large and very small firms experienced comparable declines. Medium sized firms expanded along with the lower end of the large firm spectrum. The association of adjustment success or failure by size of firm is not consistent with the graduated pattern of declines that the dual structure hypothesis would predict.

Aggregate data comparing employment and company changes by size classes is presented in Figure 4.5.

Figure 4.5

Changes in Employment and Number of Firms by Size Class
1929-1932, 1957-1959, 1975-1977 and 1978-1980



As compiled from sources cited in Figures 4.1 and 4.2

We can see that only in the 1957-1959 period does adjustment correspond with what the dual structure would predict. In the Depression, small firms of 0-199 employees expanded both their overall workforce and grew in numbers while large firms of 200+ workers registered massive declines. During 1957-1959, smaller firms suffered more than larger ones. But in the 1975-1977 recession, both small (0-299) and large (300+) classes of firms registered numerical and employment declines, and the magnitude of the shifts were greater for the large classes. Finally, in the 1978-1980 recession, adjustment burdens appear to have been evenly distributed between large and small firms. Employment decreased overall for large firms while increasing for smaller companies; the number of enterprises increased for large firms and decreased for small classes.

It is difficult to try and reconcile these findings with the dual structure claim without giving up the basic assumptions that make the argument compelling in the first place. For instance, one possible explanation for the patterns shown in Figures 4.1-4.5 above might be that during contractions large firms push off their surplus workers onto smaller firms, thus swelling the ranks of the smaller scale producers while reducing their own scale. This claim has a number of problems. The most difficult is that the whole point of the dual structure is that it is supposed to insulate Japanese large firms from disruptions in their internal organizations while preserving core economies of scale up to the point of stable demand. If large companies used smaller ones as a dumping ground for surplus labor, both economies of scale and internal company harmony would be sacrificed by this strategy. Production during recessions would be increasingly fragmented among smaller firms while the factory workforce of large firms would be in turmoil. This contradicts the basic image behind the dual economy, that employment is permanent in large firms which have stable economies of scale and cyclical in smaller ones. Even if the hypothesis were actually true, then, the nature of the Japanese economy would be quite different from what the dual structure imagines. But in any case, we will show in the next section that quite different relations between large and small firms account for the patterns in the figures above.

Let us next turn to wage differentials according to firm size. Proponents of the dual structure view argue that low wages in Japanese small businesses are symptomatic of the smaller producers' subjugation to larger firms. Low wages, in this analysis, developed because of contractor pressures on subcontractors to cut costs. To meet product cost goals,

small and medium business managers had to push their workers' pay far below that of the secure, "permanent" laborers in large businesses. They could do this at first because of slack in the market for small firm workers. The result was a stratified labor market. Small firm workers were forced to accept marginal remuneration while desperately seeking to join the pampered ranks of the giant factories. Large firms were willing to pay higher wages to secure a stable skilled workforce while sourcing for low wage, cheap parts to reduce the overall cost of their products.

We can test this hypothesis with two kinds of data. One is the historical emergence of firm size based wage differentials in Japan. If the dual structure argument were true, we should expect to see that large firms forced smaller ones to pay lower wages in return for cyclical contract work. Next is the pattern of Japanese and comparative wage differentials. If the dual structure is part of the Japanese "secret" to success, then we should see first that wage differentials in comparison to other countries were particularly wide during the period of the "miracle," the 1960s and 1970s. We will instead show that an entirely different process from what the dual structure imagines led to the initial emergence of wage differentials, and that the remuneration gap shrank to levels consistent with the U.S. by the start of Japan's postwar resurgence. This does not mean that there was no inequality in Japanese industry. All we are claiming here is that the belief that wage differentials are part of a system of exploitation integral to Japanese industry and something that can explain Japanese economic successes must be rejected.

Consider first the reasons for the wage differential's emergence in Japan. There is a "benign" tradition of analysis in Japan that views high wages in large firms as the result of inherent Japanese cultural traits; in

this view benevolent paternalism led to a wage gap because smaller firms could not afford to match the largess of larger ones.⁶ But recent studies show conclusively that neither paternalistic large firm management nor wage differentials existed in Japan until the Russo-Japanese war, or 1905, at the earliest. Throughout the Meiji Period, then, factory wages according to firm size appear to have been uniform, and low.⁷ Because the idea of large firm "lifetime employment" or other paternalistic practices developed in comparatively recent times, it is highly unlikely that it grew out of an immutable part of Japanese culture, something which would have remained more or less constant over time.

A less complacent explanation consistent with the dual structure argument is that large firms stabilized their wage rates to secure internal harmony while forcing smaller companies to cut costs by squeezing their workers. Here the idea is that the power of large firm industrialists was such that they could force labor in their own factories to accept minimal payoffs in return for stability while creating a huge pool of cheap parts suppliers to support the concessions. The power of large scale capitalists to reorganize the economy as they chose accounted for the dual structure in Japan.

The history of the prewar emergence of wage gaps in small and large firms belies this historiography. Instead, what appears to have happened is that labor unrest in large firms forced ever greater payoffs--real increases in wages--relative to smaller firms. A stratified pattern of labor careers was created in which large firm workers forced bigger factories to pay high wages because opportunities for independence were reduced in the giant factories, while smaller firm workers accepted lower wages as the price of

obtaining training that might lead to their future ability to become a factory operator.

That labor strife in the turn of the century led to concessionary payoffs rather than capitalist domination freezing the workforce has been fairly well established by Japanese historians. A crucial period was in the immediate aftermath of the Russo-Japanese war, as large manufacturing concerns in steel and armaments first expanded in the economy. Workers were thrust from traditional relationships with employers into new roles as blue collar laborers in large companies, something novel in the Japanese setting. Until the turn of the century, as Yasuba has suggested, low wages were endured by production workers as a means of obtaining training that would subsequently permit them to become independent.⁸ This system was called the **deshi** system, and resembled the way apprentices were trained in craft guilds in Europe. Late 19th century factory recruits believed that through manufacturing independence they could earn a substantial living. They were willing to accept low pay in the expectation that they would soon become self-employed.

But as the large scale factory workforce swelled in the wake of war with Russia, the older rules governing what employers did for workers and what workers had to do in return for compensation came under increasing strain. The intensely personal training and subsequent financial support that were part of the small firm worker's world were untenable in the large factories. With the possibility of future independent operations denied them, large factory workers agitated for both higher wages and job security. Consequently, as Yasuba argues, small firms preserved the **deshi** system, while work in large firms, beginning with the huge commercial houses of Meiji Japan, was organized to reflect new employment practices:

[Traditional] human relations continued into the modern period in small businesses where, with the system of apprenticeship, paternalistic care of the workers and hope for future independence could compensate for low wages. In larger businesses, however, it was becoming increasingly more difficult for employers to keep close informal contact with workers. The hope for future independence was also diminishing. As a result, the old **deshi** (apprentice) system was becoming unpopular in larger businesses even in the Meiji period, as exemplified in a most dramatic way by the strike of workers at Harimaya ([later] Sogo Department Store) demanding the modern salary wage system. Thus, it was natural that larger firms should institutionalize paternalism into seniority-oriented, higher wages and richer fringe benefits.⁹ [sic]

On this interpretation, the growth of high wage, stable employment in large firms arose because labor militancy forced its introduction in return for the abandonment of the **deshi** system and the promise of independence. The labor force became stratified between unionized blue collar workers earning high wages in large firms and low paid workers in small factories who interpreted their rights in the workplace according to different criteria. Indeed, we will show later that the plurality of career paths related to these prewar developments remains in the Japanese labor market up to the present day. Thus, in contrast to the dual structure argument that differentials emerged because of the power of large firms to create them, the wage gap grew because workers had to receive a premium to accept large scale factory work.

These developments did not begin to affect the relative position of small and large firms until late in the prewar period. Wage surveys taken during the First World War in Japan show that differentials based on firm size had yet to appear.¹⁰ Afterwards, though the pattern of prewar wage rates in different sized firms is unclear because monthly and yearly surveys

were not undertaken as in postwar Japan, there is general agreement, if not conclusive proof that from 1914 to the Depression, a considerable wage gap had developed which more or less endured until the end of the war.¹¹ One reason for this was the spread of high wages in large firms as companies copied the permanent employment strategy of leading firms in response to labor militancy. Just as the GM Basic Agreement in postwar America affected compensation for other industries, the high wage/stable employment solutions offered by influential Japanese firms like Yokosuka Shipbuilding became models emulated by other large companies.¹²

By the 1930s seniority based wages, and the idea of employment stability were established features of Japanese large factories. The emergence of such programs as the Important Industries Laws of the 1930s helped entrench these practices since large companies, as we saw above, were able to obtain subsidies and control prices, permitting larger labor settlements. In addition, high wages and seniority scales in large firms were a rational answer to the problem of retaining skilled laborers in whom large firms had sunk investments. Whatever the reason, wages in large firms increased dramatically relative to small firms.

The fact that wages were *driven higher* in large firms contradicts the idea that small firms were forced to reduce their compensation by larger companies. To be sure, tight money and a pricing system in manufacturing that favored large firms as part of the MCI's attempt to consolidate industry meant that small firms had to operate in an often difficult environment. Many did try to compete through low wage labor; this is a fact of small firm life in any country. But as a general historical process the wage gap appears to have developed because of the response of workers to large firm factory conditions and the resultant payoffs larger

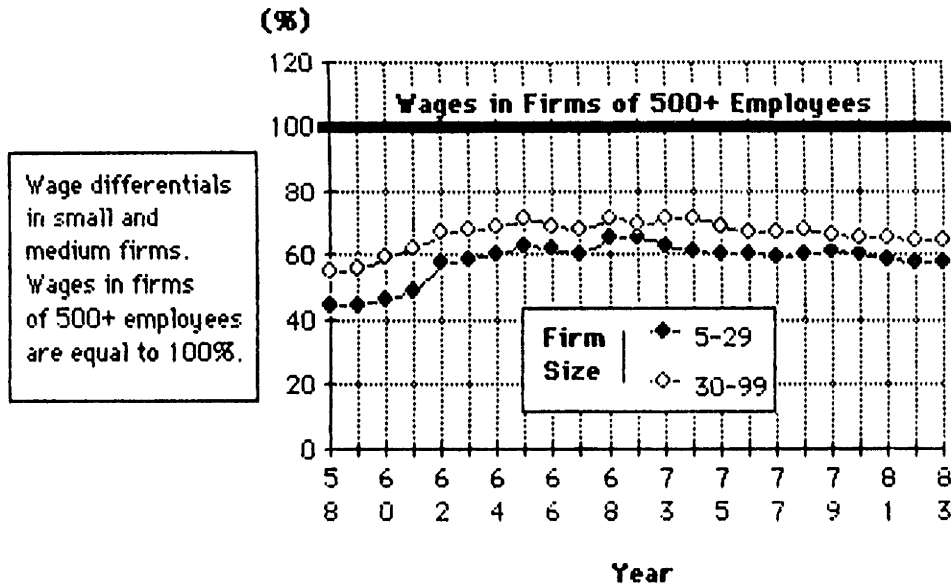
firms were forced to make to bring labor to accept them. Thus, wage gaps according to firm sizes grew because of factors unrelated to the dual economy.

Next let us consider the actual degree of wage disparities in Japan. In contrast to the dual structure argument, we will show that while there were huge size related differentials in the 1950s, these were gradually reduced by the early 1960s. During the high growth decades of the 1960s and 1970s, size based differentials were brought in line with, and were sometimes even better than those in the US. Indeed, smaller factories actually had to pay a premium for new recruits; younger workers received higher pay in small companies than in larger firms.

Figure 4.6 illustrates the postwar development of manufacturing wage differentials between firms of 500 or more employees and companies of 5-29 and 30-100 employees. These size classes are the standard references for compensation surveys undertaken by the Ministry of Labor.

Figure 4.6

Wage Differentials, Manufacturing, 1958-1982



From MITI, *Maigetsu Tsuro Tokei Chosa*, [Monthly Working Labor Statistical Survey] for years indicated

The figure shows that there have been considerable changes over time in the relative position of large and small firms. Wage differentials were very wide in the 1950s, when manufacturing firms of 5-29 employees paid wages that were just 48% of those in larger firms. But as the Japanese economy entered its high growth phase in the 1960s, wage differentials rapidly shrank. By 1965 the gap had improved by over 20 points for all size classes. Even the smallest firms' compensation was over 65% of that in large companies, and the 30-100 employee class of firm was paying close to 75% of large firm salaries. These differentials then remained steady until there was a small decline in the 1980s. The huge wage gaps of the 1950s were reduced.

The 1950s disparities, which in a large part fueled the dual structure arguments of both academics and bureaucrats in Japan almost certainly

were produced by the effects of the wartime recovery. Until the late 1950s Japan's sagging economy, coupled with a huge labor surplus because of the return of former soldiers to civilian status created an extremely slack labor market. Wages were bound to be depressed, especially for smaller firms as workers hard hit by food and other basic commodity shortages sought stable positions in larger companies.¹³

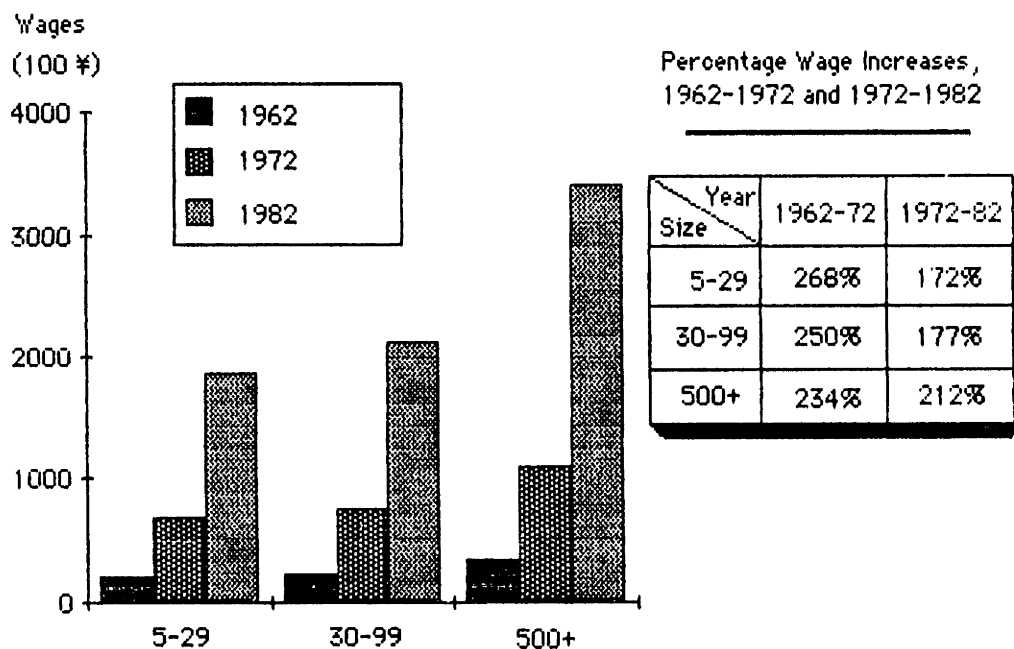
Moreover, echoing developments in the early 20th century, there was considerable labor unrest in large firms. This was prompted in part by the unionization impulse provided by the SCAP authorities. Even though SCAP later backed away from support for labor due to its anticommunist preoccupation, most of the postwar strikes experienced by major companies in Japan occurred in the 1950s.¹⁴ The result was a re-emergence of high wage/stable employment practices that hearkened back to the system first established in the 1920s. Large firms opted to pay workers more and to offer at least the verbal commitment of lifetime employment to ensure corporate harmony. In contrast, a slack labor market for small firms severely depressed wages, leading to wide differentials. The subsequent reduction of size based wage differentials can be accounted for by high speed growth in shrinking the size of the available labor force. As a labor surplus gave way to a shortage, small firms had to try and match the wages in larger companies.

The pattern of wage increases by employees in various sized factories confirms this interpretation. In the dualism argument, the relative gains made by small firms after the 1950s might be explained by the ability of large firms to depress wage increases among their own workforce; consistent oppression led to the appearance of improvements in wages although in reality all employees were worse off. Instead, as Figure

4.7 shows, labor pressure prompted huge increases in the larger firms as the "permanent employment" norm was institutionalized. The gains are particularly noteworthy given the fact that inflation in Japan from 1960 onwards was the lowest of any industrial nation. But even more impressive was the fact that wages in small firms in the 1962-1972 period outstripped gains in large companies, and stayed close in 1972-1982.

Figure 4.7

Wage Increases, 1962-1972 and 1972-1982, By Firm Size



Sources Same as Figure 4.6

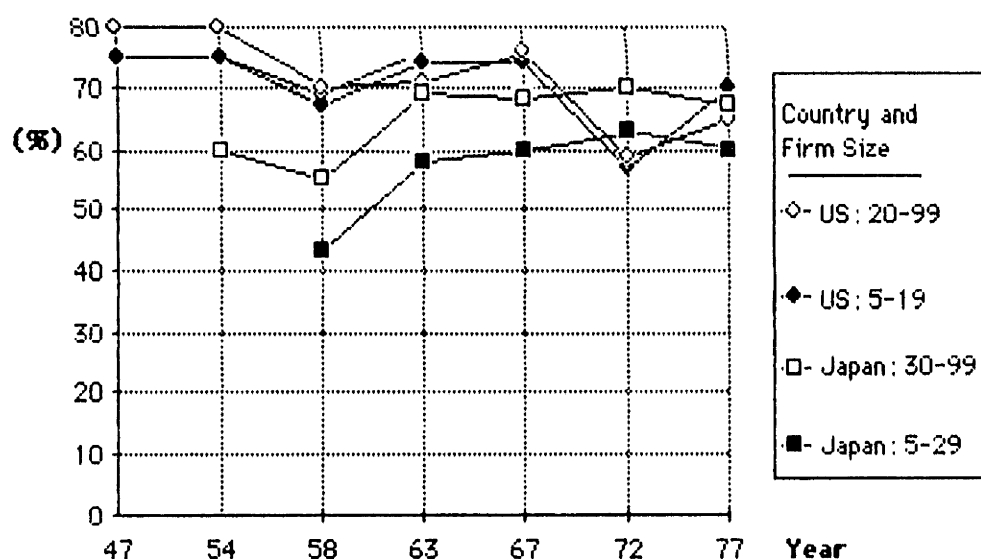
The 1962-1972 increases for the 5-29 and 30-99 classes are striking, averaging 268% and 250% respectively. Then, between 1972 and 1982, the pace of small firm increases fell off to around 170%, although it was still high. Meanwhile large firm labor payments were increasing over 200% for both decades.

Let us now look at comparative evidence of Japanese wage differentials based on firm sizes. Figure 4.8 illustrates American and Japanese postwar wages in small, medium and large firms.

Figure 4.8

Wage Differentials, US and Japan, 1948-1977, Selected Years

Wages in Firms of 500 or More Employees Are 100%



Japanese data from **Maigestu Tsuru Chosa**; American data from **Census of Manufactures**

Figure 4.8 shows that Japanese differentials improved during the high growth period to the point where they were smaller than in the US, thus cutting against the argument that cheaper labor in small firms was a unique structural feature of a supposed Japanese "dual economy." American wages were essentially uniform in the 1940s and 1950s, with firms in both the 5-19 and 20-99 employee size class paying 80% of the wages of large firms. Then, as the huge differentials in the Japanese economy started to close, American differentials began to widen. By 1972 the Japanese wage gap was smaller than in the US, where small firm compensation had eroded to less than 60% of large firm payments. Thereafter, Japanese and American differentials remained about the same.

The fact that wage differentials in the Japanese economy are about the same as in the US, and that they declined throughout the postwar period cuts against the view that small and medium Japanese firms pay

particularly low wages relative to larger companies. Further, the historical development of the wage gap did not occur as the dual structure argument would predict. Labor unrest drove up larger firm wages, gains which were gradually matched by smaller enterprises as labor markets tightened. The wage gap was not, then, a conscious product of large firm exploitation of cheap labor, and it is impossible to link Japanese successes to wage differentials that turn out to be about the same magnitude as in other countries.

Our analysis of adjustment patterns and wages may be further supplemented by considering the career paths of small scale factory employees. Implicit in the dual structure view is the idea that small firm blue collar workers are doomed to a low wage existence as they spend their working lifetimes in an unstable sector where low cost production is the basis of business. But recent studies by Japanese economists indicate that the majority of Japanese small firm employees in fact do either leave their factories to open their own manufacturing enterprises, or are promoted to white collar work in the course of their employment. Hence, small firm employees have a more complex career path than previously assumed; they start in small factories at comparatively well paid employment while young, and then move to positions as managers or independent operators in which remuneration is equal to or exceeds that obtainable as a blue collar worker in even the largest firms. This leads to a bifurcation in career paths: workers just entering the market face a choice between comparatively stable employment as a life-long blue collar worker in a large firm, or a short stint in a small firm followed by the high possibility of self employment or managerial promotion.

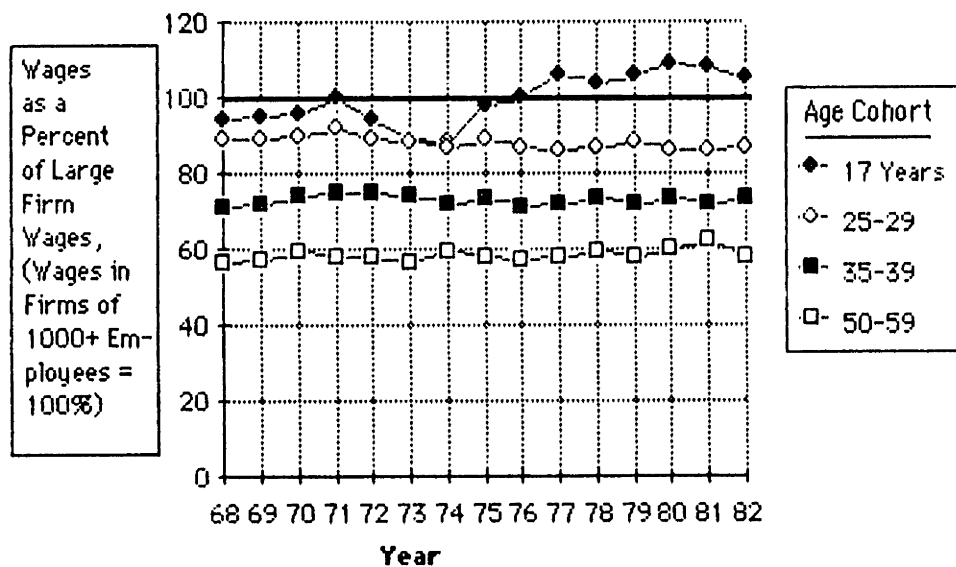
Several scholars including Nakamura Hidekihiro, a noted small business authority, Kiyonari Tadao and Yasuba have argued that the desire for independence or promotion dominates the thinking of small firm employees. Indeed, conversation in Japan about small enterprises will quickly turn to comments suggesting the intense degree desire for independence exhibited by Japanese workers. Statistically, as we will discuss, many Japanese will actually have the opportunity to operate their own manufacturing enterprises or at least earn a measure of independent authority within a factory. In contrast, most Americans experience manufacturing employment as one of hundreds or thousands of workers in immense firms. Thus, there appears to be circumstantial evidence in support of the idea that the desire for independence attributed to small firm workers is important in Japan.

However, attitudinal data showing conclusively that small firm employees actually perceive their employment in this light are currently lacking. What can be demonstrated is that the career path of small firm blue collar laborers is structured *as if* the desire for future independence was in fact their predominant goal. While we cannot confirm the claims that independence or the **deshi** system in general shape the strategic thinking of small firm workers, we can show that as these employees trace out their careers whatever wage differentials exist in Japan are further reduced. This in turn affects the validity of the dual structure argument. If the careers of small scale factory workers are positively influenced by opportunities that further moderate wage differentials, then the notion that exploitation of the smaller sector is the basis for its existence is further contradicted.

Let us begin our discussion by disaggregating wage differentials between small and large firms in Japan by the age of the employee. Figure

4.9 illustrates the pattern of age related wage differentials for firms of 10-99 employees as compared to workers in firms of 1000 workers and above.

Figure 4.9
Wage Differentials by Age in Firms of 10-99 Employees,
1968-1982



Sources Same as Figure 4.6

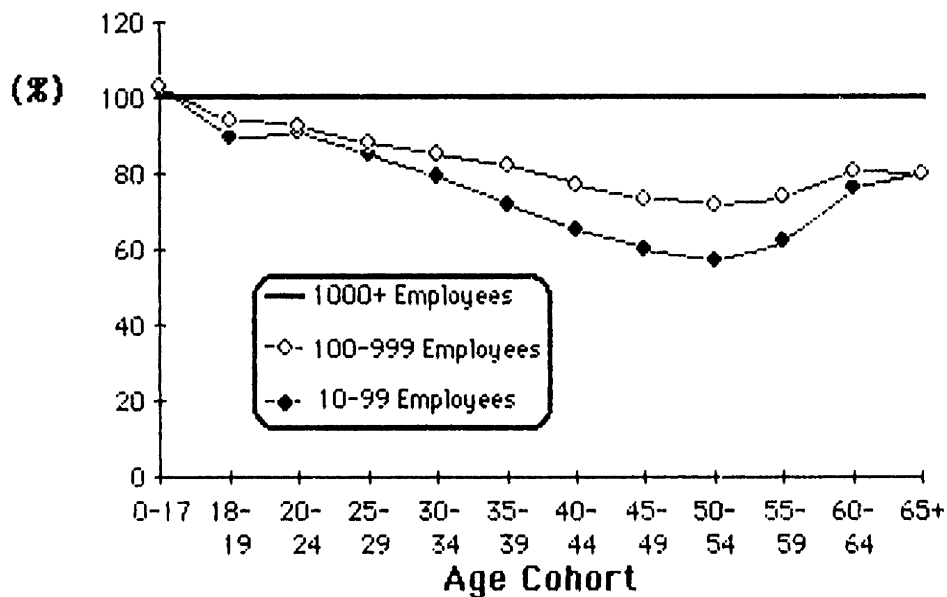
It shows that from about the mid 1960s, young workers (17-29 years old) in small firms earned 90% to 100% of the wages paid in large firms.

Furthermore, from about 1975 onwards, competition for new school leavers and employees in their twenties became so great that salaries in small firms actually exceeded those in large firms. This is reflected in the 17-year-old category, which shows that by 1980 high school leavers were receiving 110% of the wages available in large firms. But the longer small firm employees remained as production employees, the greater the gap between their pay and that available in large firms; workers between 35-39

years old were paid just 70% of employees in a similar age cohort in large firms, and those in the 50-59 category just 60%.

The skew towards lower relative wages as age increased means that wage differentials were less severe early in a worker's career. Among blue collar workers on the shop floor at any one time some will be adversely affected relative to large firm workers, while other will be earning about the same. As Figure 4.10 demonstrates for 1982, until about the age of about 29 small scale factory workers receive about 85-90% of large firm pay. Then, if they continue in blue collar work, by the time they reach their late forties they earn less than 60% of what large factory employees make.

Figure 4.10
Age-Based Wage Differentials, 1982



Sources Same as Figure 4.6

The pattern of wage differentials means that the longer blue collar small firm workers remain as production workers, especially after their mid 30s, the more they suffer in comparison to large firm workers. Whether

or not these laborers actually see their position in these terms, we will show that they *act* as if they do. In particular, two ways of overcoming age based differentials are open to Japanese blue collar workers: opening up their own manufacturing enterprise, or promotion. As we shall see, the most most rewarding solution is to operate their own manufacturing firm. But even promotion is a lucrative step; if employees can even advance to the level of a foreman, the lowest "white collar" job in Japan, they can earn wages equal to those of blue collar workers in the largest firms.

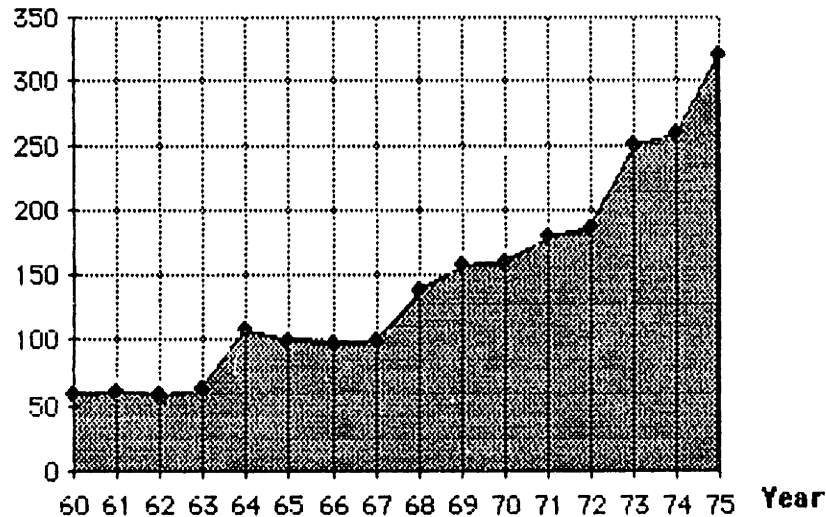
Consider at the outset the potential income of a worker who opens a new small scale factory. A good indicator is changes in earnings over time in very small manufacturing enterprises of 1-3 employees for whom managerial remuneration would be the lowest of all possible classes of enterprises. The results are summarized in Figure 4.11, which shows an almost asymptotic rise in small scale firm earnings.

Figure 4.11

Earnings Increases, Manufacturing Firms of 1-3 Employees,
1960-1975

**Earnings by Operators of Manufacturing Enterprises of
1-3 Employees**

(10000 ¥)



As cited in Kiyonari Tadao, *Chushokigyo Dokuhon, (A Small and Medium Enterprise Reader)* (Tokyo: Toyo Keizai, 1984) page 88.

The level of earnings exceeds possible wage income as a large firm blue collar worker; in 1975, for instance, operators of family firms earned 150% of pay in factories of 500 or more workers though wages had risen precipitously.¹⁵ Moreover, smaller factory income rose over 600% from 1960-75, slightly exceeding the pace of large firm compensation increases. For workers in small firms, setting up a company of their own even of entry or "petty" scale was highly profitable.

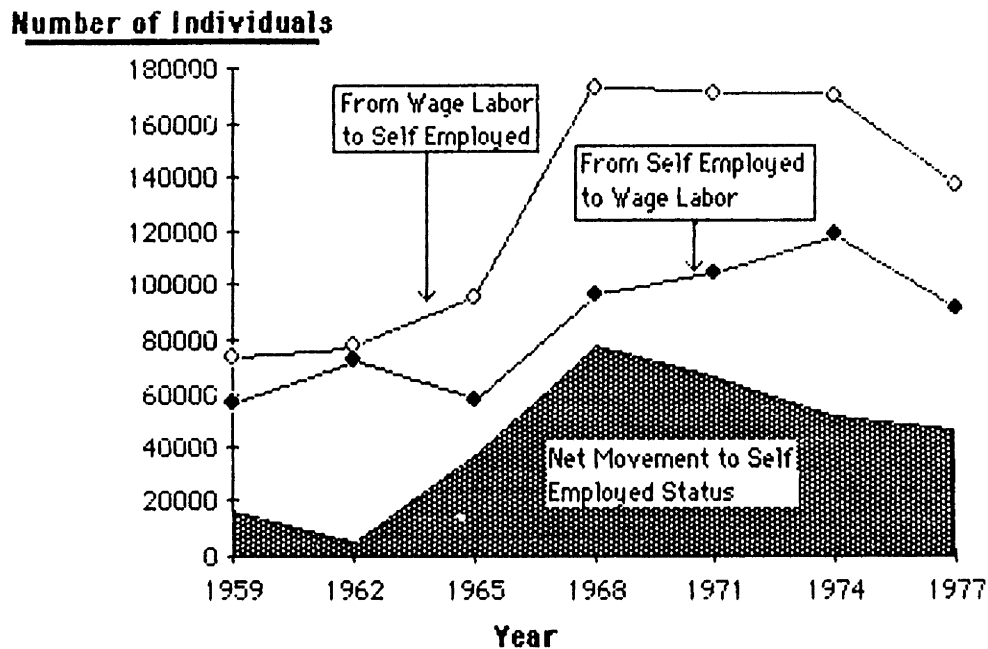
The profitability of smaller firms raises an additional point in contradiction to the dual structure argument. If large firms were exploiting smaller ones, earnings of the smaller scale factories should be much less than those in the biggest enterprises. But in fact smaller firms in Japan are markedly more profitable than larger ones, and the rate of profitability

actually increases as the size of enterprise falls. As Yasuba has documented, in 1970 for instance after tax rates of return were only 15-17% for large enterprises, rising to 24% for firms in the ¥2-5 million capitalization range.¹⁶ These "inverse" differentials in which small firms are better off than larger ones have persisted since the prewar period. As yet, a complete explanation for why supposedly technically advanced, dominant large firms in Japan should be such poor performers in contrast to the smaller firms they are commonly thought to be squeezing has not been provided.¹⁷ Whatever the reason, historically small business employees could look to the possibility of independence for a risky but often rewarding answer to the problem of age based wage differentials. And the existence of inverse differentials stands in marked contrast to what the dual structure argument suggests should have been the case.

Let us next consider the problem of the extent to which small firm workers actually open their own firms in Japan. One group of scholars, following Kiyonari, (whose work on small business in the 1960s and 1970s was the first postwar critique of the dual structure argument) strongly contends that "independence through self-employment" is a dominant factor in Japanese manufacturing.¹⁸ Kiyonari showed that the vast majority or close to 70% of all small and medium manufacturing enterprises were run by former small firm blue collar employees.¹⁹ He further estimated that as many as 50% of all small enterprise production workers would at some point in their careers open their own manufacturing firms.²⁰ This calculation was based on the ratio of new firm openings to closures in non-agricultural sectors as shown in Figure 4.12.

Figure 4.12

Net Firm Openings, Non Agricultural Sectors, 1959-1977



From Kiyonari Tadao, *Chushokigyo Dokuhon*, page 98.

Figure 4.12 shows that there is high annual shift of workers from blue collar status to self employment in manufacturing as well as a corresponding reverse movement as enterprise operators quit and seek wage labor. However, the total movement is positive towards self employment and the annual net number of newly self employed workers still reaches about 1/7 of the total number of non agricultural firms in any given year. By estimating the number of workers in a similar age cohort who might attempt to open a firm, and controlling for closures, Kiyonari argued that 50% of Japanese small firm blue collar workers would become independent in their careers.²¹

Kiyonari's work was strongly criticised by other Japanese scholars because it was not determined if the separation rate was uniform for minute as well as medium sized companies. One scholar in particular, Koike Kazuo, believed that the estimated rate was too high for medium sized

manufacturing firms and thus overstated small firm workers' probability of operating a factory.²² In order to refine further the evaluation of the move towards independence, Koike carefully controlled for firm size and other factors that might influence the rate. Because Koike's estimate was explicitly conceived as a critique of the high independence hypothesis, it provides a good "low end" control with which the claims made by Kiyonari can be balanced.

Koike's figures, while less than the sweeping rate claimed by Kiyonari are still surprising given traditional views of Japanese small manufacturers because they still show very high independence rates. Figure 4.13 presents the revised findings. It shows that the movement towards self employment in manufacturing is highest in firms of 1-9 employees, where the rate has increased from about 30% in the early 1960s to 45-50% by the 1970s. Though the rate of independence drops with the size of firm, about 20-30% of workers in firms of 30-99 employees and 20% in the 100-299 size class will leave their jobs and open their own factory.

Figure 4.13
Percentage of the Workforce Becoming Self Employed in
Manufacturing, Selected Years, Selected Size Classes

Industry	Scale	Year: 1971 1968 1965 1962 1959			
Non-Agricultural Industries	1-9	50%		33%	
	10-29	30-33%			
	30-99	30%		20%	
	100-299	25%		10%	
Manufacturing	1-9	45%		30%	Not Available
	10-29	20%	33%	10%	
	30-99	20%		6%	

From Koike Kazuo, *Chushokigyo no Jukuren*, page 89.

On the basis of his revised findings, Koike concluded that a significant movement towards self-employment was most marked mainly in the very smallest of firms; the workforce in larger firms of 10-99 employees and above was more or less stable. But employees in the 1-9 employee size category make up about 25% of total small and medium firm employment.²³ From the 1-9 employee class alone about 12.5% of the total small firm manufacturing workforce became self-employed on an annual basis. Even if the lower estimates are accepted, the annual move towards independence by total small and medium firm employees approaches 22-23%.

It is worth emphasizing that both Kiyonari and Koike's studies were of small firm manufacturing workers who opened their own *manufacturing* enterprises. Indeed, workers who leave a firm in one manufacturing sector to open their own operations tend to stay in that sector as independent

producers, a point we will develop more fully in the next chapter. The degree of new manufacturing firm startups is so high in Japan that in any given year new small scale startup factories are equal to more than half the *total* number of factories in the U.S. engaged in manufacturing. While new firm openings may be high in other sectors in America, they are very low in manufacturing; the distinguishing mark of the Japanese economy is that manufacturing startup opportunities, even on Koike's low estimate, are still much higher than in the U.S. where there has been a net drop in the total number of small firms during the 1960-1980 period.²⁴

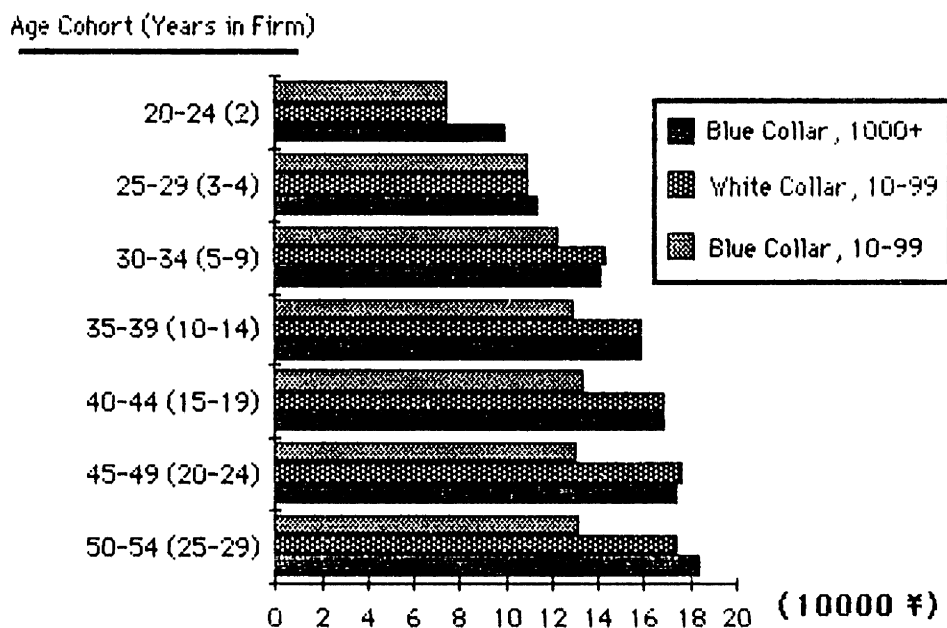
The career path of small firm workers who open their own enterprises eliminates or even reverses the problem of age based wage differentials. The peak age at which small firm employees open their own enterprises is in the 24-30 age bracket. This is precisely where wage differentials begin to appear in small factories. Workers who obtain training for 5-10 years and then become self employed can obtain substantially higher remuneration than possible in large firms. Of course, this is contingent on success; as we saw above in Figure 4.12, there is a high failure rate among these new enterprises. But as the large weight of small firms in Japanese manufacturing suggests, coupled with the fact that a single employee may attempt to open a firm several times, self employment is an important career alternative for small business blue collar workers.

Next, let us look at the problem of small firm blue collar employee advancement to white collar status. Of course, it would be impossible for all small firm blue collar workers to open their own plants though the rate of separation for this purpose is quite high. But workers who do not become independent operators are not fated to work for poor wages; promotion to

white collar status is another solution to declining earnings potential with age. Wages for white collar workers of all ages in small firms (10-99 employees) are all but identical to blue collar pay in large firms of 1000 or more employees. Figure 4.14 compares wages rates for small firm blue and white collar workers and large firm blue collar employees for various age cohorts.

Figure 4.14

White and Blue Collar Wages by Age and Firm Size, 1974



As compiled in Kolke Kazuo, *Chushokigyo no Jukuren*, page 83.

It shows that wages are about the same for all groups until workers reach their mid 30s. Then, small firm blue collar workers begin to experience a wage gap relative to blue collar large firm workers as their work tenure approaches 9 years at the age of 34. This gap widens steadily as the age cohort increases. But for small enterprise white collar workers, the career wage pattern is the same as that for large firm production workers. If blue collar employees were to be promoted to white collar status in their 30s, their career earnings would be identical to that of blue collar workers in

the "lifetime employment" firms. Promotion possibilities equalize age based wage differentials.

Data on promotions is much less controversial since intra-firm movements can be tracked with some precision. Koike, who is closely associated with the "white collarization" view of small firm work has shown that, as a conservative estimate, 33% of small firm blue collar staff with five years or more continuous experience in 1968 and 1969 had been promoted to white collar positions. Using the same cautious methodology, Koike showed that the promotion rate rose to 45% by 1974. Further, if assumptions about the rate of firm leavers were relaxed slightly, Koike contended that the actual promotion rate may have been over 60% for workers with 5 years or more experience in the 1960s and 1970s.²⁵

If these figures are even close to the mark, the probability of promotion for the majority of blue collar staff in small firms after five years of employment is quite high. These promoted employees then move up the wage scale to levels comparable to those in large firms. Once again, because the peak promotion activity occurs in the 30 year old cohort range, the career pattern for small firm workers counteracts wage differential patterns. Indeed, as compared to the career blue collar work in large firms the potential for management experience may even make small firm work more desirable.

The pattern of career shifts to white collar promotion or self employment further undercuts the dual structure argument since well over 60% of Japanese blue collar employees either opened their own firms or were advanced in the factory to jobs which equalized their differentials as compared with large firm blue collar staff. The career structure of small firm blue collar employees is not consistent with the idea that they were

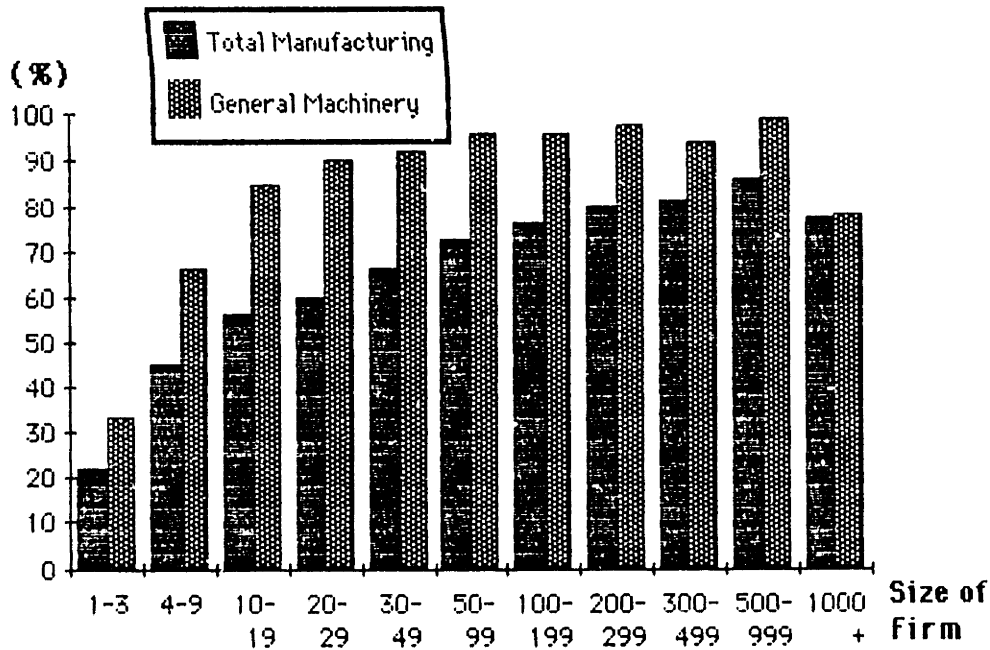
unskilled providers of cheap labor. In careers, as in wages and recession adjustments, the dual structure argument appears to be wide of the mark.

As a final test of the dual structure argument we will present evidence of the degree of small firm dependence on larger companies. Direct dependency data is extremely hard to obtain but a number of indicators provide some good insight into how and why small firms interact with larger ones. These include data on the reliance of small firms on single clients in subcontracting, and data on the extent of personnel or capital exchanges between large and small firms.

Let us first look at subcontracting in general in Japan. As Figure 4.15 illustrates, for all manufacturing and for the general machinery sector in particular, subcontracting is extensive; about 70% of all companies above the 30 employee level order parts outside. For general machinery, which includes machine tools, the number is substantially higher, about 90%, because in complex products sectors like electronics or machines the number of specialized parts is also greater.

Figure 4.15

Percent Firms Subcontracting, Manufacturing and General Machinery Sector, 1982



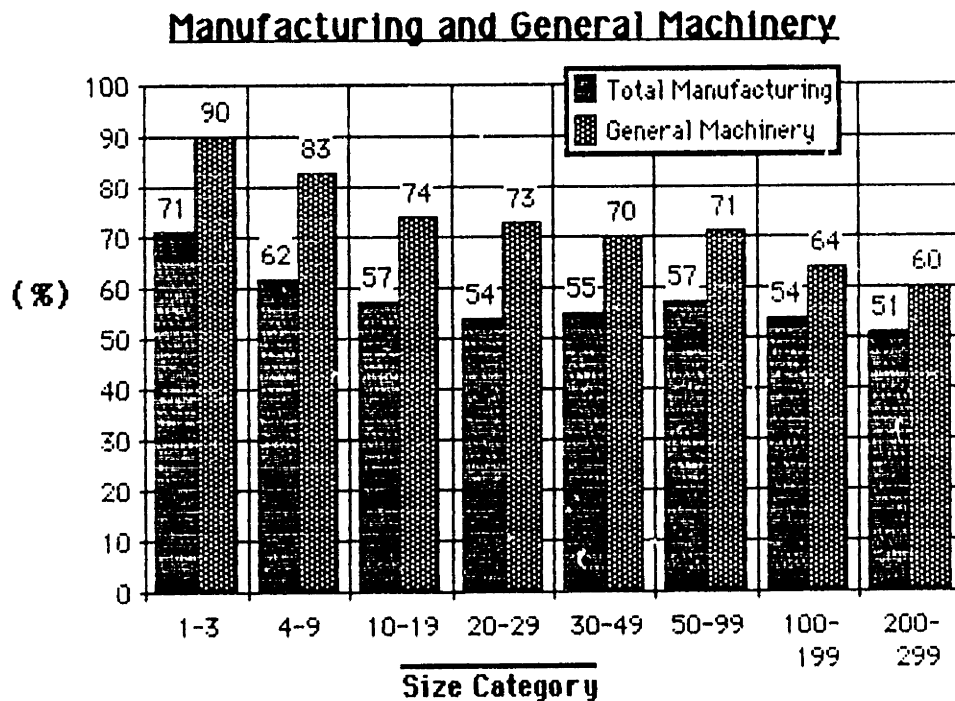
From MITI, Statistical Survey Department, *Kogyo Jittai Kihon Chosa Hokoku Sho* (Report of the Basic Survey of Industrial Conditions) *Chusho Kigyo Cho* (Small and Medium Enterprise Bureau), 1981.²⁶

To gain an appreciation of the structure of subcontracting in Japan consider statistics in manufacturing and the general machinery sector broken out by size of firm. General machinery is highlighted because it is indicative of complex equipment production; manufacturing includes all industries as well as electronics and machinery. Figure 4.17 shows that the percentage of firms that do subcontracting work varies with manufacturing sector as illustrated by the fact that the general machinery rate is higher than the average for all industries. The reason is that in some sectors small firms do not primarily accept subcontract work at all; rather as in the prewar, they transform raw goods into final goods. Examples are furniture, food and clothing. But in the complex metal or electronics manufacturing

fields subcontract acceptance rates are high. Moreover, they increase as the size of firm decreases, from a low of just 60% in the 200-299 class to a high of 90% in the 1-3 class.

Figure 4.17

Subcontract Work as a % of All Income by Firm Size, 1982



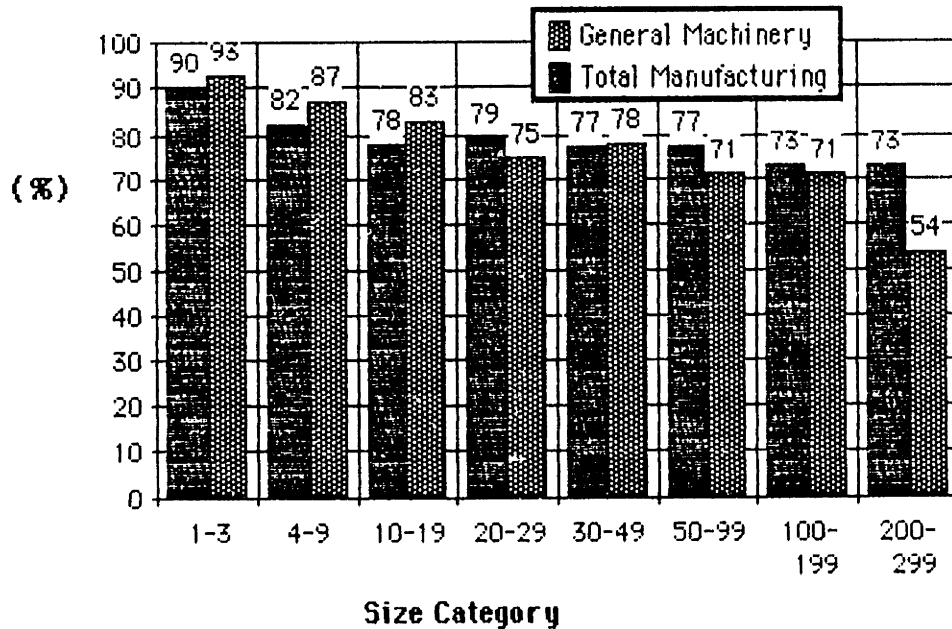
Sources same as Figure 4.16

However, it should be noted that even in the high subcontracting sectors like general machinery, as many as 30% of firms as small as 10 employees accept no subcontracting whatsoever. Subcontracting therefore is not the universal experience of all small firms.

But firms that do subcontracting work tend to earn the majority of their income through parts orders. In Figure 4.18 the percentage of firms relying on subcontracting for 60% or more of their total business is shown. Again, the rate of subcontracting reliance is highest for smaller firms, and falls as firm size increases.

Figure 4.18

**Percentage of Subcontracting Firms Earning at least 60% Of Their
Income From Subcontracting, 1982**



Sources Same as Figure 4.18

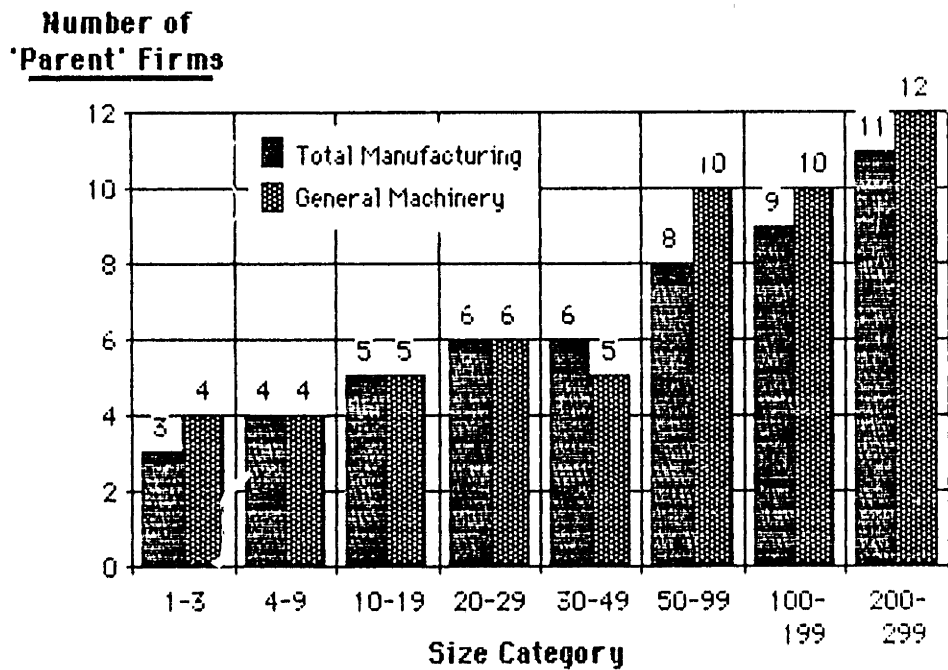
But these figures tend to obscure the fact that large numbers of Japanese small firms depend little on subcontract orders; firms that either do no subcontracting, or rely on subcontracting for 60% or less of their income amount to 44% of the total number of firms. In general machinery, the total is about 30%.²⁷ Thus, although subcontracting work is clearly a major part of small and medium enterprise activity, it is much less than conventional wisdom suggests.

Yet, the usual perception is that small firms are pressured by larger ones to cut costs and are dependent on them for technical and financial guidance. This is unlikely in the case of firms that accept little or no subcontract work. But are the smaller factories that rely on subcontracting utterly dependent on their larger clients?

One measure of the large firms' pressure is the number of contracting firms subcontractors do business with. The smaller the number, the more the assumption that large firms exert powerful price or cost pressures is warranted. A firm that relied entirely on a single buyer would naturally be in a much weaker position than a company with many customers.

Figure 4.19 shows that even the very smallest firms spread out their subcontract work among at least 4 firms; larger companies sell to as many as 12 buyers. Moreover, the number of clients per company in each size class is generally higher in the machinery sector than for manufacturing as a whole. Because the high subcontract sectors are typically fields like machinery, electronics, autos and the like, this means that in the case of complex products, demand for small firm skills are spread out over more buyers.

Figure 4.19
Number of Clients per Subcontractor by Size, 1982



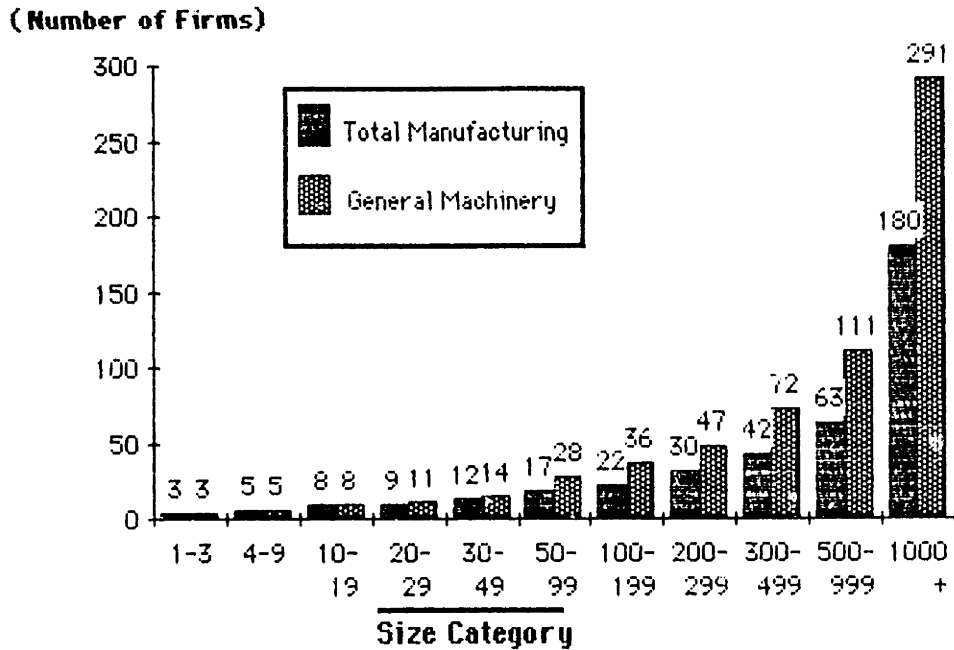
Source Same as Figure 4.16

This pattern cuts against the view that small subcontract firms are dominated by the contracting company. Of course, hidden in the Figure 4.19 are a number of cases in which subcontractors do work for only one firm; a number of studies indicate that about 20% of subcontractors fall into this category.²⁸ At the same time, Figure 4.19 therefore understates the extent to which the other 80% of small firms spread orders out among several clients to reduce large firm pressure. Indeed, as we will show in the next chapter, small firms not only try to increase the number of buyers but also try to move into different fields to reduce the possibility of dependence on any one firm or sector.

Next, let us look at the practice of recontracting orders after they have been accepted. Large firm price pressures, technical assistance or financial support would be most effective if the firm that accepted parts orders also made the equipment. But as Figure 4.20 illustrates the number of firms to which small subcontractors resubmit orders is extremely high; even companies of just 1-3 employees, basically family firms, subcontract to an average of 3 additional firms. The number rises to 47 for machinery firms in the 200-299 employee class. Of course, large firms in the 1000+ class subcontract extensively; in general machinery they place orders with an average of 291 firms.

Figure 4.20

Number of Firms to Which Outside Orders are Placed by Size Class, 1982



Sources Same as Figure 4.16

In the conventional view, large firms pass on orders to a set of "captured" manufacturers who then are forced to produce goods to a specified price. But instead of vertically organized subcontracting networks, small firms subcontract themselves as much as they accept orders. There is a horizontally organized network of subcontracting work. In this structure, the cost pressures assumed to exist in the vertical system are reduced. It would be very hard, for instance, for a small firm to pressure another for low costs when the probability is high that the subcontracting firm might itself become a parts supplier to the subcontractor in the future. The fact that even small firms both order from and subcontract to a large number of other companies argues against the view that subcontractors are locked into certain large firms. Indeed, since the actual manufacture of a part ordered from one firm might mean several

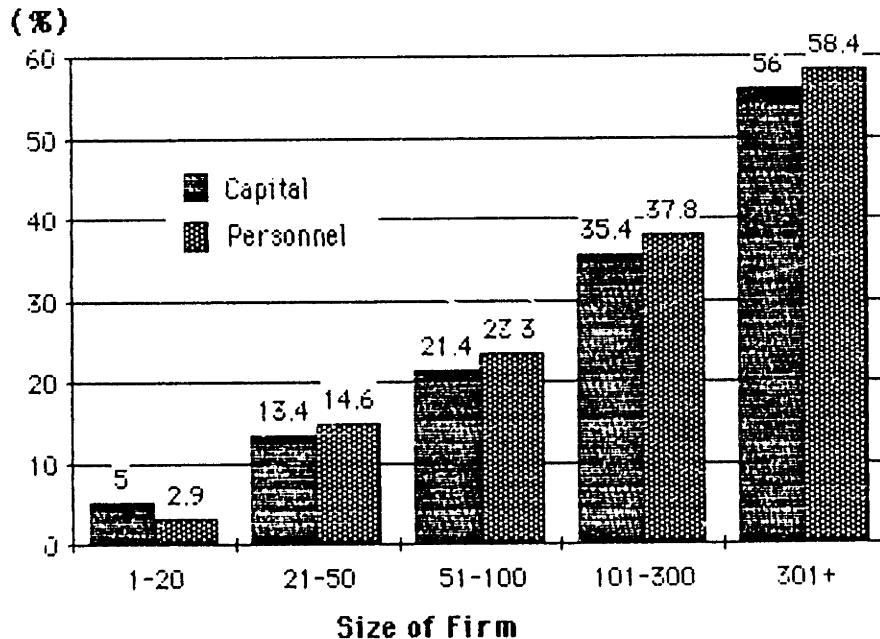
stages of subcontracting, it is very unlikely, except in special cases, that the originating firm could effectively direct pressure at the responsible companies to cut costs.

These considerations undercut the idea that the smaller firms are used by larger ones only to reduce costs and to serve as a "shock absorber." A further set of data concerns the extent of capital and personnel links between small and large firms. In the dual structure view, small firms are technically inferior to large ones, and they depend on larger firms for assistance. If this were so, then we should see a high degree of capital or personnel flows from large clients to their vendors. Materials detailing the extent of these contacts are difficult to obtain but surveys undertaken by the People's Finance Corporation, an organization dedicated to making loans to small manufacturers indicate that the degree of small firm dependence is quite low.

For instance, the most recent survey in 1982 indicated that as firm size dropped, the percentage of vendors that had received capital or personnel assistance from their clients fell; overall smaller firms had very little tieups with the firms who bought parts from them. These findings are shown in Figure 4.21

Figure 4.21

Percentage of Vendors Receiving any Form of Capital or Personnel Assistance from Clients by Firm Size, 1982



People's Finance Corporation, *Shita Uke Torihiki Kankai no Jittai*, (Conditions in Subcontracting Relationships) (Tokyo: People's Finance Corporation, 1983) page 25.

The results almost completely reverse what the dual structure claims. Just 5% of smaller vendors in the 1-20 employee size category received any capital assistance from their clients; just 3% received personnel assistance. The percentages rose as firm size increased but even at the 101-300 employee level over 65% of all subcontractors received no form of capital or personnel assistance from their clients. Interestingly, it is between large firm vendors and clients that the greatest capital and personnel exchanges take place. These figures say little about the amounts of aid or kinds of personnel assistance involved. But what they do show is that for the most part, in contrast to the dual structure argument, small firms apparently do **not** rely on larger ones for management or capital assistance. Nor is this pattern restricted to the 1980s. Kiyonari showed

that in the 1960s over 60% of all subcontractors had no links to their clients other than their contractual relationships.²⁹

Thus, when the adjustment patterns, wage structure and subcontracting relationships of small and medium enterprises are carefully studied the deficiencies of the dual structure theory become apparent. Adjustment during recessions, with the exception of 1957-1959, was not compatible with the idea that smaller companies act as "shock absorbers" for the larger ones in manufacturing. The structure of wages shows that differentials by firm size shrank during the high growth period and were about the same in Japan as elsewhere. Further, the small firm labor force was extremely mobile, as workers apparently were able to create their own firms or move into management. The smallest firms were more profitable, if more risky than larger companies. Finally, subcontracting relationships tend to contradict the idea that smaller firms are utterly dominated by the larger ones. In the next section we will try and account for these findings with an historical account of the relationship between Japanese large and small firms from the Depression to the present.

The Relationship Between Large and Small Firms

In this section we will begin to describe part of the context surrounding the eventual integration of flexible production into the Japanese economy. The focus will be on the relationship between large and small firms, and the strategies that each group pursued over time. The intent is to give a coherent explanation for the kinds of adjustment and wage developments we saw in the previous section and to highlight many

overlooked or unexplored facts about the way large and small manufacturers interacted in Japan.

We will claim that until the mid 1930s the small and large firms had little direct contact. The small scale manufacturers made finished goods for domestic or export markets while larger companies engaged in extraction or commodity goods manufacture. By the end of the war, however, small and larger firms were forced to rely on each other in subcontracting relationships, particularly in the machinery industries, for the reasons we identified in Chapter Two above. After Japan's defeat, a chronic capital shortage and an overt attempt to enter mass production markets with low cost goods that was orchestrated by large producers threatened to provoke a full blown "dual structure" in Japan. But a number of convergent developments halted, then reversed this trend. One was the rapid experimentation with manufacturing assembly lines in large firms which brought about, albeit somewhat ironically, more flexible internal operations. Another was the success of smaller firms to obtain capital and technical support necessary for them to avoid excessive reliance on contracting clients and thus become independent purveyors of high tech, rapidly changing product lines. We will discuss the financial transformations that abetted the movement away from the "dual structure" in 1950s Japan in detail in the next section; here we will concentrate mainly on the postwar interaction between large and small firms themselves as part of the general set of circumstances that moved the economy away from a purely mass production orientation.

But before we can show what the relation between large and small firms became, we must briefly discuss what their interaction was in the past. Although our focus will be on the postwar period, nevertheless an

examination of prewar developments is necessary to appreciate the way large and small firms subsequently changed.

Until the middle 1930s, prewar relations between large and small firms were very different from what the "dual structure" proponents imagined. Indeed, as we saw, Depression era adjustment was the complete opposite of what the theory predicted as shown in Figure 4.1. The dual structure hypothesis assumed that large firms and small firms were both producing the same products; small companies would produce inferior versions of large firm products, or they would supplement internal large company parts production with their own manufacturing. Then, as the economy retrenched, remaining demand would be taken up by the large firms as they cut off outside orders and relied only on their internal output to meet market needs. In fact, where products were standardized or in extraction industries, such as in coal, precisely this cyclical adjustment pattern has obtained in Japan. Small miners made up the difference in demand in boom times, and then were wiped out during contractions.³⁰

But the situation in prewar manufacturing was quite different from that in extraction or commodity goods production. In the prewar, as Nakamura has argued persuasively, large firms, especially **zaibatsu** interests, produced commodities like raw steel stock or thread which small firms made into specialty items.³¹ Smaller companies and larger firms were thus complementary. The bigger manufacturers, to the extent they were active in prewar manufacturing sectors, produced raw or semifinished materials that were then sold to smaller firms for assembly into final products. The market for the larger firms' products was the small scale manufacturing sector, which more or less independently transformed raw goods for end users in export or domestic markets. Thus, not only were the

roles of the large and small prewar manufacturers different, they actually served different markets. And though smaller firms were often forced to borrow money from wholesalers, or **toiya**, because of capital shortages induced by **zaibatsu** control of the banking sector, direct large firm interaction and supervision was slight. Indeed, if anything, the commodities producers were dependent on the smaller sector to open markets for their raw or semi-finished goods.

The classic example of this system was silk.³² Silk thread spinning was concentrated in large firms which tried to produce raw materials through mass production. The thread stock was then sold to middle men, the **toiya** who contracted with and frequently financially supported a retinue of small final-goods assemblers who made specialty western and traditional clothes for domestic and import markets. In some cases, the **toiya** also financed the larger thread makers as well. In this system, small and large firms complemented each other; the large firm needed the diversified expertise of the final goods assemblers to increase overall demand for its raw stock while the small producers sought cheap basic materials from economical producers. While the **toiya** and individual lenders could, and often did stretch out payment times or even defraud smaller cloth manufacturers to ease over short term market reversals or simply to increase profits, a fact we shall explore in detail in the next section, the supplemental production arrangements between large and small firms integral to the idea of the "dual structure" did not exist. If in fact small firms should fail, larger company product demand would also dry up because smaller assemblers were the consumers of raw goods producers made in big factories.

In fact, the prewar small firms had at least one advantage over larger producers during recessionary periods. They could export when domestic demand shrank by concentrating on specialty goods.³³ In contrast, particularly during global recessions, the raw goods producing large firms would experience direct, desperate competition from foreign producers cutting costs to expand markets. They could not readily divert output overseas. Indeed, small manufacturers might take advantage of commodity price reductions in other countries and source abroad for their materials further shrinking large company markets. Consequently, prewar adjustment during recessions was in some cases harder for the *larger* firm. Though small companies could turn to foreign markets with specialized goods, as they in fact did in the Depression in Japan, large firms had to weather both depressed commodity prices and direct foreign competition in standard goods markets.

This complementary small and large firm relationship, which persisted until the late 1930s at least, accounts for the startling Depression era adjustment we saw in Figure 4.1 where smaller manufacturers actually grew dramatically while large companies failed. The smaller manufacturers had shifted production to overseas markets, and were able to move more flexibly to whatever market opportunities existed. This ability was further enhanced by a system of small business supports that, as Johnson notes, was a Keynesian-like system of stimulation and protection that assisted recovery.³⁴ Indeed, small firms appear to have been the source of Japan's rapid advancement from the Depression, which was faster than most of Europe and the US. This protection of the small scale sector, we will show in the next section, emerged from much the same political climate and bureaucratic strategy that marked the attempt to

centralize the economy. The result of this confluence of both small firm market position and government support, whatever its original intent, was that smaller companies boomed by 1932, even as larger firms were still undergoing retrenchment.

Explaining the extreme dichotomy between the roles played by larger and smaller firms in the prewar Japanese economy is extremely difficult because of the paucity of prewar materials and the number of possible factors. Two influences were market fragmentation and the views large capital, especially **zaibatsu** interests took towards manufacturing. The markets for Japanese final goods were fragmented between a number of overseas destinations and internally diversified domestic buyers. This led to a number of problems for mass producers. Japanese demand for traditionally oriented clothes or other daily implements was distinct from the western tastes of the overseas users; further, regional tastes inside Japan were also differentiated. Regional taste variation was further exacerbated by such differences as those in electrical cycles between the east and west parts of Japan. Indeed, even today domestic fragmentation in tastes and electrical supplies preserves a number of market niches for smaller producers in Japan. Further, as we saw in Chapter Two, **zaibatsu** interests, which controlled prewar capital, did not have a confident view of potential Japanese competitiveness in mass markets, and were securely and profitably engaged in importing goods rather than investing in domestic manufacturing. Consequently, building from their base as suppliers of regional goods in markets essentially ignored by **zaibatsu** interests, ceramics, metal working and weaving, small scale factories grew into increasingly sophisticated producers for domestic and international

markets. Large firms concentrated on supplying raw or semi-finished goods for use by these smaller scale enterprises.³⁵

These relationships were thrown into profound disarray by the war and the military buildup in the late 1930s. As we described in Chapter Two, large firms which the bureaucracy had hoped would increase economies of scale were set up throughout the engineering industries but real production gains were not achieved. Smaller firms made up the gap between real capacity and government demand through subcontracting. They were forced into this role by the fact that their export markets were closed and the collapse of domestic demand. Consequently, smaller producers were brought or forced their way into the **toseikai** or distribution programs originally intended to support centralized production, and by the war's end their relations with larger firms had shifted. Instead of transforming large firm commodity products into final goods, they were now producing parts for final assembly by favored larger firms which were unable to keep pace with demand as government policies had initially sought. Gradually, in many cases small firms came to supplement the production operations of the larger manufacturers just as the "dual structure" argument supposed. Thus, if the smaller firms were not eliminated as was the original intent of prewar initiatives, the price of their survival was a transformation of their role in the manufacturing economy.

It is worth noting that before this development took place small and large producers were engaged in the prewar period in what might be called a primitive prototype of the flexible and mass production hybrid economy that would later emerge in the 1960s and 1970s. The largest producers made mass commodity goods, often through fairly unsophisticated techniques involving sweating labor while the smaller firms more or less flexibly

created final goods in craft workshops. This system contrasted with postwar practices in that the technologies in both large and small scale workplaces were primitive and the market shifts which the craft economy was capable of achieving more limited. But by the end of the war the future development of the flexible component of the economy appeared to be in peril. What we will now turn to is a discussion of why prewar craft producers were under challenge, and how flexible production principles were strengthened and re-emerged in a different form in the 1960s and 1970s.

The flexible heritage of prewar production was largely supported by smaller factories. But in the late 1940s and early 1950s these firms faced perhaps their stiffest challenges. The most pressing problem was that they found they could not escape reliance on the larger firms that they had supported in the war years as subcontractors. Furthermore, their dependence was such that the potential for the institutionalization of a "dual structure"--the use of smaller subcontractors to produce cheap products in accordance with demand cycles-- was extremely strong.

There were a number of reasons for the expansion of a "dual structure" in the postwar Japanese economy. One was the chronic capital shortage. In the prewar economy, smaller firms often relied on loans from their wholesalers which were secured against future sales. However, the immediate postwar economy reduced the role of the **toiya** because smaller firms were no longer concentrating on finished goods production but on subcontracting. Their creditors became the larger firms in each industry; as both Nakamura and Kiyonari note, smaller producers not only had to rely on their clients for support, but their ability to obtain loans from banks were also conditioned on the co-signature of the larger clients.³⁶ This meant that smaller firms had little or no leverage in bargaining with the larger

companies, and many were compelled to adopt a subservient role dictated by the power of their creditors.

A second factor was that the postwar larger firms and the bureaucracy were both in accord on the need to develop mass markets. As we shall see, in implementing this strategy larger firms eventually--if unwittingly--opened up the economy for flexible production. But in the immediate postwar period, as we saw in the machinery industries in Chapter Three, what Japanese manufacturing leaders and MITI officials sought was an integrated production network that could compete on price grounds against America and Europe. They wanted to copy the American system, put it into place in Japan, and then surpass the U.S. in manufacturing efficiency. In accordance with this strategy, the era was one of cheap standard goods for export, and products intended to provide the diffusion of "modern" commodities in the economy at home; the first Japanese entry into the American low priced standard car market in 1957 as we discussed in the Introduction and the cheap black and white television are illustrative examples. In light of this strategy, large firms put pressure on smaller ones to cut costs, a price squeeze that forced many to supplement larger firm production exactly as the dual structure theory suggests.

Market circumstances further enhanced the possibility of transforming the smaller sector into low cost supplemental producers for the larger firms. There was a massive labor surplus after the war, which made it possible for smaller firms to pass on price pressures from larger clients to laborers in the form of reduced wages.³⁷ Those workers that could not find employment in larger firms where labor strife kept wages comparatively high had to accept poorly paid employment in smaller firms. This gave rise to the 1940s-1950s wage gap between large and small firms

that we saw in Figure 4.11 above. Hence, if market transformations and dependence on large firms made the institutionalization of the "dual structure" possible, conditions after the war enhanced this potential outcome. And indeed, the structure of wages and the adjustment patterns we saw in Figure 4.2 for the 1957-1959 recession indicated that a dual structure type of relationship had apparently developed in Japan by the mid 1950s.

But several factors forestalled the complete triumph of mass producers in large firms and the subjugation of formerly flexible manufacturers as subcontractors selling cyclically sensitive, low price products. Among the most important were the internal production strategies of large firms, the resultant transformation of smaller firm practices, changes in the international marketplace and finally the provision of finance to smaller firms to reduce large firm influence. Here we will consider only the way large firms undermined their own search for a super-efficient mass production system while market reversals increased the need for flexibility, and the changes this brought to the relationship between larger and smaller manufacturers.

The first and in some ways most important factor was that the deliberate strategy of inducing and then enhancing an American style mass production system by large firms in the auto and other machinery sectors involved a constant degree of experimentation that ultimately led to production much more in consonance with flexible rather than mass manufacturing principles.³⁸ And, as in the U.S., the experiences of these leading manufacturers spread to other sectors as well. Thus, early efforts to rapidly improve on U.S. mass production techniques actually led to the belated re-emergence of the flexible potential of the early prewar economy.

One highly suggestive piece of evidence showing how this process worked was the experiences of Nissan, the second largest auto producer in Japan. Nissan initially attempted to mimic as much as possible the practices that the American giant General Motors had installed in the factory.³⁹ In the simplest of terms, what Nissan sought was to create a network of mass production suppliers centered on its own operations in as short a time as possible while improving on the U.S. model. What this involved in practice was the continual revision of assembly lines, and constant meetings with subcontractors to re-coordinate production. To discover the "perfect" manufacturing system, Nissan had to modify its operations continually, and then compel the subcontracting firms to adjust as well. As initially conceived, this process of refining the workplace and guiding subcontractors was undoubtedly thought of as central direction by Nissan.

But continual experimentation undermined both the search for stable mass production inside Nissan, and its control over the suppliers. In general, rapid change of the workplace is completely antithetical to what mass producers seek; they want to stabilize the assembly line, and then reduce the skill necessary for each task along the production system to as simple a form as possible. Rapid transformations of the factory, *even if intended to lead to a more efficient mass production system*, make it impossible to rationalize the workplace for stable economies of scale. Instead, high skill workers employing general purpose machines--the hallmark of the flexible firm--have to be utilized to permit the very experimentation necessary for the attempt to enhance efficiency--or as Nissan conceived it, to beat the Americans at their own mass production game. In trying to institute rapidly and then perfect mass production, the

Japanese initially assumed that further enhancements would be self-evident. But the fundamental ambiguity involved in industrial order meant that potential mass production refinements were not all clear to Japanese firms. New techniques would appear less promising than thought; overlooked applications would suddenly become the focus of activity. Large Japanese firms like Nissan were led to continual modifications and changes in their assembly line set ups. The result was the internal generation of a more flexible orientation to manufacturing.

At the same time, the close control of subcontractors became ever more expensive. Though Nissan was able to supervise directly the responses of its suppliers to mass production modifications in the initial phases, it rapidly became clear that continuous, intimate regulation was too costly. Subcontractors had to become more independent and develop their own expertise in meeting shifting production demands. Thus, by the late 1950s, Nissan was encouraging its suppliers to become more or less autonomous, symbolized by the insistence that the supplier firms' heads be called "president" (rather than "boss man" or "old man"), be treated as an independent businessman, and in the change of the supplier firms' name from **shitaue** (subcontractor) to **gaichu** (outside order) firms.⁴⁰ The smaller subcontractors were cut loose from the tight constraints imposed in the search for economies of scale on the American model and encouraged to become independent specialists in meeting the ever changing needs of the larger firms.

These experiences in the automobile industry were also evident in other machinery sectors. One example is the bearings industry. Japan's largest bearing manufacturer, which played a dominant role in the industrialization of Nagano Prefecture, also attempted to set up an

integrated mass production network in the 1950s. But as the firm's coordinator of outside orders recalled, by the latter half of the decade the company offered little or no technical or management guidance to its suppliers. Like Nissan, he suggested, though the attempt had been made to direct centrally the way suppliers went about their operations, cost pressures related to a lack of time and manpower to supervise continually the constant transformations of the production system led to a rapid retrenchment by the early 1960s. In any case, he suggested, "there isn't a lot we can tell them [now] anyway."⁴¹ Indeed, a small Nagano Prefecture subcontractor asked about its relations with its larger clients confirmed this view in even more emphatic terms: "if anyone was to give advice, it would be us."⁴² The experiences of Nissan and of regionally powerfully machinery firms indicates that by the late 1950s there was a great reversal of the initial attempts to install a centrally directed mass production economy in Japan.

Market developments enhanced these trends. The Japanese had initially sought to make their mark in international markets and at home with cheap, standard goods. But though from the perspective of the 1980s the Japanese seem to be unbeatable exporters, it is frequently forgotten that Japan's early export attempts in the 1950s were for the most part failures, or involved low value added items earning little or no profits. Early efforts to penetrate the American car market with standard products were so completely routed that by the mid 1960s Japanese auto exports to either the U.S. or Europe were actually zero. Experiences such as these were forcing firms in the engineering and machinery sectors to rethink competition based on standard goods and to look more at the need to differentiate their products from those produced by foreign competitors.⁴³

Thus, as the drive for mass production efficiency itself generated impulses towards flexible manufacturing, export reversals further stimulated new thinking about production, undermining the attempt to put together a stable mass production economy.

Finally, domestic competition in Japan, which for the most part was the primary market for Japanese firms until at least the early 1970s was extremely severe; in any given sector, Japanese firms always outnumbered American manufacturers and on a volume basis there were several times the number of producers. Japanese competitors would frequently bid down the price of goods to cost, or below cost, often accepting losses for the potential market advances. To avoid this type of competition, which the Japanese bureaucracy excoriated as "excessive" (and which further suggests the failure of the cartel schemes that were supposed to have halted this problem) Japanese firms had incentives to try and continually differentiate their products. This would temporarily insulate them from direct price challenges, and it would create replacement demand as with each year a slightly enhanced good would be promoted. Thus large firm export strategies, domestic marketing and experiments with mass production all induced a rollback of the plans to institute a mass production economy and thus a movement towards flexible production.

All of these pressures led to changes in the way large firms organized manufacturing, and in the freedom of smaller companies to control their own production. The result was a surprising convergence between the internal management and production strategies of smaller and bigger enterprises. As large firms sought to create internal mechanisms for promoting flexibility, they began to fragment into autonomous units that looked increasingly like collections of smaller companies under a single

corporate roof. At the same time, the increasingly independent smaller subcontractors were adopting many of the internal practices that larger firms were driven towards as they too sought to respond to the need for more flexibility. In labor management policies and in the structure of work in larger firms as compared to smaller ones, we can see this convergence and the emergence of a flexible component in the economy.

First consider the fragmentation of the larger firms. As Clark has shown, for the most part large firms did not vertically integrate their operations as was the norm in the U.S. Rather, their typical strategy was to specialize in a particular technique or component in any given sector and to buy the rest of their parts needs outside the company.⁴⁴ Further, Clark argued that the nature of the operating divisions large firms do control directly are different from the American pattern; large firms set up new manufacturing operations as autonomous units, and expect that over time these new divisions will become increasingly independent until the parent firm may only hold a small share of the new company's stock.⁴⁵ As the result of this investment strategy, which some scholars have suggested resulted from the influence of the older **zaibatsu** system of investment updated to the postwar marketplace, larger firms gradually began to take shape as collections of smaller, autonomous, specialized units.⁴⁶ These production divisions increasingly resembled the structure of the small scale sector in the economy.

In labor management as well the smaller and larger firms began to converge. It has been well established that one feature of the Japanese large firm workforce is the absence of strict job related work rules and the high general skill--and general responsibilities--of the workers themselves. Undoubtedly this was in part the product of the reluctance of

American SCAP officials to create fully a Japanese national labor union in the face of anti-communist fears in the early 1950s. Blocked from developing a national union movement, Japanese workers negotiated on the basis of company unions. This is frequently seen as evidence of the power of capital in Japan, and is usually taken as an "advantage" for Japanese industrialists since they can control the factory free from labor "interference." Yet, the most important effects of company unions were probably not to enhance the centralizing power of the capitalists, but rather to permit flexible freedom in the workplace. In the absence of a strong American style national labor movement, Japan avoided the national elaboration of work rules that froze flexible production in other countries; if labor treats a specific work task as an intrinsic right on the shop floor, then changing the production system to make new goods is difficult because such an action invites labor strife. But in Japan, the growing need for flexibility on the part of large firms was not blocked in this way and general skilled workers could be freely deployed as production circumstances shifted.⁴⁷ Thus, as the larger firms internally decentralized, and as market needs as well as assembly line experimentation required additional flexibility, the employment of general skilled labor with broad responsibilities on the shop floor was introduced.

This same style of labor management was adopted by small firms as well, for much the same reasons. In the dual structure view, the small manufacturers are thought to employ low skill labor as reducing costs are said to be their primary production objective; the practice of building up skill in their employees to increase flexibility would be an unnecessary expense. But Koike has shown that the vast majority of small firms explicitly rotate workers about the assembly lines and give them a large

degree of autonomy in order to make it possible for the firm to make new products, or to meet changing demands for existing goods.⁴⁸ The reasons for this practice are, of course, self evident in the case of firms in changing engineering fields that rely on added flexibility to move into new or changing markets. However, Koike also argued that even firms appearing at first glance to have but limited product lines also employed the rotation and worker skill strategy. One revealing case was of a subcontractor that made only three basic kinds of bearings. In this example, the firm still had to rotate its workers and train them extensively because demand for the three products was unpredictable; the firm might need to make one bearing on one day, and the other two the next, or even all three on the same day. This uncertainty in production scheduling pushed the firm towards using high skill workers on general machines so that it could meet demand for its products as rapidly as possible, precisely the strategy employed by larger firms in the search for flexibility.⁴⁹ Indeed, we can see in this case how the larger firms' search for flexibility affected the management practices of even those suppliers that had limited product ranges. In order to respond to changing needs--even if limited to small sets of related goods--subcontractors had to employ workers and train them according to flexible principles.

As the larger firms decentralized and specialized and as smaller firms began building their own production niches and using the same labor techniques employed in the big factories, the flexible component of the economy was revitalized. Coupled with trends in the politics of small firm finance that we shall discuss below, the subcontractors became increasingly independent from the larger firms, and even the larger firms had to fragment internally and concentrate on only certain processes or

products in any given market. Mass production went ahead only in the most standard items; for complicated, changing goods, firms relied on specialized subcontractors or semi-independent manufacturing divisions for the adaptation or creation of goods for new needs. Hence, in a way reminiscent of the prewar, mass production firms and flexible firms once again were interdependent.

Indeed, by the late 1960s, smaller manufacturers became noted as specialist producers of unique products by virtue of skill or machines that they alone possessed. The larger assembly firms in any sector--Nissan or Toyota in automobiles, Toshiba or Matsushita in electronics or Mitsubishi in machinery for instance--increasingly relied on smaller specialist producers because they could not proceed with vertical integration or mass production without sacrificing flexibility--an attribute that Japanese firms were beginning to consciously link with domestic and international successes. In fact, during the 1960s one of the most pressing problems for large manufacturers was to decide which segments of the market it should give up to the smaller companies, and which to retain internally. The large firms' fear was that as they relied more and more on specialist subcontractors, they would become vulnerable to price pressures; and in fact the higher rates of profits of smaller firms as we saw above seems to confirm that this concern was not groundless.

Responses to the problem of internal production and subcontractor reliance varied from company to company. Some firms like a machine tool firm in Shizuoka attempted to retain at least one employee who could make any given component of the tool produced by the company. In that way, at least in theory, the firm could once again shift to internal production if subcontractors were squeezing them.⁵⁰ Others, like a major bearing maker,

chose to specialize in product design and development, essentially setting itself up as a research organization and subcontracting the production of mass or specialized components to Japanese or overseas producers.⁵¹ Others simply confined their operations to mass producing the most basic structural items of a product to which an assortment of subcontracted parts were attached.⁵² But as the complexity of the electronic and mechanical components of Japanese products grew, the reliance on subcontractors was unavoidable. For instance, while the subcontracted work on a standard lathe was about 30% of the value of the item, for an NC lathe the ratio rose to 75%; the manufacturers simply could not internalize the production of air pressure motors, electrical controllers and computer readers.⁵³ Instead they had to purchase these exceedingly complicated goods from outside, specialist vendors. In the same way the increasing complexity of automobiles and electrical goods forced firms to subcontract to an even greater degree. Vertical integration made no sense in a changing market.

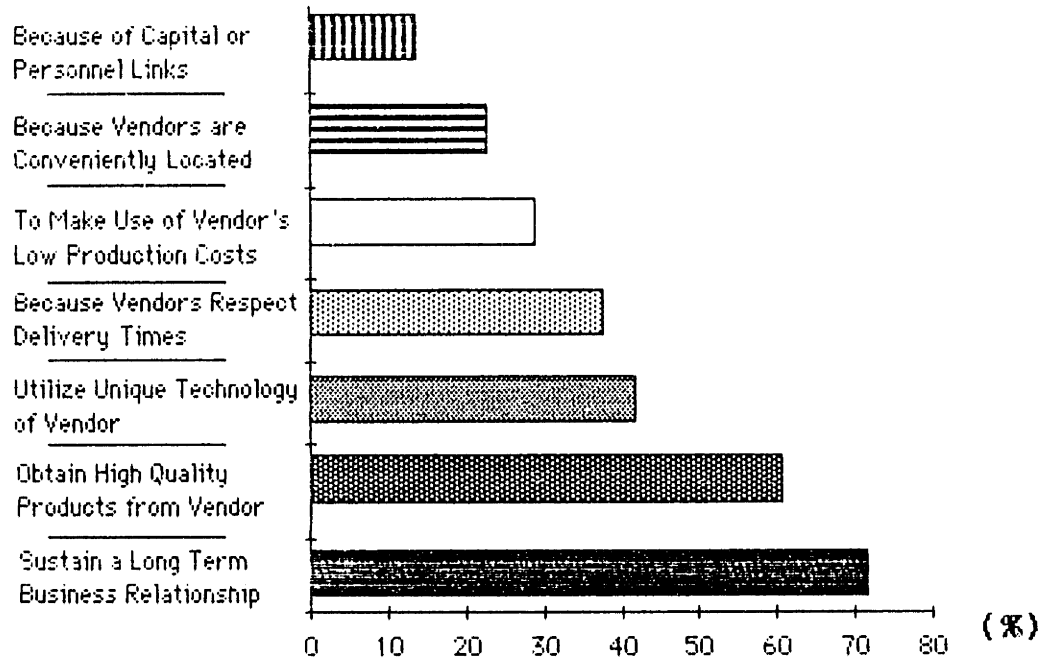
The fact that small firms escaped subjugation in the 1950s and returned to the principles of flexible production, albeit in much different markets and with different technology in the 1960s is supported by a number of surveys showing that the reasons firms placed outside orders had less to do with costs than with the superior technology and quality offered by small producers. Though some responses are cost related, for the most part contractors indicated that specialized technical skills or specialized equipment were much more important to them than low wage rates or cheap parts in deciding to order out for work.

One survey of all manufacturing industries was carried out in 1982 by the People's Finance Corporation, a government institution that makes loans to very small enterprises. Contracting firms were queried as to why they

make use of small producers for components; multiple answers were permitted. The results are collected in Figure 4.24. Responses such as "low cost" (29.8%) or "because of good delivery times"--the operation of the **kanban** or just-in-time delivery system of subcontracting--(38.7%) are all clustered at the top of the graph where the percentage is lowest. The vendors' "unique technology" (42%) and "high quality products" (61.3%) are much more frequently provided as reasons for subcontracting. The largest category, "to sustain a long term relationship" (72.7%) is ambiguous since it is impossible to tell why the parent firms started subcontracting in the first place; it could have been due to cost or to technology. The survey indicates that reasons relating to skill and technique are much more important than those pertaining to price.

Figure 4.24

Client Firm Reasons for Subcontracting, Manufacturing, 1982

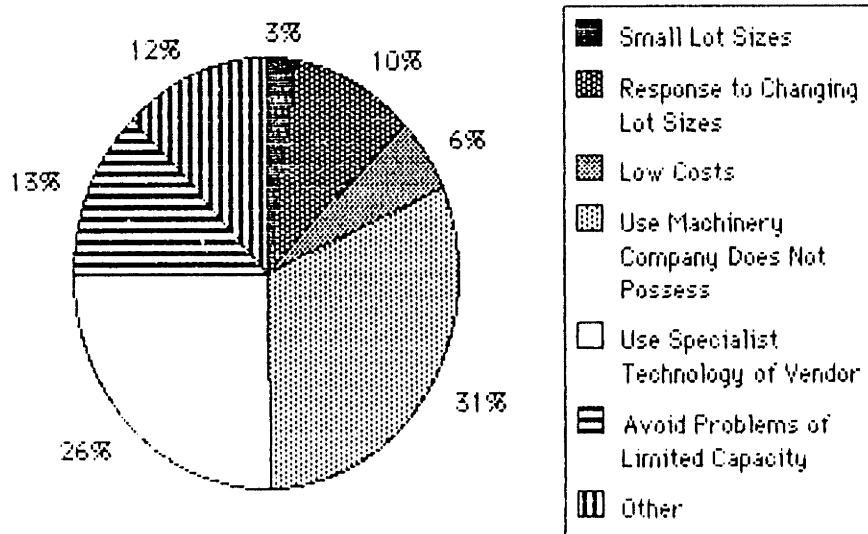


Source: People's Finance Corporation, *Shita Uke Torihiki Kankai no Jittai*, [Conditions in Subcontracting Relationships] (Tokyo: People's Finance Corporation, 1983) page 31.

If individual sectors are considered, subcontracting reasons in complex product fields exhibit an even more pronounced bias towards technology and equipment over cost. In Figure 4.25 the results of a survey of machine tool firms is presented; in this case, multiple responses were not permitted. It shows that using the vendors' technology, machinery or special skills account for nearly 57% of the responses. Another 13% mention lot size problems; large firms could not flexibly respond to market shifts so they relied on smaller ones. Only 6% mentioned low costs as a factor.

Figure 4.25

Reasons for Subcontracting, Machine Tools, 1982

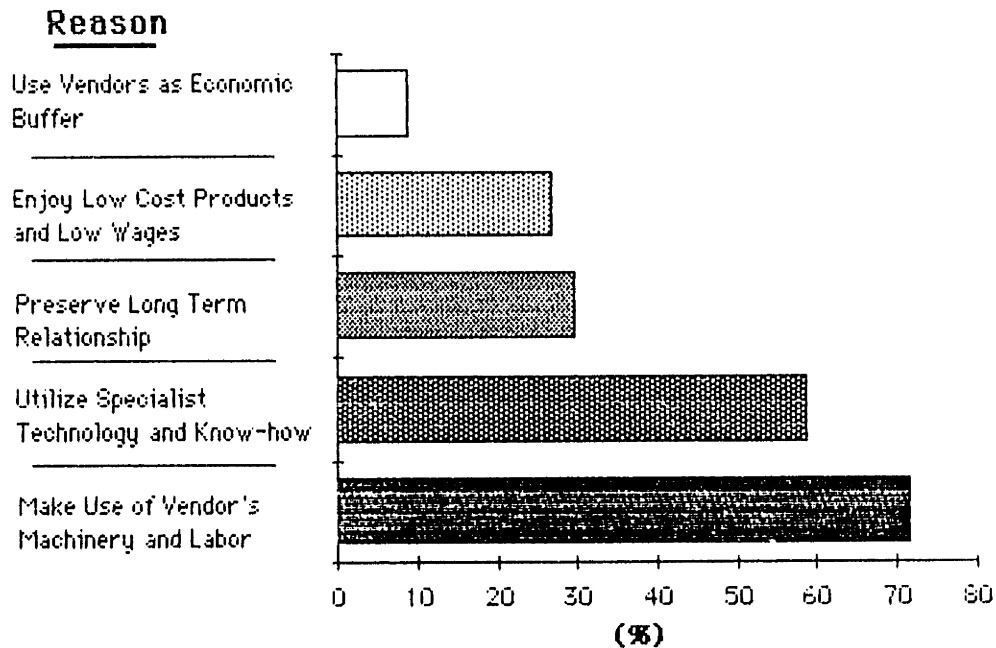


As reproduced in Kiyonari Tadao, *Chusho Kigyo Ron* [Small and Medium Enterprises] (Tokyo: 1978) page 66.

We can see that the emphasis on technology and skill in subcontracting dates from the 1960s by looking at a much earlier survey of the general machinery sector. It corroborates the evidence presented above and shows that in the high growth era subcontracting reasons have been fairly steady. The survey, taken in 1968, is duplicated in Figure 4.26; multiple responses were permitted. Technology (60%) and equipment and labor skill (72%) reasons were much more important than low wages (30%) and using subcontractors as an economic buffer (8%). Subcontractors in 1968, as in 1982, were for the most part high skill producers possessing unique, specialized technical abilities which large firms required to make quality products.

Figure 4.26

Reasons for Subcontracting, General Machinery, 1968



Kiyonari (1970), page 177.

The emergence of the flexible, specialized small firm in Japan helps us to understand much of the adjustment and career data presented in the section on the dual structure above. The needs of larger firms converged with blue collar worker opportunities to enter the market as independent operators leading to the growth of profitable small scale high tech producers. In turn, the "dual structure" adjustment pattern of 1957-1959 gave way to the 1970s patterns in which small firms, again harking back to the early prewar period, did better than larger firms in recessions. Further, the data on small firm independence and on the recovery of the wage gap by the 1960s can be seen as indicators of the resurgence of the flexible component of the economy.

Thus, as Kiyonari has suggested, there was a marked movement away from the potential dual structure that had developed briefly after the war towards a much more flexible industrial system. Under conditions of rapid expansion, possibilities for opening or operating independent factories increased; workers, attracted by higher incomes as an enterprise operator, made use of their training as small firm employees and developed specialist production techniques as the basis for their competitive edge. Older, low wage type small firms gave way to high technology advanced enterprises which transformed the entire manufacturing sector:

As enterprise-operator income increased faster than wage growth, and as opportunities for forming new enterprises expanded, the number of new firms increased. People opening new firms were primarily in the 20-30 year old range, and there were less cases in which chronically unemployed individuals were forced by poverty to become independent operators. Full employment and mild inflation preserved both good conditions for becoming self employed and high earnings. Consequently, individuals that had accumulated a variety of management resources and basic skills became independent. In contrast, for the unskilled, chronically unemployed, the period was not auspicious for learning how to manage or mastering manufacturing techniques. Consequently, at its root, the expansion of self employment after 1965 did not represent a recurrence or strengthening of the dual structure but rather its elimination. The number of small and medium enterprises that relied on cheap labor, or sought to counteract their low productivity by increasing work hours, fell. Instead, the dual structure continued to recede as large numbers of small businesses that achieved high productivity through sophisticated, specialized skills and paid high wages made their appearance.⁵⁴

Thus, by the 1960s changes in large and small firms converged in the generation of a new flexibility in the economy, and the structure of small and large firm interaction, particularly in subcontracting was reshaped. In turn, the empirical evidence of the previous section can be understood in

the light of the historical growth of flexibility. The adjustment pattern changes we saw above reflect various stages in the development of large and small firm relationships. In the prewar, the dichotomy between large and small firm markets led to a sharp disjunction in adjustment. In the 1957-1959 period, the brief emergence of a "dual structure" like relationship led to increased adjustment burdens on small firms. Then, as strategic and market factors helped to push both large and small firms towards increased flexibility, a new form of mutual interdependence was created. Many smaller subcontractors became specialized, highly proficient, flexible manufacturers of parts. These were then assembled by larger companies, many of whom had themselves diversified internally. Larger firms engaged in mass production did so through concentrating on very limited mass components that were eventually assembled with subcontracted parts. In their position of specialist vendors, smaller firms increased their profitability. In turn, small firm wages rose as price pressures became less pervasive; moreover as the economy expanded and the labor pool shrank, smaller firms could not cut wages as easily as in the 1950s. Workers sought to reap the rewards of independent operations and flooded manufacturing markets with new, specialist firms. This helps explain the pattern of wages we saw above, and the reasons for the high degree of new firms run by blue collar workers. Thus, many developments that are anomalous or overlooked under the dual structure view are more easily understood in light of the history of small and large firm interaction.

But we cannot account for the emergence of flexible small firms as the simple consequence of market transformations or an ironic byproduct of large firm mass production research alone. In other countries, market

uncertainty has forced subcontractors to adjust, and large firms have elsewhere been faced with an inability to stabilize production. Yet, the same hybridized industrial structure as is found in Japan was not institutionalized in these other cases. Other factors must have been present so that latent developments were in fact realized.

One set of concerns that still must be explained is how and why small firms were able to survive in Japan once their larger patrons reduced support and sought flexibility in the late 1950s. How could firms seeking technically sophisticated production niches afford the investment in new machinery that this entailed? How did the tight labor markets of the 1950s give way to a flourishing small firm economy by the mid 1960s where blue collar workers were able to open new factories, the number of which almost doubled during the high growth period of 1960-1980? To explain these developments, we need to see how there was a fortuitous coincidence between large and small firm relations and the resolution of political struggles surrounding the provision of finance to smaller manufacturers.

Financial Support For Small and Medium Manufacturers

Market trends and the relations between contractors and subcontracting firms, we have argued, generated an impetus in the postwar Japanese economy for the emergence of flexible operations in both large and small factories. At the same time, in the middle of the 1950s, a movement to reform the financial system to secure investment capital exclusively for the use of startup smaller manufacturers reached its peak. The result was the creation of a number of lending institutions that provided equipment

loans to smaller factory entrepreneurs, enabling them to take advantage of the opportunities that market circumstances had afforded.

We must note that it is extremely hard to say whether or not the existence of these institutions was ultimately indispensable for the emergence of flexible, independent small firms in Japan. Given the strong pressures for independent flexible operations in Japan, and such facts as the growth of a huge capital surplus in the late 1960s, it is possible that even without the provision of special financial sources smaller firms would have found necessary capital. But while it is feasible that through some other mechanism the same industrial outcome might have been produced, it is nevertheless the fact that smaller scale companies *did* rely on the new sources of capital for the huge majority of their investment needs. Fortuitous changes in small firm financial markets converged historically with the kinds of transformations we identified above. Consequently, the way that Japanese capital markets were restructured for the benefit of the smaller producers must be viewed as part of the contextual setting in which the postwar hybrid economy grew.

In this section we will describe how specialized small firm financial organs were set up in Japan. Our argument will begin with the 1920s when the MCI tried to merge smaller producers by offering subsidies to groups that would form cartels called "industrial unions" [**kogyo kumiai**]. Just as in the case of the Important Industry Control Laws episode of the 1930s involving the **zaibatsu**, the bureaucracy proved utterly unable to secure the market changes it sought, and ended up paying out funds to no avail. Gradually these subsidy payment programs were institutionalized into banks or trusts. While the prewar institutions that resulted probably had limited effect on smaller firms because their scope was so small, their importance

lay in the foundation they established. After the war intense pressure for financial relief for small firms led to the massive restrengthening of these institutions. By the 1970s, close to 80% of all small firm investment capital was accounted for by financial organs that were the direct descendants of the prewar efforts. By using loan capital from these sources, smaller firms were able to become more independent and afford the equipment they needed for specialist operations.

The fact that the government was induced to support smaller firms in the way it did raises acute problems for the centralization thesis in general, and the dual structure argument in particular. As we shall see, smaller firms were able to interact with the MCI and MITI just as the larger firms did in thwarting the intent of the bureaucracy's initiatives while accepting financial rewards. But there was a sharp difference between the *effects* of this interaction in the smaller and larger sectors. In dealing with large firms, MITI and the MCI were in the position of trying to force their way into control of companies that were generally well funded from **zaibatsu** or former **zaibatsu** financial sources and that possessed considerable political influence. Policies resulting from this interaction tended to be almost irrelevant to what actually took place in the market; the large firms refused to go along with consolidation schemes (unless of course *they* wanted them for their own reasons) while accepting financial payoffs that usually amounted, as we saw in Chapter Three, to just a fraction of their overall capital needs. The result was a generally ineffective policy record; bureaucratic payoffs to large firms in the pre and post war period were like a sideshow to actual changes in the economy.

But the same political process in the case of smaller firms was much more important since government sponsored investment sources were a

much larger share of available capital for smaller producers. This was especially true, as we will see in detail, for firms in the startup phase of manufacturing that were all but totally excluded from bank capital, funding that made up until the mid 1960s some 80% of total investment loan sources. Hence, the same degree of support that was just a fraction of large firm capital needs was a huge proportion of the investment made by the startup companies in manufacturing. The politics of small firm finance were thus much more significant in affecting industrial outcomes.

This poses two problems for conventional arguments. First is the fact that the smaller firms were able to resist consolidation schemes as did the larger companies, something we should not expect if the bureaucracy were as powerful as usually assumed. Second, to the extent the "high" politics of the Japanese state affected industrial change it apparently enhanced *decentralization* rather than consolidation as was sought. Where MITI was blocked from inducing either large or smaller firms to merge for economies of scale, its payoffs to the smaller companies, though intended to produce consolidation in effect made it easier for very small scale factory operators to obtain startup funds. As new companies flooded the manufacturing sector, the economy decentralized, and flexible production was re-established. The history of small firm financial support thus further contradicts the idea that the bureaucracy could regulate the economy as it saw fit, and highlights the ironic fact that state initiatives were only effective to the extent they actually led to the emergence of flexible production rather than mass production--something totally unforeseen by MITI officials.

The purpose of this section is to show how the financial system was reorganized from the 1920s to the present. First we will describe prewar

developments, and then the postwar growth of specialized small firm financial organs. Although our primary aim is to provide comprehensive evidence of the historical development of small manufacturer financial support--to show what actually took place in Japan and to contrast this with conventional ideas--we will also try and briefly provide a political context to account for why the bureaucracy and small firms acted as they did.

Let us begin with the prewar period. Concrete policies for the support of small manufacturers first emerged in 1925; indeed, it is a measure of the influence of small industry that the very first efforts by the MCI to regulate the structure of the Japanese industry--the birth of Japan's "industrial policy" --were taken on their behalf.⁵⁵ The initial legislation was aimed at reducing the dependence of small firms on merchants for financial support. We have already seen that in prewar manufacturing **zaibatsu** influence was much less than imagined, and in contrast to the US Japan's economic structure was more decentralized. But banking was another story. There, prewar concentration grew steadily; by 1939 the top five **zaibatsu** banks controlled 57% of the loans, 63% of deposits and 32% of paid up capital in Japan.⁵⁶ Consequently, Japanese capital resources were concentrated on the needs of **zaibatsu** affiliates engaged in commodity, retail or raw materials sectors.

Small firms, as we have seen, concentrated on the conversion of basic commodities into finished goods for domestic and overseas consumption. They had little or no access to bank capital for investment since the **zaibatsu** shunned manufacturing in general and smaller firms in particular. To obtain financing, small firms had to resort to a variety of measures and practices, none of them ideal. One was to form or join special financial

organizations called **mujin** companies which were like building societies. Members would pay a specified fee into a central pool, and loans would be determined by lot, or by a predetermined schedule.⁵⁷ The problem, of course was that there was no guarantee that entry in the **mujin** would lead to loans. Other small businesses became part of more conventional cooperatives, which were licensed to accept deposits in certain regions of Japan. The co-ops pooled capital and made investments to try and provide members with operating loans.

But most had to survive through purchase agreements with merchant suppliers of raw goods. The merchants, or **toiya**, would provide materials to a manufacturer with the understanding that they would then have the right to market the finished products. Payment was made to the small producer after final sale and after materials costs were subtracted. This arrangement gave tremendous power to the **toiya**, since the small firm could be squeezed at both ends of the production process. Particularly hard hit were export industries, as payment times were long, and ascertaining actual transaction costs was difficult for the family or small firm. Furthermore, as the number of small firms was high, the **toiya** could encourage sweating among small firms by threatening to shift support manufacturers balked at price reductions.⁵⁸

As its first major policy initiative, the MCI attempted to halt this intense price pressure and reliance on the **toiya** with the passage of two acts in 1925, the Export Union Law [**Yushutsu Kumiai Ho**] and the Major Export Industries Union Law [**Juyo Yushutsu Kumiai Ho**]. The Export Union Law was designed to create central trade organizations [**yushutsu kumiai**] for small and medium producers, accepting their goods on consignment. The unions would also inspect goods to assure quality. The use of a central trade

acceptance organization, it was hoped, would lessen the influence of the **toiya** by providing an alternative outlet to small firms.⁵⁹

The Major Export Industries Law provided for actual cartels [**kogyo kumiai**] in designated product lines. Through the cartels, member firms would agree on prices and quantity. In this way, sweating would be limited by the imposition of output restrictions supporting floor prices. Under the law, designated cartels would receive subsidies and access to loans from the Postal Deposit Bureau of the Ministry of Finance. The government was given authorization to enforce the terms of cartels against non-member firms in a specified industry when necessary.⁶⁰

The two Export Union Laws provided a preview of the future shape of prewar legislation; they attempted to consolidate industries by offering financial inducements and the threat of state enforcement if voluntary compliance failed. And, also suggesting the shape of future industrial regulation, they failed for many of the same reasons that bedeviled later laws.

At first, the creation of small business unions did move forward. By 1933, 111 separate **kogyo kumiai** were reported.⁶¹ But these "unions" fell short of anything like the goal of centralization and control sought by the legislation. The most basic problem was the fact that the unions of small firms did little or nothing to restrain the activities of their members. Rather, they existed mainly to extract subsidies from the state.⁶² Further, the bureaucracy was explicitly prohibited from enforcing the union scheme; just as in the case of the Important Industries Law, industrial opposition made it impossible for the MCI to invoke the compulsory terms of the legislation; indeed, the passage of the export and union laws was conditioned on making union membership non-voluntary.⁶³ Not once in the

period 1925-1933 was the compliance power invoked. Just as the large companies affected by the Important Industries Law would accept subsidies without complying with bureaucratic objectives, the small firm **kogyo kumiai** were little more than cynical attempts to satisfy the surface requirements of state policy to receive support. The government had no means for ensuring or enforcing compliance. This ineffectiveness is particularly marked given the comparative weakness of small producers.

But aside from the matter of subsidies, the Export Unions were manifestly ineffective. Because **toiya** frequently owned production factories in addition to controlling raw materials supply, they were able to gain entry to the **kogyo kumiai** and dominate them. Their previously informal, but influential pressure on smaller factories was then strengthened into a bid for state sanctioned control. Further, there were allegations of considerable corruption in the inspection and pricing of goods. Many firms simply pasted their own labels on products to signify compliance.⁶⁴

The **kogyo kumiai** underwent considerable modification during the 1930s. In 1931, the Export laws were amended, providing the MCI with an explicit mandate to centralize the economy for war. The unions also were expanded to cover all industries, not just export sectors. This was part of the "rationalization" program of which the Important Industries Laws were a part.⁶⁵ However, as part of the price for passage of the law, the MCI had to accept that the **kogyo kumiai** would be self-run; just like large firm regulation, the bureaucrats had no direct authority to impose pricing, product or marketing ideas on small producers.

Real structural changes resulting from the **kogyo kumiai** did not occur until the mid 1930s and materials rationing. The **kogyo kumiai** were

used to control the distribution of scarce materials, much as the ticket system was employed in the Materials Allocation Council of the machinery industry and the **toseikai**. Firms now had to join a union or face a cutoff of materials they needed for production. Membership soared; there were 662 **kogyo kumiai** by 1935, 896 in 1937 and 1301 by 1938 affecting almost 54,000 firms.⁶⁶

But this growth was not a product of the government's authority and did not signal, as many have argued, the planned concentration of small firms as a policy of increasing scale economies. Materials shortages forced companies to associate with the unions; absent these shortages, compliance would have been as ineffective as it was in the 1925-1936 decade.

Government policies aimed at small firm consolidation were merely subsidy programs under which companies received payments without compliance.

They in effect turned the centralization effort into support or preservation initiatives because the state could not insist on actual consolidation or on effective union coordination.

Indeed, despite these shortcomings, the bureaucracy was unable to reform the program. Subsidies persisted because of the political sensitivity of small business support. As Schumpeter and Allen argued, the **kogyo kumiai** movement was primarily sustained by the desire of the right wing to sustain small firms against the **zaibatsu**:

We can conclude, then, that the **kogyo kumiai** have been molded by various influences, and that their organization and functions carry traces of various policies by no means mutually consistent. In the beginning, they were designed to raise the quality of export goods and to improve the organization of small scale producers for export. In 1931 they became part of the government's scheme for rationalizing industry; and after 1933, while they were charged with certain duties of control [materials allocation]...their development was also affected

by considerations of social policy. For they came to be used as a piece of administrative machinery by which the policy of supporting small producers against the larger commercial and financial interests might be carried out.⁶⁷

At the same time that the MCI was pushing for consolidation, subsidies and support for small producers were being supplied. The government was caught between the political objectives of anti-**zaibatsu** decentralization, and the centralization effort the bureaucrats were sponsoring in a bid to increase efficiency.

The **kogyo kumiai** were only part of the pro-small business tilt in government policy. Throughout the 1930s rural areas received massive subsidies as cooperatives [**sangyo kumiai**] were established.⁶⁸ Many of these co-ops were for agricultural purposes only. However, they also initiated some of the first movements towards regional manufacturing development. This came about in part as the co-ops moved into agriculturally related industries like warehousing, farming equipment, construction or fertilizer. The government provided financial support and Postal Deposit loans for these undertakings. In addition, the government subsidized the establishment of factories in rural areas, sometimes in connection with land grants by local authorities. These policies were important precedents for future entrepreneurial development in rural districts.

A final strand of policy, not directly linked to manufacturing but strengthening government commitment to small firms, was a push to protect small outlets from department stores and other large business encroachments.⁶⁹ In this program, very similar to manufacturing and agricultural initiatives, retail firms were encouraged to form unions [**shogyo kumiai**] to economize on certain functions in competition with

larger stores. Large department outlets were restrained from advertising or other promotional efforts aimed at luring business from traditional retailers.

The creation of financial institutions for the special use of smaller firms followed on the heels of the **kogyo kumiai** movement though the direction of capital resources to small firms was greatly inhibited by the overwhelming strength of the **zaibatsu** in the banking sector. Yet, pressure for small business lending did lead to reforms by the late 1930s. In 1936, a central bank for commercial and industrial cooperatives [**sho-ko kumiai chuo ginko**] was established to fund directly the **kogyo** and **shogyo kumiai**. Its main role was to consolidate the haphazard funding provided by the Deposits Bureau and other subsidy sources; the bank would specialize in unsecured loans to the small industrial unions. Half of its capital was supplied by the government and the rest by the unions themselves.⁷⁰

In 1938 two related institutions were established, the People's Bank [**Shomin Kinko**] and the Pension Bank [**Onkyo Kinko**]. The People's Bank was a 100% government financed institution that made unsecured loans to small enterprises. It also began to support the independent **mujin** companies by accepting their deposits and providing them with loans.⁷¹ The Pension Bank was partially funded by the government and could make loans to holders of pensions (which secured the loans). Since many pensioners were small business operators, the Pension Bank was thought of as a small-enterprise institution.⁷²

These reforms were intended to finance the union effort and strengthen small business access to capital. The MCI believed that by encouraging firms to enter **kogyo** or **shogyo kumiai**, centralization would also be fostered. Small and medium enterprises hoped that the new banks

would provide them with stable funding without the unpalatable drawbacks associated with **toiya** financing. However, while it is extremely hard to determine the exact influence of these new institutions in the prewar period, especially given the lack of data after 1938 due to military regulations, it is unlikely that they satisfied either the bureaucracy or the smaller firms.

The most difficult problem was that the new banks were hampered by the strict currency and materials shortages that hit Japan after the opening of the war with China in 1936. As more and more companies were forced out of non-military production fields like textiles, they sought loans for converting to war-related production where materials were available. This prompted companies to enter **kogyo kumiai** for which funds were provided and to apply for conversion support. As a result, the banks became a force for financing the shift towards munitions that accelerated in Japan as the war drew near. When shortages finally became acute in 1941, an umbrella National Rehabilitation Bank, [**Kokumin Kosei Kinko**] was set up to coordinate the work of financing small firm liquidation or munitions conversion.⁷³ Wartime pressures prevented the development of small business institutions for general manufacturing sectors. And, small business finance institutions failed to derail the impulse towards banking concentration in prewar Japan.

Thus, the real importance of these prewar developments was to set a precedent for postwar support measures. But before we turn to the postwar history, let us discuss some of the factors that led to the effort to support smaller firms and to their ability to withstand the consolidation efforts sought by the MCI.

One element was the fact that the military took a particularly strong interest in smaller firms, and the smaller scale operators became one of the military's greatest supporters. Partially this confluence of interests grew out of the anti-**zaibatsu** and economic interventionist struggles that were spawned in the Depression. Japan's initial response to growing dislocations in the late 1920s was to attempt a radical deflationary policy by lifting a gold embargo that had been in effect throughout the earlier part of the decade. The problem was to try and square the Japanese balance of payments; Finance Minister Inoue Junosuke wanted to cover Japan's excess of imports over exports by exporting gold. Further, the export of gold would increase the value of Japanese currency while decreasing the money supply, thus reducing inflation and squeezing marginal producers from the economy. Bitter debate in 1927-1929 finally ended when Inoue, newly appointed Finance Minister in the Wakatsuki Cabinet lifted the gold standard with the explicit support of the MCI who viewed the deflation as an excellent tool for fostering industrial concentration through attrition.⁷⁴

This action was opposed by both the military and small firms. Both groups saw the deflation as a strongly pro-**zaibatsu** initiative because it strengthened the merchant banks at the hands of the domestic producers. Indeed Inoue was publically identified and reviled as a supporter of Mitsui; he was assassinated with Dan Takuma, Mitsui's general manager, in 1932 by enraged conservatives.⁷⁵ Further, the militarists wanted to increase the budget to build up armaments and the tight money policy made this impossible. They strenuously objected to Inoue's measures.

But the military had additional incentives for supporting smaller firms. We have discussed earlier the intense distaste the militarists had for the **zaibatsu** as commercial influences unjustly corrupting the

Japanese state. But the flip side of the military's industrial ideology was an almost romantic attachment to smaller producers. Throughout the prewar period, military leaders spoke of smaller firms as a production system compatible with the rigid class distinctions and hierarchy of Tokugawa Japan, as something congruent with a return to "basic values." Academics with military links like Masatochi Okotchi in the mid 1930s tried to articulate a vision in which surplus or seasonal agricultural labor-- workers untainted by urban manners or morals-- would be employed in decentralized workshops to make small parts eventually shipped to central assembly locations. The hierarchy of family and sex would be preserved in these workshop arrangements; leaders of the community would mastermind the regional factories, men would run them individually, and females would be called on to operate largely dedicated machinery. In this way, rural life could continue amid industrialization.⁷⁶

It is worth noting that the policy of support for small firms, particularly those in rural areas, was in fact reflected in military procurement patterns. The various branches of the military each attempted to divert munitions orders to rural or peripheral regions throughout the 1930s. One method was to ensure that a percentage of contracts awarded to large firms was subcontracted to rural districts. This usually amounted to about 25% of a total purchase. Another was to divert orders directly to targeted areas. According to Diet records for 1936, the last year for which military procurement records are available, approximately 14% of military orders were filled by rural producers. This is a quite high proportion if considered with additional subcontracting work, suggesting that rural producers may have accounted for close to 40% of munitions production.

Further, in support of this rural munitions manufacturing, the MCI made a number of additional grants to local authorities.⁷⁷

In any case, the anti-**zaibatsu** instinct of the military and related small firm support emerged from the political reaction to the deflationary policies. Inoue's strategy meant tight money and this fact, coupled with the Depression stimulated small businesses to make strong protests of the government's actions; popular anti-**zaibatsu** sentiment also ran high. The combined effect of military opposition and popular protest led to the fall of the Wakatsuki cabinet and Inoue in 1931.

In his place was installed Takahashi Korekiyo, who promptly turned the deflation policy on its head. The gold standard was abolished; government outlays soared. With this reversal Japan in effect put into place the first Keynesian relief system among the major economies.⁷⁸ But what was most significant about Takahashi's efforts were the targets of spending: most outlays went to the military and local or farm village relief. Indeed, for small firms, the relief sources freed up in the return to easy money probably accounted for their massive recovery by 1932 as Japan quickly threw off the effects of the Depression.⁷⁹

Thus, the convergence of interest between the military and small producers helped lead to the easy money policy of the 1930s, a background circumstance that explains why it was possible for the state to undertake subsidies and banking reforms up to the period of the wartime emergency. As Schumpeter and Allen observed above, small business relief was established as part of the right wing's program of restraining **zaibatsu** power. An additional factor was the struggle between the **zaibatsu** and the MCI; the fact that big firms defeated any attempt by the bureaucracy to gain real power in the economy could only have also helped smaller firms in the

kogyo kumiai movement resist the desires of the MCI while accepting subsidies. Finally, like the postwar machinery industry, the fact that smaller firms were so numerous meant that the bureaucracy was compelled to devolve power in regulating the **kogyo kumiai**; it was impossible to achieve central direction. Thus, there were strong pressures to provide support to smaller firms but equally strong constraints on what the MCI could obtain in return.

Let us now turn to postwar developments. Japan's defeat changed many of the forces surrounding small business support policies, strengthening some while weakening others. The new conservatives who were installed as the postwar Japanese leadership in the 1950s remained committed to small business financing and rural support; indeed in the early 1950s the link between peripheral producers and political power was enhanced. The labor force had been galvanized by SCAP reforms and began to elect regularly socialists or communists to national and local office. Coupled with strikes in the early 1950s, conservatives actively sought out the support of their prewar constituency. Small businesses became the backbone of the LDP's coalition in the postwar, a fact which increased the weight of small firms in the battle for government support.

Postwar small firm leverage was enhanced by the creation of national coalitions of small enterprises such as the Small and Medium Business Federation [**Chuseiren**], headed by extremely powerful industrialists possessing "old-school" links to the LDP leadership. Perhaps the best example was during the 1950s, a period of terrific legislative support for small firms, when **Chuseiren** was headed by Ayukawa, the former president of Nissan and the darling of the old anti-**zaibatsu** militarists.⁸⁰ What the **Chuseiren** was able to do was hire influential conservative spokesmen to

plead their case with the government, especially, as we shall see below, with respect to the problem of investment capital for smaller operators.

At the same time obstacles to small business support were waning. Gone were the **zaibatsu**, at least in their prewar form as integrated, powerful combines anchored by a central bank. By the late 1950s the tight money conditions of the immediate postwar crises and in the Dodge Line imposed by the SCAP authorities had also eased. In certain sectors the Korean war was generating the first signs of postwar revival; the means to supply support were gradually recovering. Sentiment to support small firms was high; large firm abuse of subcontractors in the "dual structure" period was one of the most inflammatory political issues of the 1950s.⁸¹

The result of all of these factors was an outpouring of legislation in support of small firms. One development was the creation of a special Small and Medium Enterprise Bureau [**Chusho Kigyo Cho**] set up in the newly reorganized MITI in 1957 to administer many of the programs.⁸² The bureaucracy was called on to foster small firms even as it bemoaned the weakness of small scale factories in such publications as the annual small business white paper. Some of its postwar measures were direct copies of prewar organization strategies; the 1957 Small and Medium Enterprise Organization Law permitted small firms to form cooperatives, and to share production or marketing concerns as an exception to the anti-monopoly laws.⁸³ The law was again an effort to promote consolidation as in the 1930s. It led to similar results; between 1957 and 1963 alone, instead of limiting market entry, the number of small and medium manufacturing enterprises skyrocketed 22% from 454,000 to 558,000.⁸⁴

Other laws attempted to correct adverse business practices like withholding payment to subcontractors. Then, in 1963 as the capital

liberalization panic warmed up, a package of "rationalization" measures designed to push for consolidation of small firms and improve their equipment was passed as the Basic Small Industry Law.⁸⁵ However, it too became a subsidy program for small firms, funding their survival rather than their transformation. We shall see in Chapter Five how "rationalization" came to mean the improvement of small businesses through state supported equipment purchases rather than centralization. Indeed, from 1963-1973, a decade after the small business capital liberalization countermeasures were passed, small businesses in manufacturing, especially in the targeted sectors such as machinery or electronics, rose in number by 25%, from 560,000 to 704,000.⁸⁶ Consolidation policies were transformed into subsidies aiding the survival of small scale producers despite the bureaucracy's intention to consolidate the economy.

But the cornerstone of the postwar effort was the complete overhaul of the financial system to provide for small business funding, something that MITI was in fact only partially involved with. Rather, direct funding for new institutions was established through Diet authorization. Successive legislative efforts built on the prewar foundation created a vast array of "private" and government institutions committed to making loans for small scale enterprises. In effect, the political impulse to respond to smaller producers' demands led the Japanese to create the industrial equivalent of the American home loan or savings and loan system for the US housing market. Except, in Japan, instead of aiming at home ownership, thrift institutions funded independent factories. This redirection of finances abetted the independent expansion of small

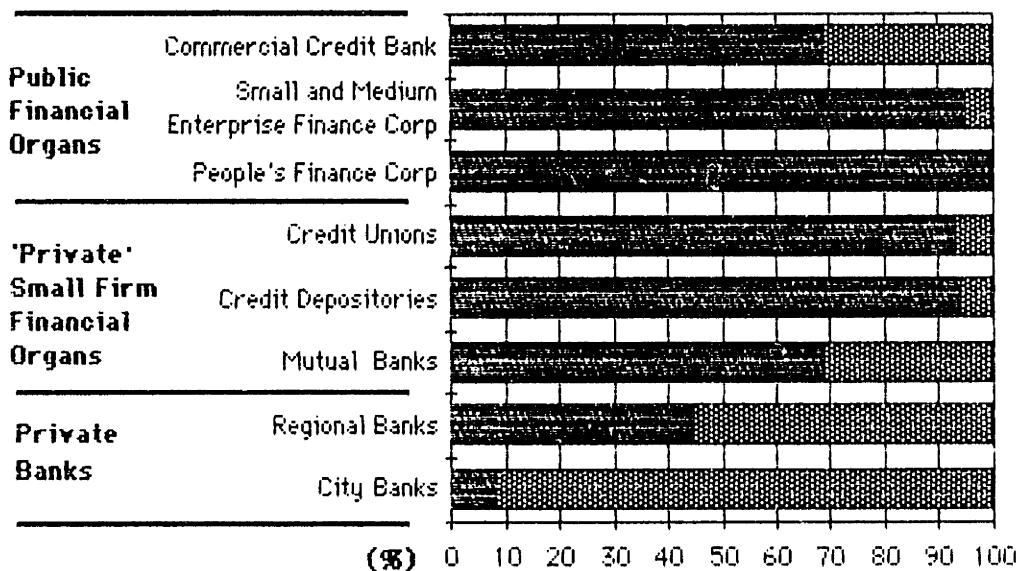
companies in postwar Japan during the high growth period and the movement away from the "dual structure."

To understand how these initiatives affected small business survival it is necessary to consider the structure and lending orientation of Japanese financial institutions. Japanese institutions, both public and private, may be ranked according to their degree of alignment towards small business. Figure 4.27 illustrates what percentage of total loans made by various institutions went to small and medium enterprises in 1966.

Figure 4.27

Outlays by Financial Institution to Small and Large Firms, 1966

Percentage Institutional Outlays to Firms of 0-299 Employees [■] and Firms of 300+ Employees [▣], 1966



From People's Finance Corp survey, *Nihon no Sho Reisai Kigyō*, [Japanese Small and Very Small Enterprises] (Tokyo: Toyo Keizai, 1968) page 124.⁸⁷

At the bottom of the list are the private banks. In Japan, "private banks" refers to City Banks [**Toshi Ginko**] including most of the former **zaibatsu** banks like Mitsui or Mitsubishi, and Regional Banks [**Chiho Ginko**]. Most of the private banks were established in the late 19th or early 20th century. Their names derive from the fact that the **zaibatsu**-

oriented City Banks were and are predominant in urban centers like Tokyo while Regional Banks grew up in secondary cities--linked to less powerful financial or commercial actors than the major **zaibatsu**-- or in peripheral prefectures, often with local support. Historically, the City Banks have been the first choice for loans by big business, especially in the prewar when many of the largest firms were part of a banking conglomerate. The Regional Banks then funded whatever large concerns were left over after the City Banks were through. Consequently, City Banks have historically focused on large firm loans; only 9% of their outlays went to small or medium firms in 1966. Regional Banks also concentrated on large firms, although the fact that city banks frequently preempted their markets forced them to supply funds to smaller firms. Regional banks directed only 42% of their business at smaller firms.⁸⁸

Next on the list are what Japanese financial surveys call "Private Small Firm Financial Institutions" (**Minkan Chusho Kigyo Kinyu Kikan**). Included in this group of institutions are the Mutual Banks (**Sogo Ginko**), the Credit Depositories (**Shinyo Kinko**) and the Credit Unions (**Shinyo Kumiai**). As can be seen in Figure 4.27, the Mutual Banks directed 66% of their total outlays at small enterprises, while the Credit Depositories and Unions focused over 90% of their business on small firms.

Though the Mutual Banks and Credit Depositories are not referred to as public institutions, they are private only in the sense that they do not receive direct financial assistance or are under the explicit control of the bureaucracy. Their scope of operations, geographical regulation and in fact their very existence were all explicitly legislated and later preserved by the state.

The Mutual Banks and the credit institutions were established in a wave of banking legislation that crested in 1951. Reform of small firm financing had been intensely debated prior to that year, but the dislocation of the war, the credit shortage and the deflation of the Dodge Line frustrated implementation of the plans. With the Korean War and imminent return of sovereignty, restructuring of the Japanese financial system went ahead unimpeded.

Mutual Banks were created in 1951 with the passage of the Mutual Bank Law [**Sogo Ginko Ho**], capping a process that transformed the old **mujin** companies into proper lending institutions. The **mujin** were the mainstay of prewar small firm loans (excluding, of course, the **toiya**) and operated, as we have explained, like building societies. One of their major drawbacks was the high element of chance; a firm might pay into a **mujin** company and then never win the drawings or lots necessary to secure a loan. Moreover, the **mujin** were not always fair, and sometimes took on the aspect of a loan shark with the added element of chance thrown in. In 1949 the **mujin** companies were required to provide a fixed remuneration based on deposits. In 1951, they were abolished altogether, and in their stead, regional mutual banks were created by combining the assets of various **mujin** companies into a single lending institution.⁸⁹

The new Mutual Banks were limited in how much they could lend, and required to maintain certain reserve balances as related to their deposits or loans. More important was the fact that they were restricted to certain geographical areas, which was accomplished by controlling licenses to open branches. This licensing was carried out by the Ministry of Finance. By limiting Mutual Banks to certain regions--typically peripheral areas-- local economies were created by which deposits were collected and then re-lent

as small business loans in fixed geographical areas.⁹⁰ Mutual Banks thus came to play the role of savings banks in the Japanese economy, though their primary focus was on business rather than home loans.

The Credit Unions and Depositories were also created in 1951 in an amalgamation of the finance cooperatives that had been set up under the old **kogyo kumiai**. After the war, it was initially thought that the cooperatives could be simply relicensed. However, it was discovered that many cooperatives were accepting deposits from and loaning to nonmember clients: they were operating as banks. Cooperatives of this sort were organized into institutions that closely resembled banks, and called Credit Depositories or Associations. They were made responsible to a central credit bank, and organized as nonprofit institutions. They could accept any deposits or make loans within tightly restricted geographical areas. The Credit Depositories performed much the same functions as the Mutual Banks.⁹¹

The Credit Unions were formed from those **kogyo kumiai** institutions that actually restricted loans to members. They were subject to less regulation than the bank-like institutions, but their lending and financial terms were prescribed by law. Again, however, the operation of the Credit Unions was made possible only by creating closed regions in which they operated.⁹² A credit union in Nagano, for instance, could not lend to clients in Aomori. Moreover, the entry of private banks into regions to be serviced by the credit unions was restricted to provide protected markets.

Indeed, all of the "private" small and medium business financial institutions were sustained by branch licensing strategies pursued by the Ministry of Finance. Branch offices were crucial to the growth of a lender's deposits and loans; in a cash and carry society like Japan, the ability to

open branches was a major determinant of survival. Between 1951 and 1965, the Mutual and Credit Banks and Unions were permitted to expand their branch networks at a rate of 5-8 times that of the City banks, and between 1965 and 1980 they grew 3 times as fast. Eventually their number of branches dwarfed those of the City banks.⁹³ Furthermore, City banks were restricted in where they could open branches, leaving large regional blocks to the small business institutions. This policy, Horiuchi maintains, had nothing to do with centralized "industrial policy" but rather was bound up in the promotion of small enterprise financial support:

Since branch offices were quite essential to banking [In the era of rapid economic growth], branch office administration was one of the most powerful regulatory weapons available to the monetary authorities. It is noteworthy, however, that this weapon was not used for the purpose of stimulating economic growth. In actual administration, the Ministry of Finance gave preferential treatment to thrift institutions, i.e. the various financial institutions for medium and smaller businesses. Owing to this preferential treatment, the thrift institutions were able to expand their branch networks faster than could the city banks...[This] was one of the reasons why the thrifts could continue to maintain a stable share of the financial markets.

Thus, branch office administration and control were used to directly support the thrift institutions and indirectly to support their customers, i.e., medium and smaller businesses...This suggests that it is an exaggeration to say that the Japanese financial policy tended to favor both big banks and big businesses to the end of promoting economic growth. For political reasons, policy makers had to pay a great deal of attention to the economic and financial environment in which medium and smaller businesses operated. The Ministry of Finance's policies on branch banking reflected this reality.⁹⁴

The private institutions for small and medium enterprises, then, survived because of explicit government support.

The last group in Figure 4.27, public small business organs, are unambiguously government institutions. These include the Central Commercial and Industrial Bank [**Sho-kogyo Chuo Ginko**], which makes 70% of its loans to small enterprises, the Small and Medium Enterprise Finance Corporation [**Chusho Kigyo Kinyu Koko**], which lends 95% of its funds to small firms, and the People's Finance Corporation [**Kokumin Kinyu Koko**], an institution 100% involved with small scale enterprises.

The Central Commercial and Industrial Bank was a restructured version of the bank chartered in 1936 to serve the **kogyo kumiai**. Even though the bank ultimately ended up financing munitions reconversion and thus aided the war effort, it was not a SCAP target. After a massive write down, it was rechartered in 1949. The government put up half the capital, while localities and other government affiliated institutions put up the rest. In 1951, the Central Bank was made the coordinating institution for the Credit Unions, providing additional indirect government support for these newly "private" financial organizations.⁹⁵ Its loan authorization was also extended to include unaffiliated credit organizations.

The Small and Medium Enterprise Finance Corporation was established in 1953 with a government appropriation of ¥13 billion. Prewar Reconversion Finance Bank loans were also taken over by the new institution. The Corporation was limited to lending to firms of 300 employees or fewer, and it gradually developed into the primary means of government support for firms in the medium range of small businesses. Originally, it was supposed to act merely as the guarantor of small business loans made by the City and Regional Banks. However, in 1955, the Corporation was permitted to make loans directly.⁹⁶

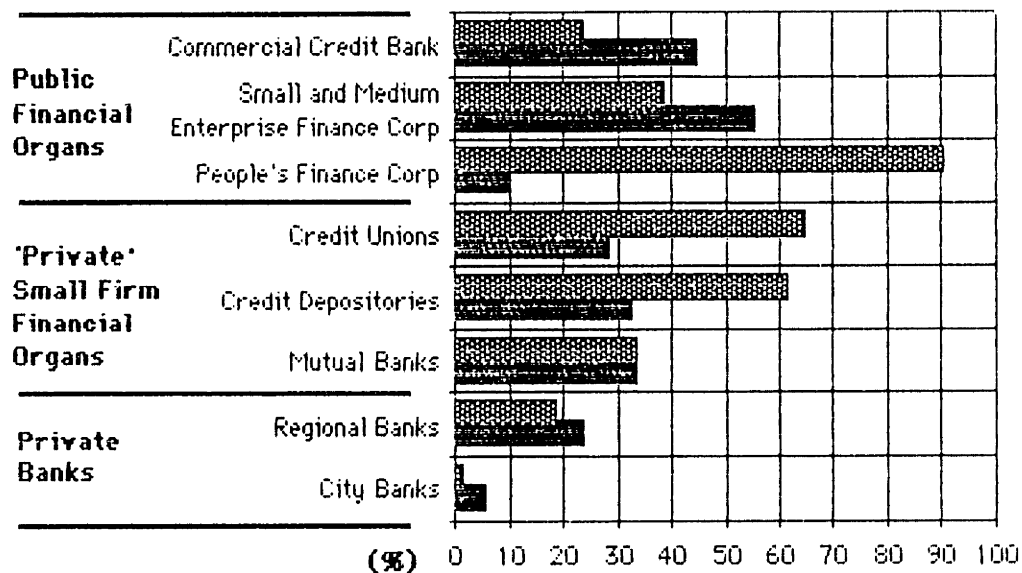
The People's Finance Corporation was established in 1949 and specialized in the provision of government funding to very small firms. Thus, it complemented the lending of the Small and Medium Enterprise Finance Corporation. The People's Finance Corporation was wholly supported by the government, although its operations were in part controlled by a private board of directors. One of its most important duties was to serve as a clearinghouse for data on small business which was then utilized in setting public policy. As a result, a large number of Japanese small business economics specialists have served in one capacity or another in the Corporation.⁹⁷

In order to amplify the structure of small business lending, Figure 4.28 illustrates bank and small firm institutional loans broken out by the size of firms.

Figure 4.28

Outlays by Institution and Size of Recipient, 1966

Percent Outlays to Firms of 0-49 Employees [▨] and 50-299 Employees [■], 1966



Source Same as for Figure 4.27

We can see that the involvement of banks in small firm capital markets is even smaller than initially supposed; City Banks make just 1% of their loans to firms of 0-49 employees and overall their small business involvement is a small fraction of their total business. Regional banks do slightly better, although loans to medium sized firms of 50-299 employees predominate. In the "Private" Small Firm Institution category, Mutual Banks split their small business loans between small and medium firms. But for both Credit Banks and Credit Depositories, small (0-49 employees) companies take up the bulk of their loans. In the public People's Finance Corporation, very small firms actually account for 90% of the loans. In both the Small and Medium Enterprise Finance Corporation and the Central Commercial Bank, medium sized companies again predominate.

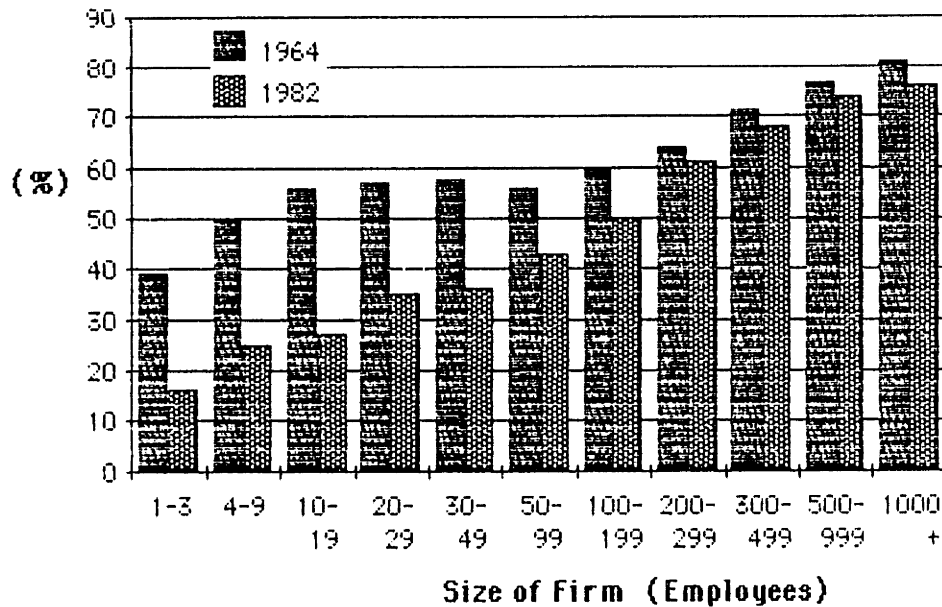
The financial reforms of the 1950s created a large body of organizations dedicated to small business finance. These institutions finally completed the movement towards enhancing small firm independence from usurious **toiya** and indifferent banks that was begun in the 1930s though aborted by the war. Before these policies could be set up, the 1950s were characterized by the domination of private banks in the economy and were a period of small firm retrenchment; an incipient "dual structure" loomed. Small enterprises were in competition with Japan's largest companies for scarce loan capital; the banks, given a choice, funded the biggest firms as they carried the lowest risk. But from 1960 to the present, as the Japanese economy registered its "miraculous" gains, new financial organs coupled with changes in large and small firm business strategies led to a supercharged small manufacturing sector underwritten by government loans.

To show how important government and government supported "private" institutions were to the spectacular emergence of high-tech small manufacturers in Japan, we will present evidence of the extent to which smaller enterprises made use of government or government-created "private" institutions. As the dual structure receded, these loan sources provided the opportunities that were lacking under the tight money circumstances of the immediate postwar period.

First, let us consider what proportion private bank loans comprised of the total loan structure of small manufacturing firms in various size classes between 1964 and 1982. The data are assembled in Figure 4.29.

Figure 4.29

Bank Loans as a Proportion of Total Loans Received, 1964-1982



From the 1982 *Kogyo Jittai Kihon Chosa Hokoku Sho* [Report of the Basic Survey of Industrial Conditions] published by the *Chusho Kigyo Cho* [Small and medium enterprise bureau] and the *Chusho Kigyo Sogo Kihon Chosa* [General Basic Survey of Small and Medium Enterprises] of 1968 also compiled by the *Chusho Kigyo Cho* [Small and medium enterprise bureau].

There are several important patterns evident in Figure 4.29. As the size of enterprise decreases the degree of reliance on banks for capital also falls. For firms in the 1-3 employee class, bank loans accounted for about 40% of all loans received in 1964; in the same year, bank loans accounted for 82% of the largest firms' lending. Next, we can see how even though small business loans were but a minuscule fraction of total private bank outlays in the early 1960s, small enterprises were forced to rely on banks for a large part of their capital. Dependence rates for the 1-100 employee size classes ranged from 40%-60%. The proportion was almost certainly higher in the 1950s, before the small business financial institutions were set up. In contrast, large firms of more than 300 employees depended on private banks for between 70-80% of their needs.

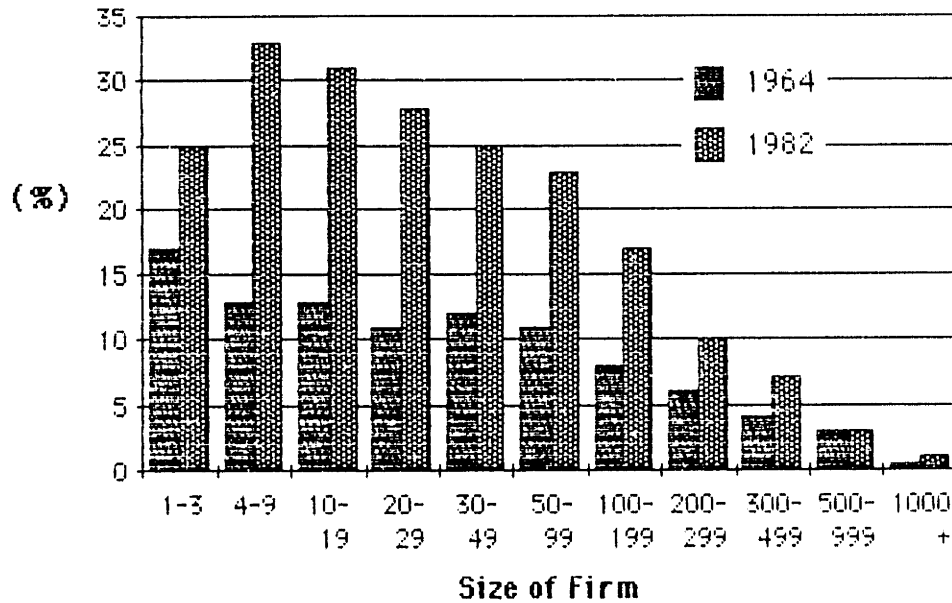
But a dramatic transformation took place in the nearly 2 decades to 1982, as the Japanese economy, and small manufacturers, registered extremely high growth. Private bank funding for firms in the 1-3 employee range declined to just 18% of total capital needs; for companies in the 4-9 and 10-19 size range, declines of close to 200% were registered as the ratio fell to under 25% of total loans. For all small businesses, the importance of private bank loans declined massively. However, the percentage of bank lending remained at very close to the 1964 levels for firms above the 200 employee level. For large companies, private bank capital was sufficient. At the other end of the spectrum, entrepreneurs who were starting or expanding small scale manufacturing operations did so with increasingly less help from banks as the high growth period progressed.

Where did these small firms secure loans from? The answer is that they relied on funding provided by the "private" small firm institutions and their government counterparts. We can see the development of this alternative financial system by examining the changes recorded between 1964-1982 for each type of institution.

Figure 4.30 illustrates "private" small business institutional loan reliance by firms in various size classes, including the Mutual Banks, the Credit Depositories and the Credit Unions.

Figure 4.30

Private Small Business Financial Institution Loans as a Proportion of Total Loans, 1964-1982



Sources Same as Figure 4.26

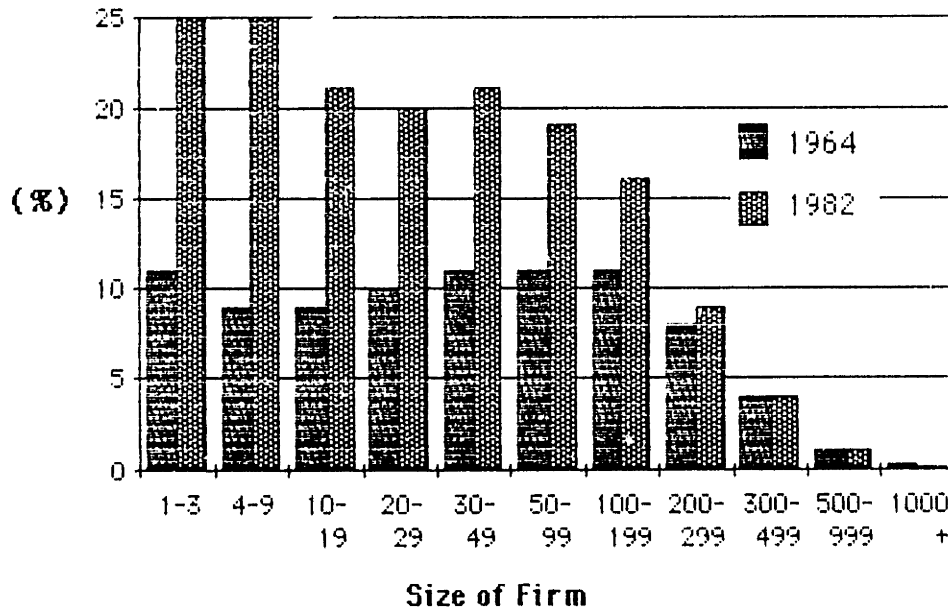
The graph clearly shows that as firm size decreased, reliance on private small business financial institutions shot up dramatically. For firms in the 4-9 and 10-19 size categories, this dependence grew from just 12% in 1964 to about 35% and 32%, respectively, in 1982. Gradually, as the new institutions were established and expanded operations, they supplanted banks in providing funds to small businesses. At the right of the graph, the low level of support for large firms confirms the specialized nature of the institutions and the reason for these companies' continued sourcing of loans with the private banks.

The rapid growth of the "private" small business financial institutions was matched by the performance of governmental small enterprise lenders. These include the Central Commercial and Industrial Banks, the Small and Medium Enterprise Finance Corporation and the People's

Finance Corporation. The percentage of total loans received from these lenders by firms in various size classes is shown in Figure 4.31.

Figure 4.31

Government Small Enterprise Finance Institution Loans as a Percentage of All Loans, 1964-1982



Sources Same as Figure 4.26.

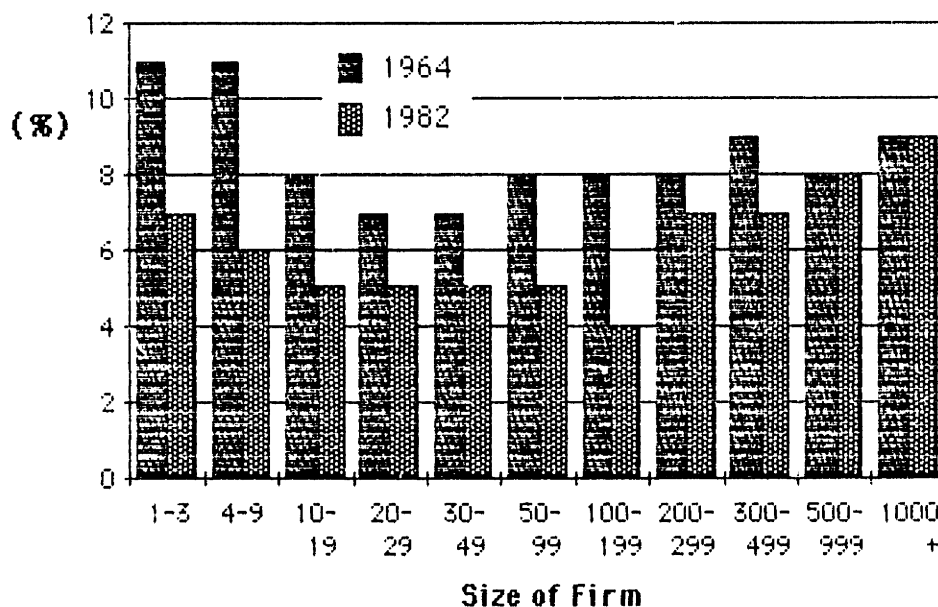
For firms in the 1-3, 4-9 and 10-19 employee size groups, specialized government assistance skyrocketed, doubling from about 8-11% to 22-25% from 1964 to 1982. Medium enterprises also exhibited a growing reliance on public small business loan sources. The rate of increase falls as company size goes up until both the absolute level of support and the magnitude of its change are infinitesimal for the largest categories.

To round out our appreciation of the extent of state support for small firms, Figure 4.32 shows the contribution of loans provided by all other national government institutions like the JDB. We can see that these sources declined in importance for all classes of firms between 1964-1982, except the very largest for whom the ratio remained the same. However,

these government loans still provided between 6-8% of small or medium firm capital in 1982.

Figure 4.32

Nonspecialized Government Loans as a Proportion of All Loans, 1964-1982



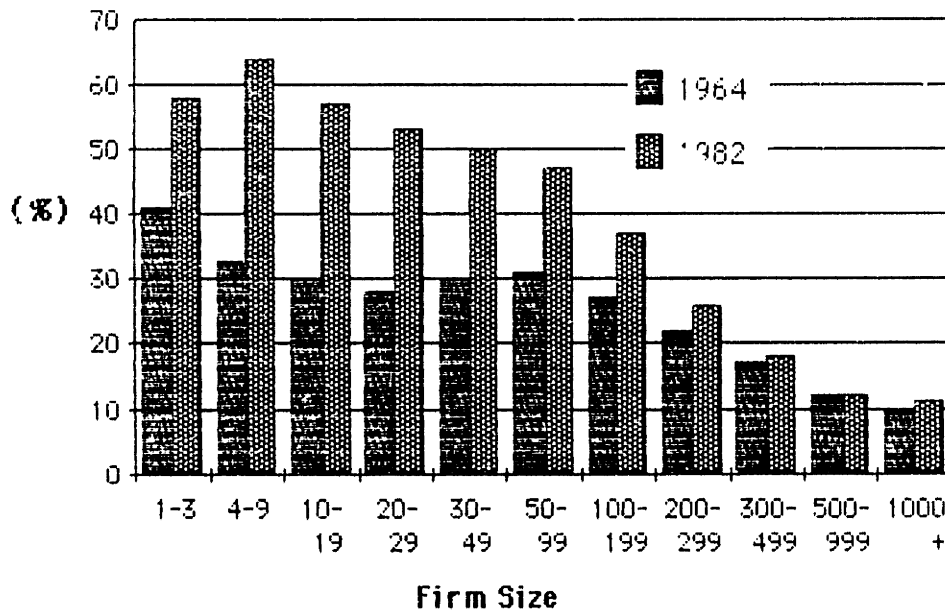
Sources Same as Figure 4.25.

The reason for the decline in small firm reliance and the steady nature of large firm support is that once the specialized small business financial institutions were subtracted from the government total, the remaining institutions like the JBD or the Export-Import Bank focused more on larger firms. They were geared to finance the various schemes put forward by the industrial wing of MITI.⁹⁸ Since most of MITI's programs were aimed at centralization, they were directed at the largest firms. Early in the postwar period rationalization programs accounted for the bulk of payments or loans to smaller businesses, but as other institutions were set up, MITI's role was reduced to more or less concentration on larger firms.

By looking at the combined share of public and private small business financial organs in the total loan position of all companies, the influence government support exerted on small firm development can be appreciated. Figure 4.33 presents the percentage of total loans secured by firms in various size classes from public small firm lenders, private small firm institutions and nonspecialized government sources in 1964 and 1982.

Figure 4.33

Combined Non Bank, Government Loans as a Proportion of Total Loans, 1964-1982



Sources Same as Figure 4.25

State supported loans were the major component of small firm financing, and their weight grew from 1964 to 1982. Particularly impressive were the figures for the smallest size classes. For firms in the 1-3 group, government or government supported loans accounted for 60% of total resources, an increase from 40% in 1964. Firms in the 4-9 size group exhibited a 65% reliance by 1982 up from 32%; the 10-19 category depended on government finance for 58% of its loans as compared to 30% in

1964; and 52% of the capital supplied to the 20-29 size group was of government origin, a figure just 28% in 1964. During the high growth period, government support nearly doubled for the smallest classes of firms and accounted for the majority of their capital needs.

The pattern of loan support revealed above shows that government capital assistance varied enormously with the size of the firms involved. It was much more important at the startup or initial phase of a firm's development. The smaller the company, the larger the role of the state in funding its entry into the market. Then, as (or if) the company succeeded, it turned increasingly to private sector lenders.

Consequently, Japanese firms may be thought to be divided into three financial types corresponding to their involvement with government, or government-backed lenders. The first is the startup firm, when risks are high. Here, the manufacturer is dependent on public or semi-public loan institutions. The second type, which begins to emerge with the 100 or 200 employee class of firm, is transitional; the firm is now a proven organization and private lenders begin to supplant state institutions. Finally, as a firm moves into the larger size classes, state support is very slight, and the bulk of financial commitments are carried out by private banks or equity issues. This pattern corresponds to firms in the 500 employee class and above.

This pattern of successive movement away from government support - as a firm grows accounts for the fact that small firm capital intervention in Japan was enormously influential though consolidation efforts were not. Japanese economic policy as pursued by MITI focused on restructuring large firms. It was not notably successful partially due to the fact that outlays associated with these policies were but a fringe element, a bonus, to

targeted large firms; private capital sources provided the huge majority of financing required by large enterprises. And, of course, the power of large firms to thwart or twist MITI initiatives was high. But the effects of the political payoffs made to small firms were much more important because government financial contributions were an enormous share of total available resources. It was in the startup phase of company development, then, that the Japanese state made a difference--if unintentional or unconsciously-- in the industrial structure.

The redirection of financial support towards small business was a contributing factor in the set of circumstances leading to the emergence of high-tech flexible manufacturing in postwar Japan. Whether or not it was a *necessary* factor is something that we cannot determine. But it is possible to argue that the politics of small firm support made it more likely that the market and subcontracting trends towards flexibility would ultimately succeed. Companies that previously had to rely on uncertain capital or accept the harsh terms provided by the **toiya** in the prewar could find a wide range of sources for industrial funding in the postwar period. Firms trapped by the business conditions of the 1940s and 1950s and thus mired in subordinate production agreements could break out into independent specialist markets. Blue collar workers who wanted to operate their own factories could take the first step by establishing their own firm with state support. Thus, the survival of small manufacturers as independent, flexible, specialist enterprises was enhanced by postwar politics.

In this chapter we have detailed a general description of the different manufacturing strategies of smaller and larger firms as a background to the more specific problem of explaining industrial success in the machine tool sector. In the following chapters we will explicitly link the nature of the

flexible manufacturers to market and producer transformations in the NC machinery industry. The first step in this account will be to consider another contextual element in the growth of the hybrid economy, industrial regionalism. Even state financing of small enterprises coupled with large and small firm strategic trends identified above may not have led to the gradual retrenchment of the "dual structure" and the return of flexible producers. The existence of comparatively plentiful capital might just as well have produced to an even more extensive network of subordinated producers if some means had not developed for restraining price and wage exploitation. In the next chapter, regional regulatory systems that grew up at the same time startup opportunities for small firms were enhanced will be detailed in the case of one manufacturing hamlet in rural Japan. The focus of the study will be on how fiscal opportunity and local politics combined with the larger trends we discussed in this chapter to lead to one of the most highly concentrated groups of small NC-using firms in the world. As the general processes described above are clarified in a concrete example, the role the small firm sector played in NC development will also become apparent.

¹c.f. Nakamura Takafusa, **The Postwar Japanese Economy**, (Tokyo, University of Tokyo Press, 1981), pages 174-175 for a useful summary of the conventional Japanese view of the dual economy.

²See Johnson, **op cit**, for the early position of Yoshino and other MITI officials on small enterprises in prewar Japan, page 98.

³See Michael Piore's account of technological dualism in Piore and Berger, **Dualism and Discontinuity in Industrial Societies**, (Cambridge: Cambridge University Press, 1982).

⁴Nakamura, (1981) **op cit.**, page 175.

⁵See Johnson, **op cit.**, page 13 for a brief summary of the way American academics have absorbed the dual structure argument.

⁶See the excellent discussion by Yasukichi Yasuba, **The Evolution of Dualistic Wage Structure**, in Patrick et al., **The Social Consequences of Japanese Industrialization**, (Berkeley: University of California, 1976) p. 253.

⁷See Umemura, *Chingin Kakusa to Rodo Shiryo*, [Wage Differentials and Labor Materials], in **Nihon Keizai no Bunseki, Vol II**, [An Analysis of the Japanese Economy, Vol II] (Tokyo: Keiso, 1955).

⁸See Yasuba, **ibid.**

⁹Yasuba, **op cit.**, page 286.

¹⁰See the discussion by Morishima Michio, **Why Has Japan Succeeded?**, (Cambridge: Cambridge University Press, 1982) pages 110-111.

¹¹**ibid.**

¹²c.f. Dore, **op cit.**, pages 380-385.

¹³See Nakamura (1981), **op cit.**, page 174.

¹⁴See Dower, **op cit.**

¹⁵MITI, *Maigetsu Tsuru Tokei Chosa*, **op cit.**

¹⁶Yasuba, **op cit.**, pages 249-280 presents fascinating data about the existence of inverse profitability differentials. (Confirm Pages)

¹⁷**ibid.**, page 287.

¹⁸Kiyonari's Classic work is *Nihon Chusho Kigyo no Kozo Henda*, [Structural Changes in Small Business] (Shin Hyoron: 1970) in which he presented the first comprehensive challenge to postwar dual structure theory. He since became one of the leading academic spokesmen for small scale financial and support organizations and has written numerous elaborations of the view that postwar small firms did not rely on exploited labor but rather skilled use of capital intensive machinery.

¹⁹**ibid.**, page 245.

²⁰Kiyonari, *Chushokigyo Dokuhon*, **op cit.**, page 98.

²¹Privately Kiyonari argues that the rate may be even higher, but in his writings he settles for the 50% figure. See *Chushokigyo Dokuhon, op cit.*, pages 95-98.

²²Kolke, *op cit.*, pages 89-90.

²³As found in MITI, *Hihon no Kogyo Tokai, op cit.*

²⁴Figures on U.S. startups are not regularly covered in U.S. surveys. However, a special report by Joel Popkin and Co., "Measuring Gross Product Originating in Small Business: Methodology and Annual Estimates 1955-1976" (Small Business Administration: #SBA 2624 OA 79, 1981) suggested that small business manufacturing had declined about 50% in the period of the study, while Census figures show that smaller firms have declined in absolute numbers during the postwar period. Both of these figures increased in Japan.

²⁵Kioke, *op cit.*, page 96.

²⁶The principle source for detailed information about postwar small business are the surveys taken at irregular intervals by MITI's Statistical Survey Department entitled *Kogyo Jittai Kihon Chosa Hokoku Sho* [Report of the Basic Survey of Industrial Conditions] published by the *Chusho Kigyo Cho* [Small and medium enterprise bureau] six times from 1960-1981. The statistics presented above are from 1981. **Note:** The first three surveys were called *Chusho Kigyo Sogo Kihon Chosa* [General Basic Survey of Small and Medium Enterprises]; the name was changed in 1972 with the fourth survey.

²⁷As calculated from raw data in *Chusho Kigyo Cho, Kogyo Jittai Kihon Chosa Hokoku Sho, op cit. 1981*. Kiyonari, using a different methodology estimated in 1966 that small firms doing no subcontracting at all amounted to about 47% of all firms engaged in manufacturing, and those doing no subcontracting or only partial subcontracting amounted to over 57%. (Kiyonari (1970), *op cit.*, page 166.) Thus our figures are considerably more conservative than other studies.

²⁸c.f. Kiyonari (1970), *op cit.*, page 166.

²⁹ See also Kiyonari (1970) page 171 for confirmation that even in the early 1960s "business contact" [*torihiki kankei*] was the only form of relationship between suppliers and contractors for over 60% of Japanese small firms doing subcontracting.

³⁰c.f. Richard Samuels, *Energy and the Business of the State*, Chapter Three, forthcoming.

³¹This division of labor has been noted in several places; in English see Nakamura (1983), *op cit.*, pages 83-94, especially page 94 where he shows that in most manufacturing sectors in the prewar Japanese small firms were exporters and producing the bulk of commodity items from

intermediate goods made by larger firms. Thus, he writes of the prewar "interdependence of the modern and traditional (small scale) sector."

³²Allen and Schumpeter, *op cit.*, pages 655-675.

³³The fact that small firms in Japan produced most of the country's exports was well recognized and the basis for an intense trade dispute in the 1930s. On the dispute see Johnson, *op cit.*, pages 98-99; on small firm exports more generally see Nakamura, *op cit.*

³⁴Johnson, *op cit.*, page 109.

³⁵An indispensable guide to the way that small scale manufacturers operated in the prewar is Teijiro Ueda, **The Small Industries of Japan** (New York: 1938) which describes the ceramics, electronics and transportation manufacturing industries throughout the 1920s-1930s. Ueda shows that there was considerable technical and marketing expertise in the smaller firms. More generally, Lockwood, *op cit.*, has an excellent discussion of the role of smaller prewar firms on pages 201-214. Both works provide an important corrective source for viewing the prewar small firm in Japan as considerably more dynamic than previously thought.

³⁶c.f. Nakamura, *op cit.*, Kiyonari, (1970) *op cit.*

³⁷c.f. Nakamura, *ibid.*

³⁸Much of this discussion was suggested by the intriguing observations on Japan in Sabel and Piore (1984), *op cit.*, Chapter 9.

³⁹Material on Nissan may be found in Michael Cusumano, **The Japanese Automobile Industry** (Harvard University Press: Cambridge, 1985); also, for an extremely useful survey of postwar manufacturing strategies in larger firms and their relations with smaller ones, see Asia Productivity Organization, **Intra-National Transfer of Technology** (Tokyo: Asian Productivity Organization, 1975) especially Juzo Wada, "A Case History of Guidance and Upgrading of Subcontracting Firms," pp. 87-119 in which the Nissan case is presented in detail.

⁴⁰c.f. Wada, *op cit.*, pages 102-103.

⁴¹These observations were made by the Mechanical Section Manager of Minebea Inc., a huge manufacturer noted for ball bearings. Minebea itself is an example of Japanese success; a small subcontractor, it grew into an international power. During a factory visit to see how large firms regard subcontractors, the manager, who was in charge of technical liaison with parts makers, stated that while some assistance was extended in the 1950s, the practice had all but died out in the high growth era: large firms could not afford to support smaller ones, and in any case they did not know more about particular production problems than smaller ones. Interview, November 18, 1984.

⁴²Interview with manager of Niki Kogyo, a small subcontracting company in Sakaki Township, Nagano Prefecture, December 18, 1984. (See chapter 5 for additional details).

⁴³See the account in Friedman, *op cit.*, of how Toyota tried to export and learned that if it did not change its products and seek unfilled niches, US firms would be able to defend their markets with price reductions.

⁴⁴See Rodney Clark, *The Japanese Company*, (New Haven, Yale University Press, 1979) page 56.

⁴⁵*ibid.*, pages 60-61.

⁴⁶It has been suggested that one reason for this process is cultural and historical; the Japanese **zaibatsu** first initiated the practice of using centralized capital to create increasingly autonomous production units under the nominal central direction and this became the Japanese norm. See Sabel and Piore (1984), *op cit.*, Chapter Six for an interesting discussion.

⁴⁷For a comparison with the US and the problems of task specific work rules as related to flexibility see Sable and Stark,

also Sabel and Piore (1984), *op cit.*, Chapter Nine.

⁴⁸See Koike Kazuo, *op cit.*, pages 98-113.

⁴⁹*ibid.*

⁵⁰Based on interviews taken in November, 1984, Shizuoka Machinery.

⁵¹Interview, Minebea, *op cit.*

⁵²Interview, Mori Seki, December 25, 1984.

⁵³As cited in Yano Securities, *op cit.*

⁵⁴Kiyonari, *Chusho Kigyo Dokuhon*, *op cit.*, page 90.

⁵⁵This is explicitly recognized by Johnson, who nevertheless sees the effort as one of consolidation. Johnson, *op cit.*, pages 98-99.

⁵⁶Nakamura (1983), *op cit.*, page 207.

⁵⁷For an English account of the **mujin** see Research Division, Fuji Bank, **Banking in Modern Japan**, (Tokyo: Fuji Bank, 1967) pages 73-74.

⁵⁸Schumpeter and Allen brilliantly describe the manipulations of the **Toiya** in the context of textiles; see their account in Schumpeter, *op cit.*, pages 530-537 and 556-566.

⁵⁹*ibid.*, pages 761-762.

⁶⁰*ibid.*

⁶¹*ibid.*

⁶²*ibid.*, page 765.

⁶³Johnson, *op cit.*, page 99.

⁶⁴Schumpeter, *op cit.*, pages 764-767.

⁶⁵*ibid.*, page 763.

⁶⁶See the informative note by Allen in Schumpeter, *op cit.*, page 768.

- 67 *Ibid.*, page 768.
- 68 *Ibid.*, pages 769-771.
- 69 *Ibid.*
- 70 Fuji Bank, *op cit.*, pages 128-129.
- 71 *Ibid.*, page 147.
- 72 *Ibid.*
- 73 *Ibid.*
- 74 See the excellent discussion by Johnson, *op cit.*, pages 104-107
- 75 See Nakamura, (1983) *op cit.*, page 232.
- 76 See the account in Asashi, *op cit.*, pages 109-116.
- 77 As described in Asashi *op cit.*, pages 108-109.
- 78 The excellent account in Nakamura, *ibid.*, pages 232-240 explains in detail what Takahasi did and how it worked to reduce the Depression.
- 79 See Nakamura, (1983) *ibid.*
- 80 Nakamura (1974), *op cit.*, page 176.
- 81 See the account in Nakamura, (1974), *op cit.*, pages 175-176.
- 82
- 83 *Ibid.*, pages 176-177.
- 84 *Nihon no Kogyo Tokei*, *op cit.*
- 85 Nakamura, *op cit.*, page 177.
- 86 *Nihon no Kogyo Tokei*, *op cit.*
- 87 Surveys on the proportion of lending to enterprises divided by size of recipient are extremely rare in Japan; most studies are far too aggregated and do not show the internal lending structure of the institutions. One notable exception is the People's Finance Corp survey, *Nihon no Sho Reisai Kigyo*, [Japanese Small and Very Small Enterprises] (Tokyo: Toyo Keizai, 1968) page 124. which is used here. Although the data is from 1966, the general pattern has changed little except to emphasize the role of small business lending institutions in the economy.
- 88 An account of the history of City and Regional Banks may be gleaned from *Waga Kuni no Kinyu Seido*, *op cit.*, pages 156-197.
- 89 Fuji bank, *op cit.*, page 226.
- 90 *ibid.*
- 91 *ibid.*, page 225.
- 92 *ibid.*
- 93 Horiuchi, *op cit.*, page 7.
- 94 *ibid.*
- 95 Fuji Bank, *op cit.*, page 225.
- 96 In 1958, the credit insurance role originally intended for the Corporation was shifted to a new institution, the Small Business Credit Insurance Corporation [*Chusho Kigyo Shinyo Hoken Koko*]. Since the late prewar

period, localities themselves had been the main guarantors of small enterprise loans. This burden was gradually shifted to the national government, sometimes by reinsuring the local level guarantees through national banks. In 1953, the government passed the Credit Insurance Law [**Shinyo Hoken Kyokai Ho**], which among other provisions made available special funds to be paid to lending institutions that suffered losses on small business long term loans. In 1951, it was extended to include payments to local insuring bodies as well as banks. These functions were all incorporated into the Credit Insurance Corporation and represent additional state support for small business credit because they reduce lending risks. Fuji Bank, **op cit.**, pages 266-267.

⁹⁷**ibid.**

⁹⁸See Fuji Bank, **op cit.**, page 267.

Chapter Five

Sakaki Township: A Manufacturing Hamlet

In this chapter we will discuss another contextual element in the expansion of flexible manufacturing in Japan, the development of industrial regions. Coupled with the trends in the relations between large and small firms, the changing market strategies of larger producers and the transformation of startup manufacturer financial support, the growth of self-conscious regions of small scale factories helps us to understand why potentials for flexible production in Japan eventually were realized. In this chapter we will highlight the development of one extremely unlikely site for a high-tech manufacturing hamlet, Sakaki Township in central Nagano Prefecture. The purpose will be to illustrate how these general trends in the Japanese economy produced remarkable industrial changes even in unpromising regions, and to link these transformations with the emergence of small, general purpose NC tooling. We will show that there was a close connection between the historical process of flexible manufacturing growth and the initial expansion of a new kind of NC market in Japan.

Regional associations of small scale, flexible factories have figured prominently in other studies of alternative industrial development in Europe.¹ The most basic reason appears to be that some degree of collective identity and action is necessary for the sustenance of flexible specialist firms. One particularly important role of regional groups is to define and maintain an ideology of resisting price pressures from larger companies; should some firms in a given area begin to try increasing their business by reducing prices through wage or profit squeezes, then the possibility that

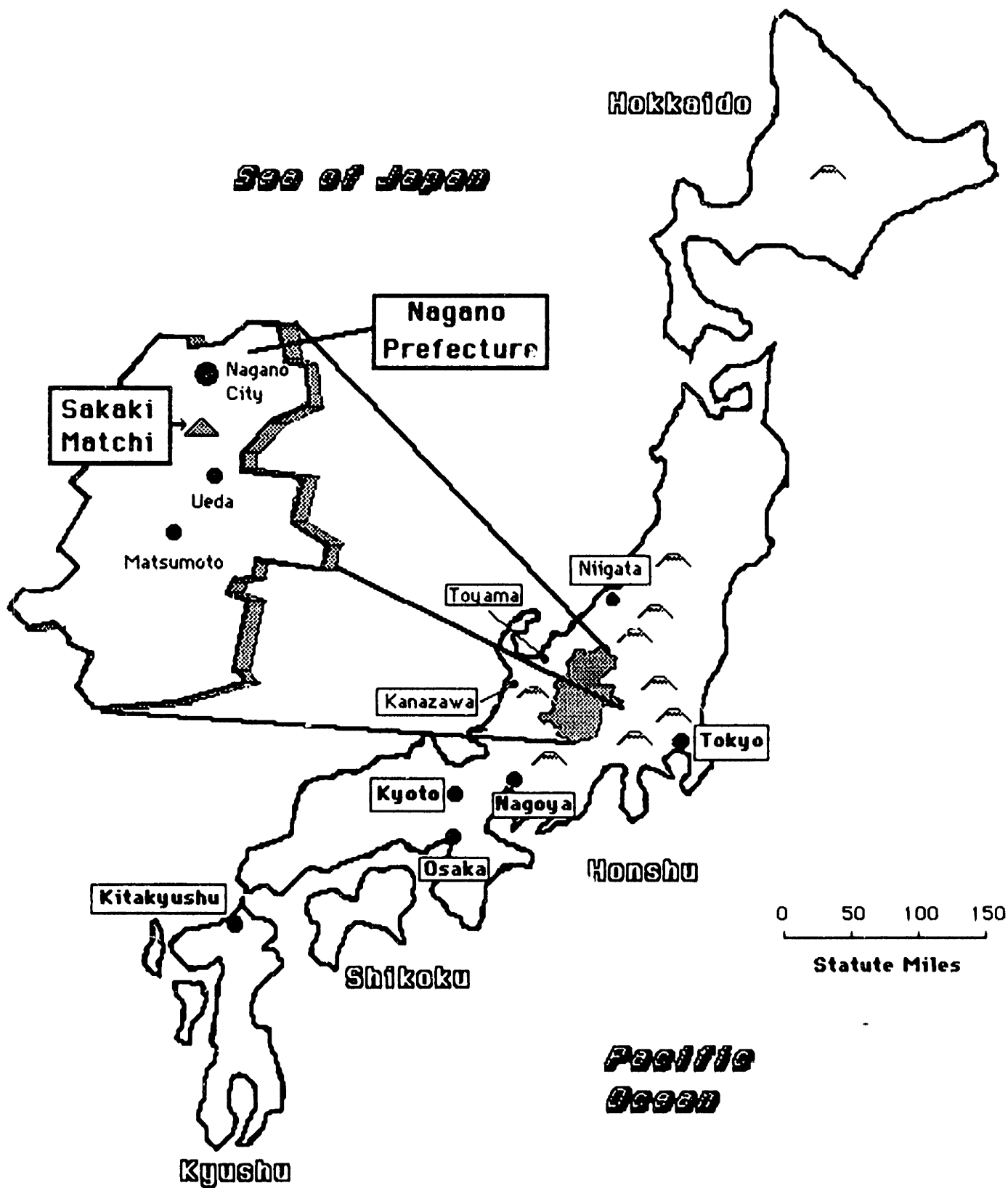
all the firms would be caught up in a full scale price war would be increased. Should that happen, many of the internal company practices that permit flexibility in manufacturing such as high skill labor and shop floor trust permitting rapid production modifications as markets change would be sacrificed. As a whole the region would begin a downward spiral towards a "dual structure" like role in the economy--supplying cheap parts on the basis of lower labor costs. Regional consciousness is one way that firms set up and maintain ground rules on what constitutes fair or unfair pressure from larger companies. We shall see in this case study that the group of companies in Sakaki have very clearly joined together to build up defenses against wage or profit sweating.

A second role is in fostering some degree of cooperation in the opening up of new products markets. There is a tremendous risk in the investment of time and capital in trying to move into a new market or sell a new technique; yet, without this effort, one of the advantages of flexibility which provides the smaller factories with their competitive edge would be lost. Regions help alleviate the problem. In Italy, for instance, flexible firms collaborate in trying to find new, joint applications for their specific skills, thus collectively defining new products to which each firm contributes a part or process.² As we shall see, the extent of cooperation in Japanese regions stops far short of this, but there are mechanisms by which an individual company relies on the assistance of its regional neighbor as a way of reducing the risks involved in moving into new markets. The Japanese solution was to institute a system of borrowing machinery as production schedules required; by sharing machinery, a subcontractor could bid for new work secure in the knowledge that if an unforeseen snag developed, backup capacity was available. Over time, in fact, the client large firms came

to recognize that regions provided this additional security and thus were more disposed towards placing new orders with an untried vendor. Regional cooperation in this way enhanced the development of new technology and markets for smaller firms in Japan.

Finally, the actual funding of companies takes place at the regional level; In Japan, especially in the startup phase, regional authorities make the crucial decisions about whether or not a certain firm receives state funding. In general, regions appear to be associated with efforts to reduce the costs of business for the smaller factories that are located within them. In Europe, for instance, regional or local groups have provided plant space or infrastructural improvements to collections of flexible producers. The connection between regions and finance is even more direct in Japan as the actual distribution of the resources of the "private" and public small business banks or trusts we discussed above takes place at the local level. To understand the details of how flexible firms developed in Japan, we must see how financial opportunities were mediated and applied by local authorities.

The focus of our study is Sakaki Township, a community located in Nagano Prefecture among the mountains of central Honshu. (See attached map). The choice of this community is important for several reasons. It is our claim that the factors leading to flexible production were strong enough to produce a general modification in the entire industrial system of Japan, creating a hybrid economy. It would be a comparatively easy test of our argument if it focused only on the more famous small factory regions of Japan such as Omori or Fukugawa. In these areas it would not be totally surprising to see warrens of smaller factories--the direct descendants of the prewar craft producers--that possessed extremely complicated



日本と長野県と坂城町

Japan, Nagano Prefecture and Sakaki Matchi

computer machinery and produce very sophisticated goods. Indeed, such small business collectivities in urban Japan are quite famous for their dynamism, and often treated as exceptions for precisely that reason. But if contextual factors leading to flexible practices in Japan were strong enough to generate a hybrid economy and thus account for Japan's extremely successful development, we should see their influence at work even in the most unlikely of regions as well. Sakaki, a manufacturing hamlet in one of the most isolated areas of Japan is the the hardest possible case for our argument. Has it too been affected by the more general trend towards flexible production?

The Industrialization of Sakaki

The answer is an unqualified yes. Not only does Sakaki's industrial history perfectly mirror the larger trends in the Japanese economy discussed in Chapter Four, but the growth of its remarkable small scale manufacturers was closely linked with the development of the most advanced NC computer machinery. In 1983, the township had only 16,000 inhabitants and 321 manufacturing enterprises, about .013% of Japan's total population and .04% of its firms. Yet, Sakaki possessed close to 600 NC machine tools, or 1% of the total deployed in Japan, making it one of the world's most concentrated collections of sophisticated production machinery.³ The general political forces that transformed Sakaki went hand in hand with the way Japanese NC tools were designed and employed.

Were Sakaki located in a large urban area of Japan, its development might have been merely surprising. But the fact that an insignificant municipality in Nagano Prefecture should grow into a high tech production

center is nothing short of astounding; it would be as if American technological leadership passed suddenly from New York to a farming village in North Dakota. To understand how anomalous Sakaki is, one needs to appreciate the conventional characterization of Japanese industrial geography.

Japan is traditionally divided into a well defined industrial center and a dispersed periphery. The center is composed of the Tokyo-Nagoya-Osaka/Kyoto axis, as shown in the attached map. The eastern half of this metropolitan conglomeration is separated from the west by a range of coastal mountains; the east, with Tokyo, is usually called the **Kanto** and the west, including Osaka and Kyoto, is the **Kansai** region. The Japanese make a great deal of differences in history, accent or even sporting teams between the **Kansai** and the **Kanto**, much like New York and Los Angeles in America. The differentiation also carries over into industry; while both regions are host to the largest Japanese firms, the **Kansai** is thought of more as the location of huge conglomerations of small manufacturers. And, though the **Kanto** has a number of famous districts like Fukugawa or Oomori in which small firms have predominated, it has the reputation as a large firm region. This categorization persists at least in informal perceptions in government and business up to the present day.⁴

The periphery is composed of a number of different kinds of areas. The most "advanced" in common thinking are regional centers like Sendai in Northern Honshu, Sapporo in Hokkaido or Southern Kyushu. These cities are sizeable urban centers, often known for certain industrial processes or markets. Kyushu, for instance, is the site of much of Japan's microchip manufacturers, forming part of a "silicon island" complex responsible for

major inroads in the world's computer market. These regional centers are the elite of the Japanese industrial periphery.

Next in line are urban centers that for reasons of geography are thought to be isolated or undesirable locations. Cities located on the Sea of Japan side of Honshu are excellent examples; they are buffeted by massive snowfalls originating in Siberia that are halted in their southeast movement by the mountain range bisecting the Japanese archipelago. Niigata, Toyama or Kanazawa, to name three examples, are often featured in nightly news or newspaper stories for the intensity of the wet, heavy snowstorms they endure, which result in collapsed housing, snarled traffic and even the disruption of the Tokyo-Niigata Shinkansen (bullet train.) These "remote" areas are commonly thought to be the most "backward" urban areas in Japan, a characterization that dates to periods in which families would be forced to migrate to find food or shelter given the harsh winters. A more contemporary expression of the way Japanese think about the Sea of Japan cities can be found in the conversation of businessmen, who when decrying the difficulties of overseas or domestic transfers are heard to say, "at least it isn't Toyama." And indeed, transfer to Toyama does not just entail physical endurance, but is also a sign that one's career is in trouble; it is an industrial backwater. But despite these popular conceptions, Sea of Japan cities have often developed unique manufacturing processes in paper or other traditional goods. Niigata was the site of a huge shipbuilding complex that spawned a considerable metal working industry. Further, some Sea of Japan population centers have been the base of operations for powerful political leaders.

At the bottom of the Japanese industrial hierarchy are the large but sparsely populated districts that lie in the mountainous terrain covering

70% of the county's land mass. Included in this group is Nagano Prefecture and Sakaki Township. For many Japanese, these areas are synonymous with agriculture, tourism and long-time hardship. Famous folk tales describe how farming villages in the mountains were so poor that to stave off famine they had to discard surplus elderly individuals on the slopes of barren hills.⁵ A measure of the "remoteness" of the mountainous regions, despite their physical proximity to urban metropolises can be gained by considering that the Japanese alps, a collection of peaks within 100 miles of Tokyo, were almost completely unexplored until late in the 19th century; furthermore, this period of discovery was led by a foreigner.⁶ While the villages and towns in these areas are frequently the source of considerable nostalgia-- like the "family farm" of American folk fiction-- the headlong rush out from these areas into the cities was as much a matter of choice as of economic necessity.

Moreover, if districts like Nagano Prefecture would be an unlikely site for a high tech renaissance, towns like Sakaki would be the last place for an industrial miracle to occur. Most of the towns and villages in Nagano are located along a major river that bisects the mountains into a broad valley. An express train from Tokyo enters this valley at Karuizawa, and then passes through small commercial towns like Ueda until it reaches Nagano City, the administrative capital of the prefecture. The express, which takes over three hours to complete this 100 mile journey, completely bypasses the folded nook of mountains in which Sakaki resides. To get to the township, one must transfer to a local train, often a two-car vehicle, that passes through a tunneled track to its destination.

Sakaki's isolation was matched by agricultural hardship. Its climate was unsuitable for growing rice, so it was forced to trade for commodities

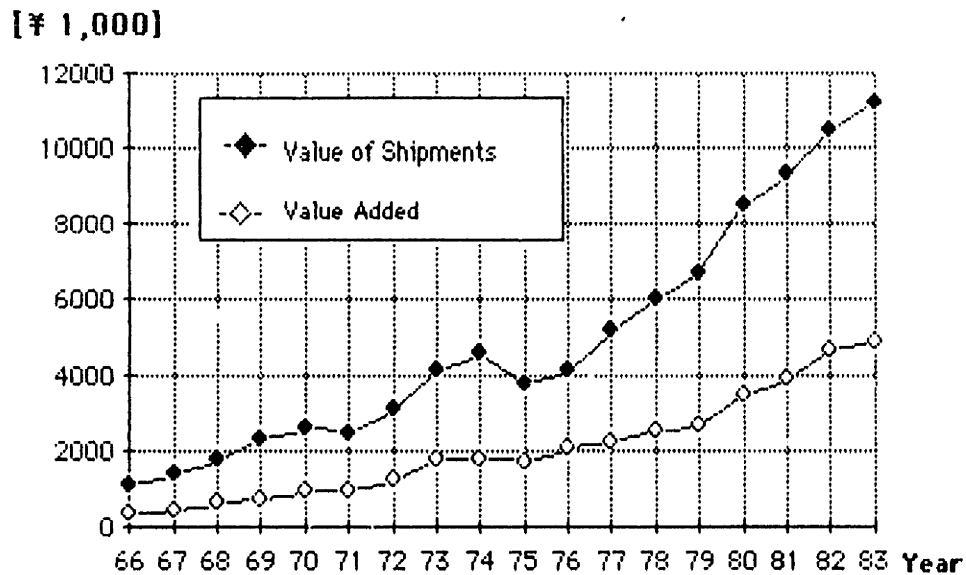
by producing silk or growing apples and grapes. In agriculture, the small size of the plots further compounded matters since to compete with larger operations the local growers had to cut their profits to match prices. Then the silkworm industry collapsed in the late 1930s. There had been a steady outflow of population out of the town, and into prefectural cities or back into the **kanto**.⁷ Sakaki's past would have seemed to condemn it to agricultural poverty rather than manufacturing leadership.

But Sakaki's postwar manufacturing growth was phenomenal. From just 5 factories by the war's end in 1945, the township had grown to 321 firms in 1983. The period of most rapid expansion was after the late 1950s, when the specialized small business finance institutions were set up. By the mid 1960s, Sakaki had entered a golden age of which its local **shokokai** (chamber of commerce) employees fondly recall, "we were opening a firm a month."⁸ So intense was the rate of new firm opening that all of the available land space was utilized by the 1980s, causing a slowdown. Some entrepreneurs looked to neighboring municipalities for new firm locations, while at least 8 companies relocated out of Sakaki between 1982-1983.⁹

The pace of value added growth and the expansion of the value of shipments recorded by Sakaki's enterprises matched the rate of enterprise creation. As Figure 5.1 illustrates, value added rose over 1,200% between 1966 and 1982, while shipments increased 1,000%.

Figure 5.1

Value Added and Shipments Changes, Sakaki, 1966-1982



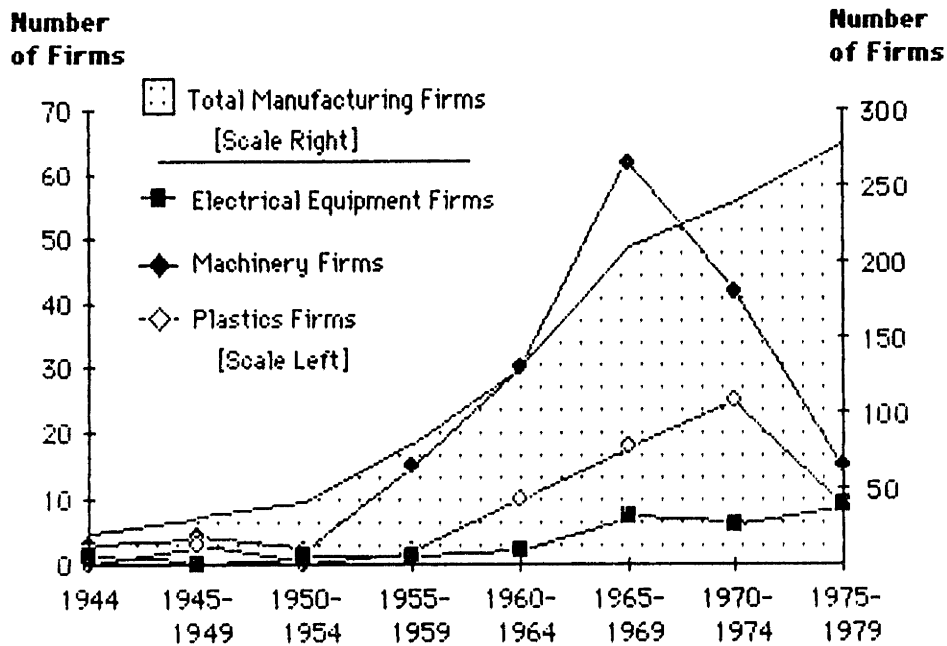
From *Sakaki Matchi Shokokai, Sakaki Matchi Shokigyo Keiei Shihya*, [Sakaki Township Small Enterprise Management Indicators] 1983, page 4.

By way of comparison, Japanese value added in manufacturing industries rose "just" 690% in 1966-1983 during the height of the economic "miracle," where US value added increased only 302%, and that amid high inflation, during 1963-1977.¹⁰

The township's economic development was marked by several stages in which certain industries predominated. The first wave of expansion, from the immediate postwar to the mid 1960s was in general machinery, led by auto parts production as shown in Figure 5.2. Then, in the 1970s, new firms in electronics and plastics sectors predominated. Many of the older auto parts firms also shifted to new sectors, a process we will describe in detail below.

Figure 5.2

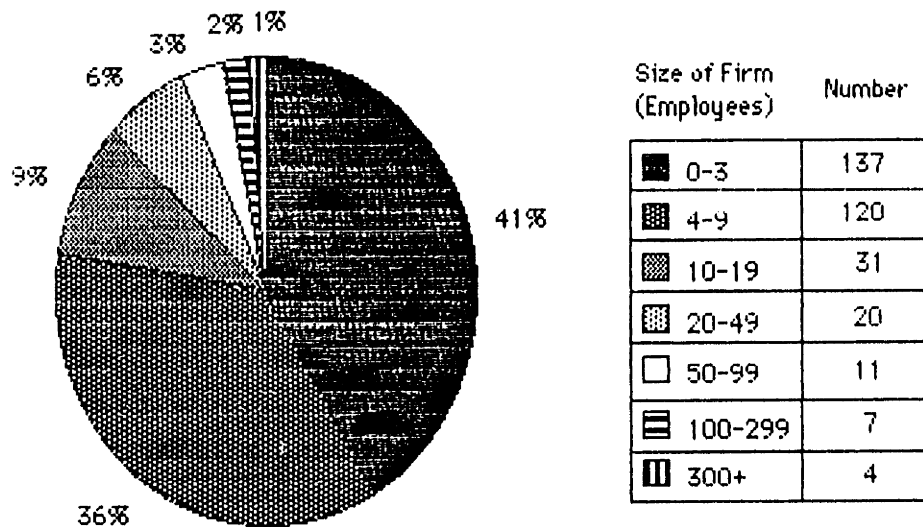
Annual Growth of Manufacturing Firms in Sakaki, 1944-1979



From *Sakaki Matchi Kikai Kogyo Sanchi Shindan Hokokusho*, [Report of the Investigation of Sakaki Township's Machinery Industrial Region] page 3, and *Sakaki Matchi Shokigyo Keiei Shihyo*, page 4.

Sakaki's industrial achievements were accomplished by extremely small manufacturers; only four of its companies in 1982 employed more than 300 workers. The township's firms were managed, for the most part, by former blue collar workers who were employed in other local factories before becoming independent. Indeed, in 1982 firms of between 0-9 employees still were in the vast majority as shown in Figure 5.3.

Figure 5.3
Firm Sizes, Sakaki, 1982



From *Sakaki Machi Shokigyo Keiei Shihyo*, page 6.

Of 330 manufacturing firms in 1982, 257 were in the 0-9 category and 41% were in the 0-3 employee size class, basically family enterprises. All but 11 of Sakaki's factories were enterprises of just 99 or fewer workers; the average firm size was about 18 employees, or well into the "petty" category as defined by the Japanese government. Small and medium firms accounted for over 60% of the value of shipments of the township, a figure that almost certainly understates their contribution since large firms shipments always had a large subcontracting component.¹¹

Even the larger firms in Sakaki are not much removed from their roots as former small scale factories. Approximately 11 have grown into what industrial surveys call "complete product makers," producers that make finished goods rather than parts. Almost all of these companies were once small producers that originally started in Sakaki and not the product of outside investments directed at the township. They typically capitalized on

unique technical skills or knowledge to formulate specialized products for specific uses; in that way, many came to dominate world markets. Nissei, for instance, held 65% of the global market for blood pressure testers; Nakajima All Precision captured 20% of the world's share of manual typewriter keyboards and 35% of the US market for electric models; Takeuchi led the world in the production of mini-backhoe construction equipment; and Soar, a maker of portable, sophisticated electrical testers in ten years grew from a family operation to the point that it opened a new world headquarters in Sakaki, replete with the Japanese symbols of corporate success: the company name in English etched in stone and a spanking new English language classroom.¹²

Sakaki is extremely productive despite the small size of its firms; while the township ranks 9th in Nagano Prefecture--itself a peripheral region--in terms of average firm size, it is first in shipments per population and fourth in value added per employee. In fact, Sakaki's wealth is such that it is one of only two municipalities in Nagano Prefecture that do not receive a local tax rebate.¹³

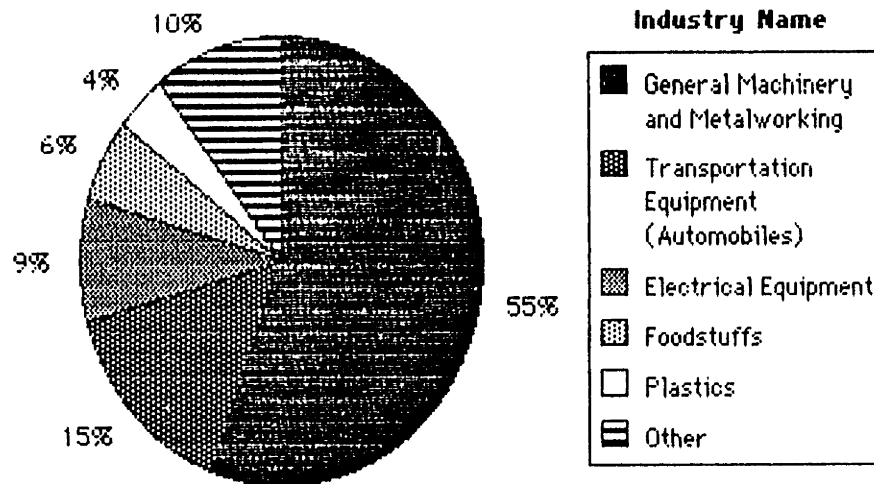
The small size of manufacturing enterprises in Sakaki and their dispersal throughout the township, lends a surreal air to the countryside. By the train station, there is the usual clutter of shops and an occasional sign, "Electrical Research Lab" [**denki kenkyu jo**] suggesting economic activity. But the real industrial activity of Sakaki is concealed in small, often shabby corrugated metal structures that look like storage sheds or garages. After a few experiences in which the husband and wife owners of a typical firm lead the way from their two story house (worth an enormous sum in Tokyo) to one such "garage", unlocking it to reveal a star wars-like complex of integrated NC lathes or mills, the eye is trained to see these

structures for the high tech factories that they are. Thus, one of the world's most concentrated collection of computer controlled machine tools can be found in the front yard or garden of a number of former agricultural holdings.

These small factories are independent. It might be easy to imagine that family firms in Sakaki, and even the medium sized companies are beholden to large firms who support them in exchange for cheap labor. But several statistics contradict this claim; just as the general development of Japanese small manufacturers coincided with a reduction in exploitative relationships, Sakaki's companies are free-lance subcontractors maintaining contractual, rather than vertically integrated, links with their clients.

One indicator is the historical transformation in the township's product mix. The explosive growth of the 1960s was begun with heavy reliance on auto subcontracting; the township was popularly known in the prefecture by the label "auto parts town" [**jidosha buhin no machi**]. But in the 1970s, auto work declined while specialty parts supply in general machining, electronics and plastics became much more important. As Figure 5.4 illustrates, by 1983 auto subcontracting accounted for less than 15% of Sakaki's total production.

Figure 5.4
Product Mix, Sakaki, 1983



Product data from *Sakaki Machi Shokigyo Keiei Shihyo*, page 6.

Since most accounts of the dual structure in the Japanese economy suggest that automobile manufacturers exert the strongest pressure on their suppliers, the movement away from auto parts subcontracting argues for increased independence.

A second piece of evidence is the pattern of outside parts ordering and orders received by Sakaki's manufacturers. It is generally thought that when groups of subcontractors rely on one local manufacturer for their business the probability of large firm domination is very high. Conversely, in cases where small firms rely on orders from afar, while the large firms in a specific area source out to other regions for parts, the degree of centralized direction would be very low. The major reason is that small firms separated geographically from large ones would be unlikely to experience direct control due to the costs of coordination, which would

undermine the low production cost rationale of maintaining control in the first place.

The pattern in Sakaki is for the larger, complete products producers to source outside the township for their parts while the smaller firms sell to companies throughout the **Kanto** plain. As Figure 5.5 shows, local large firms direct only 14% of their orders to companies in Sakaki. They rely on manufacturers in other Nagano Prefecture cities or in the **Kanto** region for their parts. Subcontractors, in contrast, receive over 51% of their orders from the distant **Kanto** area, and about 23% from other locations in Nagano Prefecture. Just 11% of their business arises in Sakaki. And even this cannot be assumed to be generated by local larger firms; Sakaki's subcontractors, once they receive an order, tend to keep the business in the township: 44% of outside orders by subcontractors go to other Sakaki companies. This pattern of business tends to support the view that subcontracting small firms are independent manufacturers.

Figure 5.5

Subcontracting and Outside Ordering, Sakaki, 1982

Contracting Type	Regions	%
Sakaki Complete Products Makers, Locations of Outside Orders	Sakaki Township	14%
	Northern Nagano Prefecture	10%
	Eastern Nanagno Prefecture	30%
	Kanto Region	17%
	Other	29%
Sakaki Subcontracting Companies, Locations from Which Subcontracting Orders Arise	Sakaki Township	11%
	Northern Nagano Prefecture	12%
	Eastern Nanagno Prefecture	11%
	Kanto Region	51%
	Other	5%
Sakaki Subcontracting Companies, Locations of Outside Orders	Sakaki Township	44%
	Northern Nagano Prefecture	23%
	Eastern Nanagno Prefecture	26%
	Kanto Region	2%
	Other	2%

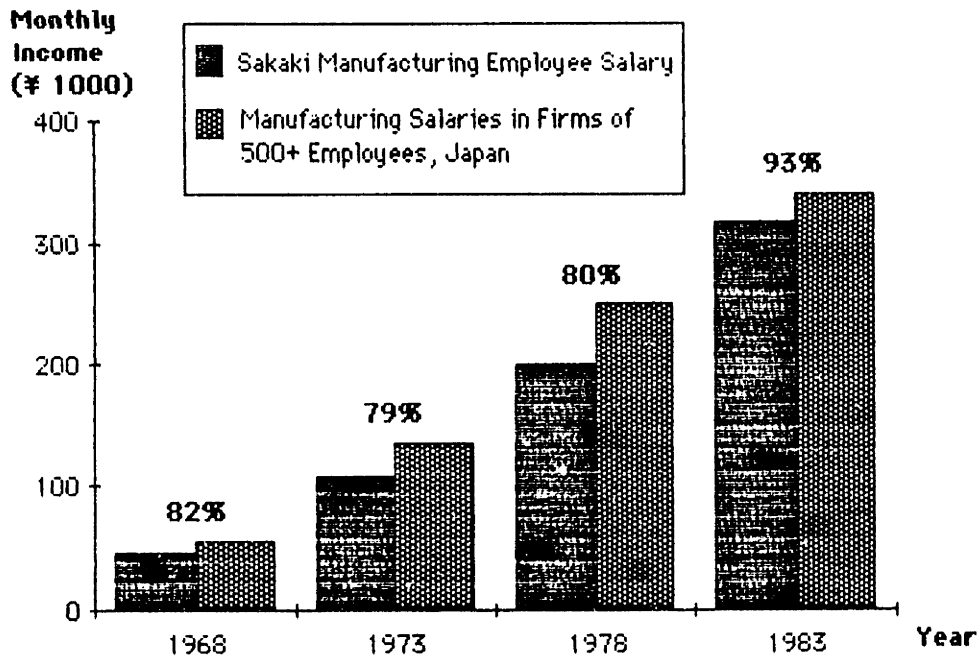
From *Sakaki Matchi Kikai Kogyo Sanchi Shindan Hokokusho*, pages 10-11.

A final piece of evidence is the wage structure. If the township's firms were captured suppliers for larger concerns, a wage differential at least as large as the Japanese average should be observed. Indeed, since the costs for **Kanto** firms of doing business with companies in isolated mountain communities would be high, one might even expect that Sakaki's wages would be much less than the average to compensate. But Sakaki's wages are far and away the highest in Nagano Prefecture; blue collar compensation per employee was 10% greater than the next closest municipalities, the much larger cities of Okatani and Suwa.¹⁴ Moreover, in comparison with average wages throughout Japan, Sakaki's compensation is much higher than payment offered in comparable firms elsewhere. In fact, workers in the township are paid almost exactly the same as blue collar employees in Japan's largest firms of 500 employees or more; over time, Sakaki's relative wages have risen from an impressive enough level about

82% of that for manufacturing firms of 500 or more workers in 1968, to 93% by 1983 as shown in Figure 5.6.

Figure 5.6

Wages in Sakaki versus Wages in Manufacturing Firms of 500+ Employees, 1968-1983



Data on Japanese wages from MITI, *Maigetsu Tsuro Chosa*; for Sakaki from *Sakaki Machi Shokigyo Keiei Shihyo*, page 4.

High wages are inconsistent with the notion that Sakaki's firms are captured suppliers. The pattern of wages can only be understood as arising from independent operation as manufacturing specialists, a position from which high work charges could be made to support comparatively high salaries.

The history of Sakaki's rise in manufacturing almost exactly parallels nationwide postwar developments in small business growth. The first factories in the township were established in 1941 under the military's strategy of dispersing armament contracts throughout the countryside, a policy that reflected both its pro-rural stance and the desire to avoid

concentrating industry in regions vulnerable to bombing. By 1945, four metal working factories and one plastics firm had been diverted to Sakaki, or opened in conjunction with a military order. Among the machining firms was Nakajima All Machine, an affiliate of Nakajima aircraft, which would later become a major power in the area, promoting factory construction through subcontracting orders.¹⁵

Until the end of the war, Sakaki's few factories made airplane parts and communication equipment. With Japan's defeat, the firms shifted production to non-military markets such as agricultural implements, metal casting, and household goods. A small group of subcontractors associated with Nakajima moved into machinery parts manufacture. However, until the late 1950s, production in Sakaki was uneven, plagued by high startup costs, a lack of financing and uncertain markets.¹⁶

Sakaki's fortunes changed in 1957 when the township passed the "Sakaki Township Factory Promotion Ordinance" [**sakaki matchi kojo yuchi jorei**]. This measure took full advantage of newly created national institutions for small firm development and promised support for potential factory operators.¹⁷ This encouragement was met with an enthusiastic response: Sakaki's output and number of firms shot up. Although the term "**yuchi**" as it appears in the 1957 Ordinance has connotations in Japanese of 'invitation' or 'enticement', suggesting that officials were trying to lure outside firms into the township, well over 90% of all companies that were subsequently established in Sakaki came from the area. Of these, about 80% were cases of workers leaving another Sakaki firm to start independent operations, and 20% involved the manager's switching from agriculture to manufacturing.¹⁸

The homegrown character of Sakaki's development bears emphasis since it accords with the view of Japanese blue collar work careers developed in Chapter Four. As a Nagano Prefecture report indicated, one of the strengths of the Sakaki system was the way that future managers could gain expertise and then easily start up their own company:

There are no dominating large firms in the township. Rather it is a typically small enterprise town. The vast majority of the managerial staff of these small enterprises learned their craft by taking employment in the township's small firms, mastering a certain set of technology and then becoming independent. The full range of managerial skills can thus be studied in this way, simplifying the process of starting a firm. In this regard it must be pointed out that most of the small firms became independent from other small businesses, and that firms that began as offshoots of huge enterprises are extremely rare. Moreover, in Sakaki it is possible to become independent with just a single lathe or through the development of general purpose, advanced technology--a fact that is thought to make it easy to open new firms.¹⁹

Consequently, Sakaki's expansion involved the advancement of former blue collar or agricultural workers towards independence as a factory operator after a training period in a local small firm.

Sakaki's manufacturers typically seek to enhance their independence by developing a unique product or technique. Over the years from the 1940s to the present, there have been three main patterns of success. The first, prominent in the 1940s and 1950s, was to become expert in particular manufacturing techniques.²⁰ After a firm became independent, it would seek to apply the most advanced techniques to required production or assembly processes. This enabled Sakaki's firms to increase the accuracy and reliability of various operations, and they became known for their

mastery of production techniques. In turn, specialty work from afar was attracted to the township.

The second route, which emerged in the late 1950s and 1960s was to first become independent as a parts supplier for a larger firm.²¹ Then, by applying the techniques learned in parts production, the firm would develop its own unique products. From there, several choices were possible. The new part could be supplied to the original contractors, resulting in design or quality advances in the final assembled product. Or, by extending the new product, the firms might be able to enter new markets, expanding the range of sectors for which it produced. Finally, breakthroughs in technique or design could lead to the transformation of the parts firm into a complete product manufacturer itself.

In recent years, a third route has emerged.²² In this case, Sakaki's firms develop expertise in electronics or electronic applications and then market their skill independently. Again, as in the case of Soar, this may mean that the firm becomes a complete product supplier, often on a global level. More commonly, it involves the application of a special skill to a variety of manufacturing problems or designs. A firm could utilize skill in connector technology, for instance, to increase the quality of keyboard, communication or gauging equipment as all of these products depend on translating physical motion to electrical signals by reading pulses generated by striking keys or exciting diaphanous material. The way that aspirants found a global market varied from firm to firm but typically involved an initial contact with an overseas user through a parts supply contract, an arrangement usually set up through a trading firm. Then, in the course of supplying the parts, companies like Soar were encouraged by the foreign collaborator to try and produce more complex products for special

markets. In the cases where these attempts proved successful, the Japanese producer managed overseas sales directly and became a "complete parts" maker.

Sakaki's success has become a model for local planners throughout Japan. In 1984, close to 40 regional authorities visited the township, as well as observers from the Korean Small Business Authority.²³ The phrase "Sakaki Dream" [**Sakaki dori-mu**] has even entered the lexicon of small enterprise policy debate in Japan because the township symbolized the pattern of growth that most localities would most like to achieve.

But how did the national financial measures, market shifts and technological trends in postwar Japan converge in the specific case of Sakaki to produce such remarkable industrial results? Part of the answer is that the **shokokai** administered state financial support and maximized the ability of small scale entrepreneurs to enter manufacturing markets. Once these firms were established, inter-firm relations within the township reinforced the financial and managerial support provided by the **shokokai** and prevented a descent into wage or profits squeezing. When firms finally reached the point of technical mastery and stable private financing, state support was gradually withdrawn. Sakaki's growth shows in microscopic detail how the general context we detailed in Chapter Four converged in actual regional settings to lead to flexible manufacturing in Japan.

The Role of the Shokokai

First, let us consider the influence of the **shokokai**. Although "chamber of commerce" is the usual translation of its name, its functions are much more extensive than those of its American counterpart. In Japan,

the **shokokai** is responsible for administering the entire range of small business financing options, involving recommending firms for specific sources of capital. To understand how a small firm gets started in Sakaki and throughout Japan, one must first see how the **shokokai** operates.

With the exception of the largest metropolitan areas,²⁴ the **shokokai** in any given town or village is directly supervised by the prefecture, which pays for the staff salaries and makes annual assessments. Like most Japanese bureaucracies, nominal vertical hierarchy actually conceals a substantial degree of local autonomy. An organizational map of the **shokokai** would show them to be at the bottom of a chain of command that originates with MITI, passes through MITI's Small Business Division, continues down to the Division's five Commerce Bureaus [**tsugyo kyoku**] which are dispersed throughout the country, then to the prefecture and finally to the local **shokokai** themselves.²⁵ However, this is an exceedingly idealized chain of command; it exists only as a highly formalized structure. Prefectural authorities are notoriously independent from MITI, frequently playing on their political clout to subvert, or at least blunt national bureaucratic initiatives to fit their own needs. And the same degree of functional autonomy is experienced between the local **shokokai** and the overseeing authorities in the prefecture.

One example will make this clear. In the 1960s, as we saw in Chapter Four, MITI passed legislation aimed at the rationalization [**gorika**] of small businesses as capital liberalization generated panic responses throughout the bureaucracy. The measures provided a set of financial incentives to form cartels; what the central bureaucracy wanted was to combine the small firms into larger ones, and then to supply them capital so that they could compete with what was feared to be technically advanced foreign

firms. The result was a now familiar pattern in which "cartels" were formed by small firms precisely to avoid consolidation, thereby thwarting MITI's objectives.

One reason for this failure was the fact that the determination of when firms were "rationalizing" as called for under the program was left, of necessity, to the local **shokokai**. MITI could not possibly regulate the activities of the hundreds of thousands of manufacturers under its purview, nor were prefectural bureaucrats able to manage producers in their regions. Instead, the **shokokai** handled the distribution of resources mandated by the "rationalization" scheme. But in most cases, the **shokokai** adopted the sense of rationalization as "technical advance" as its standard for financial support, authorizing funds not for firms that had consolidated, but rather for firms that were eager to buy new equipment. Thus, instead of leading to mergers, the rationalization program helped protect small factories. A further irony was that since MITI was most concerned to protect the financial stability of small businesses, the **shokokai's** application of the program actually weakened the capital position of small enterprises because it encouraged rapid purchases of new equipment, and therefore increased debt. We will see how this came about in detail later.

In Sakaki, the **shokokai** is housed in a small public building in the center of town. About 80% of all its operating expenses comes directly from the prefecture; of this 50% is supplied by the prefecture's tax base, while the other half is a subsidy provided by MITI's Small Business Division to the prefecture, which then decides where to allocate the funds. The rest is secured by charging firms a membership fee and a service fee for any work done by the **shokokai**. Most companies join; in the rare case where one does not it will be ineligible to participate in purely local programs,

although support provided through "national" policies will still be extended.²⁶

Shokokai staff are usually not former businessmen; like the members of the Machine Tool Builders Association, they are career bureaucrats. In Sakaki, the typical path to joining the **shokokai** is to first study engineering or a related profession in university, and then to take a civil service exam. Successful applicants--the rate of passage on the test is only about 10% in Nagano Prefecture--then become junior staffers at **shokokai** dispersed in the prefecture. These employees have considerable leeway in where they work; all the staff at Sakaki was born and raised there. Usually, **shokokai** employees have strong local roots, although for promotional reasons, or perhaps to do different work, staffers may request posts in unfamiliar locations. As a result, they tend to identify strongly with the area in which they work, in effect championing the district's needs.²⁷

The most important industrial role of the **shokokai** is to help with startup expenses for local entrepreneurs. This can be appreciated by considering the pattern of government aid in Sakaki. 33% of the manufacturing enterprises in the township have some form of direct government capital assistance made possible by the **shokokai**. The remaining firms, though funded by "private" sources, will often have their loans guaranteed by the locality or receive approval based on the recommendation of the **shokokai**. But the **shokokai**'s influence varies with the size of a firm; close to 100% of the companies in the 0-20 employee category all received, in some way, government assistance.²⁸

Most of this assistance goes for equipment purchases. Small firms in Sakaki usually already own or have mortgages on the land they will use for

their operations. Consequently, manufacturing tools and machinery are their greatest expense. Aid from the **shokokai** is instrumental in providing blue collar employees with the capital for securing their own machines; without this aid, prospective managers would not be able to bear the investment burden, especially where expensive NC machines are involved. By reducing equipment startup costs, or in most cases eliminating them, the **shokokai** is an extremely important factor easing small business creation.

For prospective factory operators, **shokokai** input is essential in securing a loan. Most simply, it acts as an expert counsel on what funds are available. Deciding where to apply can be a daunting task, since each of the small and medium business financial institutions has dozens of separate funds, some for equipment alone, and other for more general purposes. For instance, the 1984 edition of a summary of funding sources put out by the Sakaki **shokokai**, "Finance for Small and Medium Enterprises" [**Chusho Kigyo Kinyu no Shiori**], listed 63 major financing programs carried out by the national and local governments and by "private" institutions.²⁹ Many of these programs were further subdivided; a firm must tailor its application exactly as an American academic needs to fit a research proposal to the orientation of specific grant agencies. Often, equipment might be funded under seemingly unlikely programs such as pollution reduction; a new addition to a factory might be financed through loans offered as part of an effort to encourage consolidation: two small firms could share a new facility and claim to be fostering "joint activity" [**kyodoka**]. The **shokokai** is an expert in the various twists involved in each application.

But the **shokokai** does more than just advise. It is the ultimate judge of whether an applicant is worthy of receiving support of any kind. In

Sakaki, aid and loans are supplied by various institutions in the following proportions: 30% comes from national sources, 40% from the prefecture, 20% from programs administered by the township itself, and 10% involving joint insurance of loans.³⁰ In the case of prefectural and township programs and loans, prospective industrialists must apply through the **shokokai**, whose recommendations determine the outcome of the application. In the case of national sources, like the People's Finance Corporation, the situation is more complex. Up to a certain level, usually about \$40,000, the **shokokai** is given independent authority to write a loan drawing on the national institution's reserves. But for larger sums, an application must be sent to the central office in Tokyo. It is theoretically possible for a prospective small business client to apply directly for these larger loans since the final decision is made in the headquarters. But given the degree of small business activity in Japan, the local officials' evaluation of the application's merit is extremely influential; a loan request that bypassed the **shokokai** would be under a severe handicap. Much like an unsolicited manuscript entering a publishing house, the absence of a **shokokai** recommendation all but scuttles any chance for aid. Therefore, 99% of all financing from all sources is accomplished through the **shokokai**.³¹

Loan guarantees are another area in which businesses need the **shokokai** to obtain funds. The purpose of these guarantees is to increase the pool of available capital by reducing risks for banks that normally would be hesitant to loan to small firms. In rural Sakaki, the large City banks play little or no role, but the second tier Regional banks [**chiho ginko**] can be induced to lend to small firms if their capital is insured. Usually the bank's involvement represents 30% or 40% of a total aid package also composed of funds from other sources. The **shokokai** determines in special cases

whether a firm is stable enough to merit insurance, and then commits the prefecture to payment of the bank's equity in the event the firm fails.³² The bank's portion of the loan is therefore risk free and the guarantee program increases net capital available--provided the rate of failure is low.

All applications for government or insured loans are accompanied by a detailed account of the production, growth, marketing, income and employment strategies the proposed venture will try to achieve. Even when an applicant is funded by private sources alone, the **shokokai** may be consulted because it has expertise in evaluating the proposals in a certain area. The **shokokai** staff is responsible for checking the plans and often will compel an applicant to modify parts of them. It therefore has intimate knowledge of the operating histories of most of the firms in the township, which provides a base for evaluating new proposals.³³

Under the national and local system of loan distribution, the **shokokai** has strong incentives for ensuring that the firms it selects ultimately succeed. If its recommendations lead to a number of failures, it will lose influence with the national funds and the township as a whole will suffer as it gains a reputation as a poor risk. Further, commitment of local funds to failing companies will lead to pressure from the prefecture, reducing future funding and local autonomy. And, of course, even with loan guarantees the banks would be unlikely to participate in additional proposals if the **shokokai's** predictions prove to be untrustworthy.

To reduce the possibilities for financing failures, the **shokokai** undertook a number of initiatives and developed strategies that have influenced industrial development in the township. Its funding tended to be approved for related industries, leading to collections of companies that had

broadly similar machines, production experience and relations with the outside purchasers. Later, we will see how this congruence affected independence in permitting subcontractors to use their neighbor's machines to meet manufacturing deadlines. In addition, the region developed a reputation as a "one stop" location for various related goods--In the days when Sakaki was known as the "auto parts township" a producer had confidence that a business trip would lead to contracts for most of its parts needs.

Another policy was the continued provision of expert advice throughout the startup phase of the newly funded firm. This advice may range from finance to marketing and production. Financial assistance, as we have seen above, was invaluable given the huge number of individual loan programs. But marketing assistance was also important. Sakaki depends almost completely on outside parts orders, and on the sale of goods to users beyond its borders. Up to a certain point, this external reliance does not create problems because the township's companies have been very successful in penetrating outside parts and products markets. This is particularly true of the more established companies or the complete parts makers; in one interview a spokesman for ASB suggested that Sakaki's export successes--three complete product makers alone sell in 95 countries--was due to a history of dealing outside the township: "There's just not much difference in whether you send something to Tokyo or to America; we experience no real distinct sensation in moving overseas."³⁴ But this confidence is not always shared by new firms whose ability to search for new buyers is, of course, constrained by a lack of time and capital.

Startup firms usually obtain their initial orders from the company the new manager was formerly affiliated with. For instance, a worker in a small firm making plastic electronics holders might want to contract independently to build a small part of the product. The worker's supervisors might then negotiate with their main contractor to see if the additional subcontracting proposal is acceptable; if so, the worker will open his new firm on the strength of promised orders obtained through his former employer. Additional work usually also is obtained through the old company, and we shall see later why firms have incentives to keep former employees solvent.³⁵

Another route is for new firms to draw on family ties. Like most of Japan, Sakaki has experienced an historical population drain towards the largest cities. Frequently, family relations of Sakaki workers rise to positions in large firms from which they can influence parts sourcing decisions. They act on behalf of relatives or friends in Sakaki, and local firms, armed with an inside edge can confidently expand sales.³⁶ And, of course, there is a multiplier effect in that a good contact might benefit not only the immediate recipients but also companies with ties to the favored firm.

Private arrangements thus lead to many marketing arrangements. But the **shokokai** can also be instrumental in finding parts contracts for firms that either want to move into new fields, or whose main business is drying up. The staff maintains contacts throughout Japanese industry, augmented by the resources of the prefecture. Manufacturers with certain skills can be matched with clients that have the same needs. Moreover, the **shokokai** specializes in marketing strategies and in selecting trading firms that have good overseas track records. By carefully keeping track of the export or

extra-prefectural sales accomplishments of the complete products makers, the staff can advise smaller firms on how to go about carving an independent product niche either in Japan or abroad.

Next, the **shokokai** provides technical support. This can range from classes in computer programming and NC utilization to individualized production support provided by expert specialists brought in to assist a problem company. Classes of various sorts have been held in Sakaki since at least the 1960s, supplemented by frequent special presentations or seminars designed to acquaint local managers and workers with new production systems or techniques. The instruction is extremely detailed, frequently tuned to specific parts manufacture of concern to Sakaki enterprises. The prefecture also sponsors materials research, programming and engineering courses outside the township at universities and colleges; Sakaki firms may attend these courses or call for help. Further, in response to local interest about NC machinery and other complicated computer technology, the **shokokai** created the "Sakaki Small and Medium Enterprise Skill Development Center." This center offered year-round instruction in NC programming, general computing skills and other matters of use to manufacturers: courses for the latter half of 1984 included quality control for small firms, producing plastic parts for computers, drafting on computers, business English, tax reporting and wholesale marketing.³⁷

The **shokokai** helped build a working knowledge of computers among both managers and workers, thereby raising the overall ability of the township's manufacturing population. Because Sakaki's factories were independent, this training was one of the important resources firms drew upon to meet orders, particularly since large firms offered no assistance at all. As we saw in Chapter Four: the dual structure image of a large

contracting firm leading a helpless small producer through the steps necessary to make a part is not true in general. In the same way, Sakaki's companies did not receive outside guidance for any of their manufacturing tasks; in interviews, factory operators frequently suggested that in particular production tasks large firms knew less than they did.³⁸

In a typical order, a subcontractor was given a blueprint for a part, specifications regarding tolerances, and a contract for production and delivery. All decisions about how to make the part, how to manage raw metal stock, the best programming routine and even modifications to the basic design to enhance certain qualities were the responsibility of the small firm itself. Indeed, large firm influence on any of these items would be treated as an infringement of independence and resisted. But cutting routines, in which the manufacturer must decide in what order turning, milling, boring or other cuts should be done to achieve the fastest, best results are extremely complicated. Most of the initial knowledge a firm's staff has about NC equipment is gleaned from a basic introductory course provided by the machine tool manufacturer; machinery producers maintain an educational service in which representatives lecture to equipment users and provide rudimentary instructions.³⁹ The **shokokai's** technical support programs enhanced the basic introduction: it enabled firms to learn about making various classes of products which they could compare to new product orders and thus obtain a starting point for designing cutting routines. Consequently, local instruction eventually bolstered the market confidence of Sakaki's firms as well as increasing their overall technical ability.

But if financial, marketing and technical assistance should not prove to be sufficient, the **shokokai** also oversaw programs that provided startup

firms with guarantees against bankruptcy. Even with careful screening and substantial support, companies may encounter critical difficulties as their line of work is subject to a global slump or demand shifts. But the nature of public involvement in startup firm financing meant that private difficulties were made public; the reputation of both the **shokokai** and the township itself depended on the success of the local manufacturers. To avoid these individual and collective problems, the **shokokai** administered two programs, a "Bankruptcy Prevention Fund" [**Tosan boshi shikkin**] and a "Factory Conversion Fund" [**Kojo iten shikkin**].⁴⁰ Both of these emergency funds are supported by the national and prefectural governments, although the township itself also makes a contribution.

The Bankruptcy Fund was designed for smaller firms whose debt, particularly in the early startup period, was especially high relative to income. For these companies, short term order interruptions are catastrophic; the Fund provided for temporary payments to cover investments until orders recover. The Fund also guaranteed payment to both equipment suppliers and subcontractors, assuring creditors that a troubled firm would be able to meet contracted obligations. In this way, the **shokokai** could cushion vulnerable firms from adverse market shifts.

In fact, bankruptcy rates among firms with high equipment investments were very low in Japan. Statistics on bankruptcy are somewhat unreliable because many 'firms' such as food vendors fail without filing, while others shift operations or move into other fields as business fails but are counted as bankrupt. Nevertheless, although small firm startup failure was high, for firms like those in Sakaki regional protection funds tended to prevent outright bankruptcy, preserving continuity between equipment suppliers, parts orders and the subcontractors. Thus, of the 20,841 firms

that went bankrupt in Japan in 1984, only 25% were in the "Metal Industries" that include general machining, electronics, transportation and precision equipment, or fields that accounted for the bulk of Japanese manufacturing. For firms in these sectors, investments were higher and were protected more fully by local funds. Or, viewed another way, bankruptcies involving firms that had more than \$50,000 worth of assets, the lowest possible cost for a single NC tool and excluding land or other equipment, amounted to less than 10% of total failures in all industries. In contrast, independent construction contractors, a miniscule field compared to the share of the economy generated by the metal industries accounted for 31% of all failures, and service industries generally produced 50% of Japanese bankruptcies.⁴¹ What these statistics show is that startup firms with large equipment costs are supported heavily, reducing the possibility of failure due to temporary market reversals.

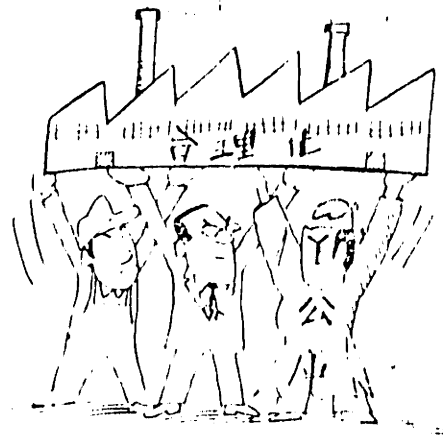
Supplementing bankruptcy support is conversion assistance. The supply of funds for transforming equipment to meet new needs first grew out of MITI's efforts to induce small businesses to merge and form larger ones. But, over time, the local administration of the law led to a different function; conversion monies were used to bail out manufacturers that had guessed wrong about certain markets and make it possible for them to move to more promising areas. In Sakaki, a battered company can receive loans under this program for up to five years. Together with bankruptcy prevention funds, the conversion funds further buffer firms from market shifts.

Indeed, bankruptcy is so rare in Sakaki that no one at the **shokokai** could remember its having occurred. Declines in firm numbers were always explained by movements to other districts, typically for lack of land.⁴²

What **shokokai** policies accomplished, then, was a systematic application of resources that enabled firms to enter independent production, and then to stay in business once established. Its efforts were important in the extension of NC or other advanced production technology in the township. Without the **shokokai**'s skillful manipulation of various loan sources, firms might not have been able to introduce the new technology. Absent efforts to educate operators as to how the new tools might be used, NC machines might have become an expensive millstone about the township's neck. And finally, if measures were not taken to ensure that startup firms not be wiped out by the first economic dip to come their way, the "Sakaki Dream" would have been less sweet and much shorter, ending when bankruptcies soured the attitudes of both equipment suppliers and contractors towards the township.

That locally administered financial assistance for equipment purchases makes possible machinery sales to small enterprises is explicitly recognized by Japanese machine tool firms, often in a humorous way. The machine tool industry **gyokai** publishes an annual pamphlet entitled, "Guide to Obtaining a Machine Tool" [**Kosaku Kikai Konyu no Tebiki**], subtitled "All About Equipment Rationalization" [**Setsubi Gorika no Osusume**].⁴³ Reflecting the market strength of small business in Japan, the booklet is almost entirely geared towards small scale purchasers. It makes no mention of private financing; instead the entire document lists public sources of assistance, together with addresses and telephone numbers of local administrators all over Japan. In case a prospective buyer

should not get the point, the booklet is filled with cartoons. One shows a manager, a worker and a samurai, holding aloft a small factory beneath the phrase "rationalization." The samurai bears the inscription



"public funds" [koko] and his face is shaped like the yen (¥) character.⁴⁴ Another shows a man just waking up in the morning, his head shaped like a factory. He is stretching as though weak and tired. On a table nearby is a vial

of tonic medicine bearing the label, "National, City, Town and Prefectural finance;" drinking from the vial will lead, the cartoon suggests, to the "strengthening of enterprise quality."⁴⁵ Few illustrations suggest with more clarity how Japanese tool makers and small business clients view state financing.



As the above example drawn from the national machinery **gyokai** implies, intensive government equipment assistance is not limited to Sakaki. The same pattern has been well documented for other areas of Nagano Prefecture. Even in the 1960s, when standard equipment startup costs were not high for metals manufacturers, Kiyonari, writing about Suwa, a large town in Nagano Prefecture, showed that localities would supplement personal savings so that needed machinery could be purchased or leased. Since most new firms were housed in a room of an existing home or an addition to the lot, most entrepreneurs could open small manufacturing enterprises in Suwa without incurring expenses beyond their savings.⁴⁶

Then, Ikeda, in his study of Nagano's Ueda and Maruko townships showed that in the 1970s and 1980s the introduction of new, expensive computer equipment into small 1-4 employee-sized firms was conditioned on government support. He documented 10 instances of NC diffusion; in every case almost the entire cost of NC introduction was defrayed through government aid. Ikeda concluded that only special Japanese public capital assistance programs permitted the high-tech factory revolution in small scale enterprises :

...An NC lathe costs about [\$60,000] and a machining center costs between [\$60,000] and [\$165,000]. Consequently, it is impossible for very small enterprises which rely on family labor to obtain this machinery through normal channels. As a result the vast majority of these firms obtain their capital by utilizing such funds as the National Small and Medium Enterprise Equipment Modernization Fund, the Small and Medium Enterprise Equipment Loan System or local lending assistance, the City, Town and Village Small and Medium Enterprise Promotion Fund or the Equipment Fund of the People's Finance Corporation. Moreover, many of the firms are part time farmers, and members of Agricultural Cooperative Unions, so there are cases where equipment purchases were funded by money from this institution. Thus, Japan's small and medium enterprise finance system is much more extensive than in the US or Europe. This is especially true of equipment modernization funds which firms may rely on through a variety of national, regional, and local programs. Consequently, even in the case of extremely small firms that have amassed no capital of their own whatsoever, obtaining very expensive machinery becomes possible...By using these public financial organs, most very small firms can rely on loans to obtain NC equipment. Their reliance on personal funds approaches zero.⁴⁷

The experience of machinery firms in Nagano Prefecture represents a common state of affairs throughout Japan.

This simple catalog of the **shokokai's** activities may suggest that the local government has a tremendous degree of power in contrast to the national bureaucracy in terms of actually affecting industrial change.

Where MITI struggled for decades without results, it may appear that local officials are much more effective in shaping industrial change, if on a smaller scale. But in fact the **shokokai** is limited in its authority, and in its independence by a number of factors. First is the simple fact that the **shokokai** sees its role and is expected to act as the agent of the region it represents. Should the local bureaucrats begin to apply investment or industrial policies in a way that ran counter to what factory owners in the locality sought, there can be little doubt that local politicians would strongly petition the prefecture for their removal. The fact that this conflict rarely erupts suggests the degree of congruence between local industrial needs and **shokokai** initiatives.

Next, though the **shokokai** is a contact point for banking and government funding sources, its potential to stifle competition or market entry is reduced by a number of compensating circumstances. While the extent of state startup support is particularly pronounced in Sakaki due to the high degree of NC equipment and the lack of alternative investment sources, for Japan as a whole the percentage of manufacturers that rely on state aid is much lower; about 30-40% are entirely self-financed. In these cases the **shokokai** would be more or less irrelevant to the way firms enter the market and hence its latent ability to regulate regional development would be undercut. This is precisely the same constraint that we saw at work in the efforts of MITI and the **gyokai** in trying to coordinate machinery production in the face of "outsider" firms.

Another factor is that existing manufacturers supply the criteria and judgement that go into a loan application determination, and are the source of the overall market vision the local bureaucrats employ. The **shokokai** relies on local firms to assess whether an applicant should receive support;

it depends on the insight of local industrialists to maintain its own record of successful review. This is particularly important since the single most telling item in an application is the existence of solid contracts after startup. In the huge majority of cases, a prospective applicant obtains its first orders through an existing company, usually one in which the operator was an employee. As we shall see below, there are incentives in the regional system for firms to support new startups by their workers. But this means that the **shokokai** is usually in the position of asking local firms to assess the merits of an application that they themselves are already backing. This further undercuts the **shokokai**'s independent authority.

In practice it is very difficult to assess the relations between the **shokokai** and the local firms. Each side will tend to take most of the credit for industrial successes while downplaying the contribution of the other. Further, in field interviews, perhaps especially in Japan, it is very hard to delve into possible resentments or conflicts that individual bureaucrats or factory owners might have experienced. The general sense is that the **shokokai** and local company managers view themselves as part of a single team competing for resources against other prefectural and national groups. And, as we have indicated above, both groups are mutually dependent on the other, a fact which seems to ensure that potential conflicts are avoided as much as possible.

But in any case, the **shokokai**'s activities can only explain part of the reason why Sakaki's companies were able to grow as fast as they did: the extension of financial support cannot tell us anything about why the township's manufacturers moved into machinery sectors; nor can it account for the massive introduction of NC machine tools into an isolated mountain

hamlet. Monetary assistance alone cannot guarantee the growth of a high tech small scale manufacturing region. In an economy in which giant enterprises interact with extremely small ones to generate final goods, some means of controlling wage and profit sweating needs to be established to protect flexible firms. To see how Sakaki developed such a mechanism, which transformed it from a well financed collection of independent factories into what can be properly called a manufacturing community we must look at the strategies of the firms themselves. We will see that NC tools were not only attractive in response to production problems but were also bound up in the restraint of spiraling wage or profit pressures that would have destroyed the emergence of high tech manufacturers.

Regionalism and the Small Firm in Sakaki

It has been suggested by Kiyonari, Nakamura and others that the desire to be independent dominates the thinking of small businesses in Japan; interviews with individuals working with small manufacturers like those in the Sakaki **shokokai**, officials of the People's Finance Corporation in Tokyo and small business scholars/ political spokesmen overwhelmingly state that this is so. While assessing this claim remains difficult in general, it is undeniably true of Sakaki. Indeed, in discussions managers in Sakaki speak of little else. Even the smallest of startup firms in Sakaki dreams of achieving the status of the complete products assemblers like Soar or Nakajima which command world markets with unique products.

Startup companies are motivated by a picture of an idealized development path that helps define their strategies so they can move towards complete independence. In its basic form, the dream begins with

diversification away from *single product* manufacture, then involves integration of various technologies to become an *assembled* parts supplier. The final step is seen as the extension of assembly and technical expertise into new markets as the firm offers complete or *finished goods* appealing to unique tastes.

In their everyday activities most startup firms in Sakaki operate within the parameters of the first stage, diversification. In interviews, every manager was keenly aware of the danger of becoming a single part supplier to a single firm or industry.⁴⁸ These circumstances, they argued, put the subcontractor in the position of total reliance on the parts contractor, leading to both uncertain orders and price squeezes. The contractor could claim that market reversals force it to cut back on business, while also demanding cheaper parts to boost demand. Thus, even in the rare case where a Sakaki manufacturer is locked into one good and one buyer, as with a family operation built on a former farm which made bumper parts for a backhoe, the operators will wistfully describe how they would like to diversify.⁴⁹ And some firms learned to diversify through painful experience; in another family firm case, an owner of four NC lathes failed after the first oil shock (1973) when business in autos, his only field of production, fell. After assistance from the **shokokai**, he diversified extensively; his small workshop, run with help from his wife, now makes construction equipment parts, cylinders, aircraft parts, oil pressure gauges and agricultural implements.⁵⁰

This kind of diversification is the norm in Sakaki. In one company, half of a small (20 employee) factory was dedicated to making dies or molds on electric spark discharge milling machines for auto use, while the other half was taken up with NC plastic moulding equipment for cameras. In

another, a firm of just 5 people made floppy disk drive parts, keyboards and light fiber casings in the small workshop below their home. Still others tried to combine major work in gear cases or auto parts with specialty machining for electronics or computers. All firms appear to watch carefully developing industries like robotics, or advanced electronics to determine if opportunities exist for new production.

Diversification has a number of benefits. It prevents reliance on a single industry so that if a slump should hit one field, another might carry the firm. It also helps to reduce price pressure by making it feasible to decline work orders from particularly heavy-handed contractors. Finally, firms that experiment with new goods are able to learn to integrate technologies into new products; the biggest trend in Japan is for parts suppliers to become partially finished goods makers, responsible not only for a piece of a product, but for the assembly of an entire portion. For a firm seeking to eventually define its own product niche, moving up to complex mixed production is an essential step.

But moving into new fields is not easy. If machinery is attuned to, say, turning auto parts, it cannot be easily converted to making camera shutters. Nor can workers trained to make one type of product rapidly learn to make another; a learning period is necessary. A firm might invest in additional equipment, but operating the new tools would take personnel away from primary production, putting established work at risk. Further, while new work was being drummed up, it would be difficult to justify new equipment purchases; contractors would be unlikely to place a full order at first, preferring to see how a single lot came out before committing itself to a new subcontractor. The prospective subcontractor then would not only

face a problem of investment risk, it might also lose possible orders because it could not meet the quality standards of its prospective client.

Historically, in an effort to solve these problems and increase flexibility, Sakaki's firms established a system of cooperation to enable them to bid competitively on new work. Now, "cooperation" is an oft-repeated theme in Japanese studies of Sakaki, and in Japanese economic analysis in general. The **shokokai** will give visitors glowing accounts of how leaders of various firms offer technical assistance to smaller companies, and how after work blue and white collar staff will meet and discuss production problems in restaurants or **nomiya** (neighborhood bars.)⁵¹ Prefectural reports even tie this supposed spirit of cooperation to ancient traditions forged during planting or harvest times.⁵² And, of course, a welter of material suggests that Japanese "harmony" might account for economic success by fostering joint efforts by labor, management and government.

In fact, Sakaki's cooperative spirit is limited. When interviewed, all company managers without exception denied that they received any technical help from other firms, or that they met with fellow manufacturers at all, at times with a vehemence that embarrassed observing **shokokai** officials. Others indicated that they competed strongly against other firms, using them as yardsticks to measure performance.⁵³ Statistical indicators back up the claims made by the managers; for instance, one survey of the extent to which Sakaki firms were "cooperating" in the development of joint ventures or research showed a "yes" response of only 5%, and a strongly negative response of 75%.⁵⁴ Clearly, "cooperation" in Sakaki is much more circumscribed than officials suggest.

Yet, the same managers who seem to treat insinuations of joint activity as a direct insult to their abilities readily acknowledge that they frequently used other companies' machines to meet production deadlines or to make products that were impossible on their own equipment. The use of equipment owned by other firms was widespread.⁵⁵ The difference between this form of cooperation and joint ventures is that in sharing machines, planning, bidding and ultimate responsibility for production rested only with the manager of the firm holding the original contract; the assisting firm often contributed nothing but equipment.

The free sharing of machinery had important ramifications in manufacturing in Sakaki. First, it helped to eliminate barriers to diversification. In order to expand business, a firm would bid for work that it might not have had the capacity or even technical ability to produce. But by relying on neighbor firms, the bidding company could confidently accept an order. If attention to new products were to cut into time necessary for meeting previously contracted production deadlines, the firm could achieve its objectives by borrowing a neighbor's lathe or mill. Or, if new products required new techniques, a friend's tooling and expertise might solve the problem. Thus, the first step along the path towards independence, diversification became a matter of mutual cooperation in the use of equipment or manpower.

This development had a second effect. As the limited cooperation production system grew in Sakaki, NC tools emerged as the mainstay of the township's production equipment. Indeed, NC equipment in Japan might have been invented with Sakaki in mind. Their programmability avoided the problems of buying new equipment to meet different product needs; by reprogramming, radically different cutting patterns for a wide range of

materials could be achieved. Further, once programmed an NC tool could work automatically, which spared scarce employees for other tasks. At the same time, by increasing productivity, NC tools could alleviate some of the cost pressures involved in diversification. Increased accuracy also meant that a producer could cut down on waste while pleasing clients through constructing higher quality goods. Finally, NC tools were ideal for cooperative production. Instead of spending costly time setting up and calibrating a neighbor's general purpose lathe or mill to make the balance of parts due under a contract, all a manager had to do was hop in a truck with a cutting path tape and raw materials, drive next door, and immediately produce goods to specifications. NC tools provided flexibility within cost tolerances while enhancing the crucial cooperative production arrangements essential to Sakaki's survival.

A third effect was the gradual redefinition of the way contractors perceived their relationship with the township. Large firms outside the region came to realize that an order with one of Sakaki's manufacturers was actually guaranteed by the whole network of factories that could be called in to help in case of trouble. This benefited Sakaki as a whole; an individual firm was strengthened in its bargaining with a potential client because it could assure that contractual requirements would, one way or another, be met. **Shokokai** officials state that among contractors in Japan the township came to be known as "Sakaki Inc." a parody of the more famous phrase.⁵⁶

Further, the attitude of contractors and Sakaki's future growth strategies led to increased reliance on NC tooling. Because NC tools came to be perceived as part of the Sakaki system by both contractors and local factory managers, a company had to have an NC machine merely to be

considered for contracts; without one, it was viewed as isolated or backward. Everyone was aware that a firm with an NC tool could utilize other equipment to meet contracts. Thus, to stimulate orders, even companies that did not really need additional flexibility or accuracy rushed to obtain computerized machine tools. Indeed, many **shokokai** officials lamented that expensive equipment, involving large public loans, was often introduced into factories or workshops without any compelling technical reason.⁵⁷ Firms purchased the equipment and then found out if it was useful or not. Sometimes, the manager never became comfortable with the new equipment; in one family firm the owner, working hard over an old standard lathe while a brand new NC mill stood nearby producing only trivial parts, was asked why he bought the NC unit. He smiled sheepishly and said, wistfully, "I wonder...;" later, the owner pointed out that having an NC machine was important to attract business even if it was under-utilized.⁵⁸

A fourth and perhaps most important result of the cooperative production arrangements was that they fostered an identification of group welfare with individual advancement, an idea that helped prevent downward price or wage squeezing in Sakaki. This is not to say that price pressures were not a factor in production contracts. The economic slowdown after the oil crises led to a well publicized "cost down" [**cosuto-down**] campaign throughout the Japanese economy, and it was one reason why NC tools were avidly sought in Sakaki. But surveys of the township's manufacturers focusing on management concerns consistently show that cutting costs was only one of several problems identified. According to survey statistics, it was dwarfed in importance by "increasing parts quality" and roughly tied with "retaining and educating employees, "moving into new fields" and "developing new products or technology."⁵⁹ Any manufacturing operation will

be required to reduce costs, but in Sakaki this concern was not of primary importance and did not extend to the point of sweating labor or profits.

The reason why the township's subcontractors could avoid excessive cost demands from huge contractors is that cooperative production arrangements make the terms proposed in any individual contract negotiations into a regional matter. Viewed from the perspective of a subcontractor seeking work, even the smallest company could resist pressures from the largest firm in Japan by threatening to cut off its access to all of Sakaki. As one operator put it, "we don't tolerate any excessive pressure to cut back our prices to get work. We tell our clients that. And if any company tried to get away with it, we wouldn't work for them. Nor would anyone else around here [in Sakaki]."⁶⁰ The threat, moreover, was not a bluff: the image of "Sakaki Inc." was earned because manufacturers in the township could, and would engage in collective action to defend itself.

What underpins this resolve is the keen awareness that letting a price breaker into Sakaki would devastate the financial and strategic positions of the township's firms. Financially, most companies carry huge equipment debt loads (due to NC purchases) that they need a reasonable capital return to pay off. They can obtain this return only if they can bid for contracts at fair prices. But their bidding strength is partially supported by the ability to use other firms' machinery, and partially by a collective resolve to resist cost squeezes. If a price war erupted, the cooperative structure would vanish leading to a downward spiral of wages and profits. Companies would become insolvent, shrinking the pool of machinery available for use, forcing firms to compete on cost grounds and leading to a decline in Sakaki's reputation. Firms would have to abandon

their dreams of independence and would have to move from high technology production to sweating to obtain orders. The collective manufacturing system that makes it possible for Sakaki's small firms to make a living while pursuing the dream of complete product independence would fall apart.

All of these incentives towards collective repudiation of price pressures are intensified by the labor effects of the cooperative production system. Indeed, Sakaki developed a way of subcontracting that can be accurately called a *system* in that each component of the manufacturing process, from negotiation to final delivery was affected and ultimately defined by another part. Just as equipment, pricing and production strategies have become so intertwined that they appear as a seamless web in which each part supports the whole, so too did labor management become linked to high wages, high skill and NC tooling.

Because NC tools are generally thought to be labor saving devices due to automation, it is a curious fact that their introduction in hamlets like Sakaki was welcomed by blue collar workers and helped support their high wage rates. The reason is that Sakaki's employees, especially in smaller firms took employment with the expectation of independence, or at least an eventual managerial appointment. These goals meant that they had to be trained on the best equipment and in a variety of tasks. This led to the introduction of NC machine tools in Japan as a recruiting aid; as one writer, a former machinist recalled a factory operator lamenting, "If I don't install NC machine tools, workers won't come."⁶¹

This might be a cruel joke if it turned out that blue collar employees actively sought the installation of equipment that would automate the factory, leading eventually to lower skills and unemployment. But under

the system in effect in Sakaki, NC machinery actually enhanced wages by reducing price pressures. Firms could afford to pay higher wages, and they did. Moreover, the redirection of competition away from price toward product quality or uniqueness required that the workforce be extensively trained to meet a wide variety of demands. The labor-replacement potential of NC tools was subordinated to their use in making a rapidly changing, technically innovative line of products manned by highly skilled operators.

Thus, throughout the township nearly all the workers in a small firm including wives or daughters could operate any of the machines. Furthermore the majority of the workforce could enter cutting instructions via the cathode ray tube interface attached to most NC tools. Programming via tape, which involves a special punching machine, or the making of computerized cutting routines was a bit more restricted, and there was some variance among different factories. A typical case would be a firm of six employees, three of whom could create digitized programs on tape and three who could not. Sometimes, all of the workers were trained to program in the most sophisticated manner, and a company would have a special programming room in which young workers could experiment with different ideas. In other cases, the owner would be the primary programmer.⁶²

The attempts to promote high skill in the workforce are not unique to Sakaki. As we have seen in Chapter Four, Koike has argued that for Japanese small firms in general most employees are trained so that they can perform all or most of the tasks production requires. Flexibility demands a broadly skilled workforce, even where products appear at face value to be standardized as with bearing manufacturers.⁶³ Of course, where

firms seeking diversification make unrelated products, the management rationale behind training workers for high skill in small factories becomes even more clear. Furthermore, the desire of small firm employees to obtain complete training in a tight labor market led to the promise of wide experience in the factory to recruit blue collar staff.

NC tooling thus enhanced skill. It also increased the ability to pay high wages. Price pressures were reduced in Sakaki through the collective action of the township's manufacturers. This in turn was aided by NC machinery which made equipment sharing easier, and parts production more accurate. Indeed, the presence of NC equipment even brought work to the township as contractors sought both higher quality and reliable delivery. Again, equipment and strategy reinforced each other in the Sakaki system.

Sakaki shows how the financial resources directed at small firms after the 1950s produced hamlets of sophisticated manufacturers in Japan. It also illustrates how NC machine tools fit into the system, suggesting why Japanese machinery makers had a market for small, low cost equipment that led to their international success. Inter-firm cooperation in machinery utilization protected companies against sweating while the local government adeptly administered monetary, technical and marketing assistance for manufacturers in its area. Gradually, two important requirements for the emergence of high tech small scale producers were met, availability of finance, and reduction of price and wage squeezing.

Sakaki's experiences re-enforce our findings in Chapter Four by showing how high tech manufacturing in small firms could emerge in a concrete case. What is striking about the township, and about other regions like it is not the actual details of what the **skokokai** did or what the criteria for small firm support were but rather the fact that any of this

kind of activity went on at all. In the conventional view, the notion that some of the most sophisticated factories in Japan grew out of regional initiatives involving one or two person enterprises in remote mountain hamlets would be unthinkable. Indeed, the idea that smaller firms contributed more than a cushion to the larger ones is not readily acceptable under either the dual structure or the centralization thesis. But what we have seen in Sakaki is that the same general contextual factors that led to modern flexible manufacturing firms in postwar Japan played themselves out in even the most unlikely settings--villages that in other countries would not have a chance of becoming industrially significant regions. The details of how regions operate in Japan, then, must not obscure the most telling point: it is miraculous enough that debates about and policies to effect funding for rural or urban small factories to buy NC tools actually took place at all.

In more or less similar ways, the pattern in Sakaki was repeated throughout Nagano Prefecture and Japan. Individual regions varied, of course, in the degree to which local authorities were able to direct funds to prospective new firms, and in the extent to which companies were able to coordinate against cost reductions. In some locations, price squeezing did emerge and patterns consistent with the dual structure argument were the norm. Moreover, urban areas, involving many more firms with more direct ties to large contractors may have developed solutions less effective than in Sakaki. But the many famous small machinery hamlets in the **Kansai** and **Kanto** regions are evidence that the Sakaki model is not confined to rural cases; overall trends towards independence, technical skill and government support as shown in Chapter Four indicate that the same kind of industrial outcome has occurred in even the largest metropolitan areas. Collectively,

urban and rural industrial hamlets changed the shape of Japanese manufacturing, leading towards a decentralized economy of great flexibility. In Chapter Six, we will examine what this conclusion means for our interpretation of Japan's NC tooling successes, for Japanese political economic studies, and for our understanding of other national cases of industrial development.

¹See the discussion in Piore and Sabel, (1983) **op cit.** for a treatment of the Italian case which highlights regional associations of smaller factories.

²**ibid.**

³A general account of Sakaki in English can be read in **Far Eastern Economic Review**, "Silkworms First, Then Showhorns and Now Robots" December 20, 1984 pp 70-71; Also a more extensive review in Japanese is "*Semai Dotchi, Seikodanbane ni*" [Small Area, But It Has Become a Hot Topic of Success] in **Shino Mainitchi Shimbun**, September 12, 1984 page 6.

⁴I am indebted to the Director of the Survey Division of the People's Finance Corp., Ida Shoni(?) for this observation, interview, December 10, 1984.

⁵The famous *Obastuteyama* fairy tale, literally, "Grandmother-throw away-mountain" is the best example; in the story, one young man defies the tradition of leaving elderly relatives on barren slopes to die to preserve food supplies.

⁶Materials describing the conquest of the central range may be found in Hida Takayama's Minkan-en, historical village park, Japan.

⁷c.f. "Silkworms First", **op cit.**; "*Semai Dotchi*" **op cit.**

⁸From an interview with a Sakaki **Shokokai** official, Uchiyama Norito (?) December 18-19, 1984.

⁹The best account is a study of Sakaki by the *Naganoken Chushokigyo Sogoshidojo* [The Nagano Prefecture General Bureau for Assisting Small and Medium Enterprises] **Sakaki Matchi Kikai Kogyo Sanchi Shindan Hokokusho**, [Report of the Study of the Sakaki Township's Regional Machinery Industry] (Secret document provided to the author by the Sakaki **Shokokai**, 1983, pages 1-3.

¹⁰Japanese data from *Nihon no Kogyo Tokei*, **op cit.**; US data from **Census of Manufactures**, **op cit.**

¹¹**ibid.**

¹²See "*Semai Dotchi, Seikodanbane ni*" **op cit.**; material on Soar was from company interview, December 18, 1984.

¹³Relative rankings are from materials provided by the **Shokokai**, "*Naganoken Kogyo Joi Ranking*" [Top Ranking Industries in Nagano Prefecture], 1983. Tax data is from Uchiyama interview, December 18, 1984.

¹⁴From materials provided by the **Shokokai**, "*Naganoken Kogyo Joi Rankingu*" [Top Ranking Industries in Nagano Prefecture], 1983.

¹⁵*Sakaki Matchi Kikai Kogyo Sanchi Shindan Hokokusho*, **op cit.**, pages 1-3.

¹⁶**ibid.**

¹⁷**ibid.**, page 3.

¹⁸Interview, Uchiyama, **op cit.**

¹⁹**ibid.**, page 4.

²⁰**ibid.**, pages 24-26.

²¹**ibid.**

²²**ibid.**

²³"*Semai Dotchi, Seikodanbane ni*" **op cit.**

²⁴In these cases supervision is vested in an urban institution called the **ku**; Greater Tokyo, for instance, is made up of some 28 **ku**, which are something like a board of supervisors of city council.

²⁵Uchiyama, **op cit.**

²⁶Uchiyama, **op cit.**

²⁷Uchiyama, **op cit.**

²⁸Uchiyama, **op cit.**

²⁹*Sakaki Matchi Shokokai, Chusho Kigyo Kinyu no Shiori* [Finance for Small and Medium Enterprises] 1984.

³⁰Uchiyama, **op cit.**

³¹Uchiyama, **op cit.**

³²Uchiyama, **op cit.**

³³Uchiyama, **op cit.**

³⁴"*Semai Dotchi*," **op cit.** (It should be noted that this statement was presented as a joke because it suggested the possibility that foreigners were no different from **kanto** inhabitants.)

³⁵Uchiyama, **op cit.**

³⁶Uchiyama, **op cit.**

³⁷Data on classes from *Sakaki Shokokai, Hai Teku Jidai ni Kotaeru*, [Adjusting to the High Tech Era] 1984.

³⁸Between December 18-19 the author visited 10 small manufacturers in Sakaki and conducted interviews.

³⁹Interviews, machine tool firms and Sakaki manufacturers.

- 40 *Sakaki Shokokai, Shokogyo Shinko no Shiori*, [Programs for the Promotion of Commerce and Manufacturing] 1984.
- 41 Bankruptcy statistics in Japan are best compiled by Tokyo Shoko Research, "*Gurafu de Miru Tosan*" [Bankruptcies as Presented in Graph Form]; statistics here from the December, 1984 edition.
- 42 Interviews, December 18-19, **Shokokai**.
- 43 JMTBA, *Kosaku Kikai Konyu no Tebiki: Setsubi Gorika no Osusume* [Guide to Obtaining a Machine Tool: All About Equipment Rationalization] October 1984.
- 44 **ibid.**, page 17.
- 45 **ibid.**, page 5.
- 46 Kiyonari Tadao, *Chiki no Henkaku to Chusho Kigyo*, (Shita) [The Regional Revolution and Small and Medium Enterprises, Vol. II] (Tokyo: Nihon Keizai Hyoron, 1975) pages 205-207.
- 47 Ikeda Seiryu " *Sho-reisai Kigyo no ME-ka* " [The "Mechatronization" of Small and Very Small Enterprises] in People's Finance Corp, *Chosa Geppo* [Survey Monthly], November, 1984, No. 283. pages 19-21.
- 48 Factory Interviews, Sakaki, December 18-19.
- 49 Interviews, **op cit.**
- 50 **ibid.**
- 51 Shokokai interviews, **op cit.**
- 52 *Sakaki Matchi Kikai Kogyo Sanchi Shindan Hokokusho*, **op cit.**, page 4.
- 53 Company interviews, **op cit.**
- 54 *Sakaki Matchi Kikai Kogyo Sanchi Shindan Hokokusho*, **op cit.**, page 37.
- 55 Company Interviews, **op cit.**
- 56 Shokokai interviews, **op cit.**
- 57 Shokokai interviews, **op cit.**
- 58 Company Interviews, **op cit.**
- 59 *Sakaki Matchi Kikai Kogyo Sanchi Shindan Hokokusho*, **op cit.**, page 14.
- 60 Company interviews, **op cit.**
- 61 See Mori Kiyo *Matchi Kojo* [Village Factories] (Tokyo: Keizai Hyoron, 1982) pages 61-91 for an account of NC introduction in the eyes of a professional small firm technical employee.
- 62 Company NC utilization strategies from company interviews, **op cit.**
- 63 Koike, **op cit.**, pages 98-113.

Chapter Six

The Hybrid Economy and Industrial Development

In this concluding chapter we will show how the expansion of flexible production in Japan directly affected the growth of the NC machine tool market and greatly aided in postwar Japanese economic successes. Indeed, it was the development of the hybrid industrial system, in which flexible firms were interdependent with mass producers that constitutes the real "miracle" in Japan. To make this argument, we will first discuss the expansion of the NC machinery market from the perspective of the contextual theory of industrial growth and show how rejecting conventional wisdom enables us to account more consistently for the way machinery producers expanded. We will then compare Japanese experiences with those of American producers, highlighting the divergence between the two national cases as a function of the background factors that shaped them. Next, we will present a more general contrast between the U.S. and Japan to illustrate how the Japanese hybrid economy differs systematically from the American industrial system; we shall see that Japan is best understood as a case of divergent development, rather than an example of a superefficient perfection of the mass production model. Finally, we will discuss the importance of these findings for our picture of Japan, of the U.S., and theories of economic change in general.

NC Machinery in Japan and America

Our study of the machinery industry and the nature of the flexible economy in Japan has required us to challenge almost every major claim of conventional thought. First is the idea that the bureaucracy was able to direct Japanese machinery producers towards centralized economies of scale. As we saw in Chapters Two and Three, from the late 1920s to the present bureaucratic regulation was manifestly ineffective, never once correlating remotely with market outcomes nor leading to industrial changes as the MCI or MITI sought. Indeed, we saw that the bureaucracy could not actually "plan" at all; MITI's ideas were for the most part merely recitations of market trends defined by the "regulated" firms on their own and were not backed with effective compliance powers. This ineffectiveness was particularly marked in the period of NC expansion, from the late 1960s onwards, as even the futile "cartel" episode and **gyokai** sponsored market control schemes crumbled. It is extremely hard to argue that the bureaucracy led to NC developments since its capital assistance was trivial, its reorganization schemes ignored, and its technical plans utterly derived from what companies were already doing in the market. Although MITI desperately wanted to control the machinery industry, it was never able to do so.

Nor can we interpret NC market advances as a function of centralized activity controlled by other actors such as the **gyokai**. Like the bureaucracy, we found that the **gyokai** frequently tried to limit market entry and control production to achieve economies of scale. But its efforts were also unsuccessful; firms exhibited dramatic market shifts even in the few areas of production that were supposed to be controlled, and most of the growth markets were explicitly exempted from restraint agreements, as in the case of the 5%-20% discussed in Chapter Three. Outsider firms

further weakened whatever trend there was to regulate expansion. A measure of the ineffectiveness of the **gyokai** control effort is gained from historical growth in machine tool firms: between 1957, when the **gyokai** first attempted to implement a market stabilization measure, and 1982, the number of Japanese machine tool firms increased 633% from 303 companies to 1,918.¹

These analytical errors in evaluating what industrial actors actually achieved in Japan and in assessing the link between their efforts and real market changes are further compounded by errors of omission. Conventional perspectives leave unexplained the most dramatic feature of NC market developments, the fact that Japanese products were smaller and built for general purpose use by smaller factories while American machines were large equipment intended for specific tasks in huge enterprises. If Japan had "forged ahead" of the US, we should expect to see it produce the same kinds of products but at less cost, or perhaps to have improved basic designs to make them more efficient. But instead Japanese machinery firms concentrated on a market segment that, as we will see, American manufacturers for the most part wholly ignored. Japanese successes were achieved not through comparative cost reductions--their products may have been less expensive, but they were also much smaller than the NC tools in America--or through the perfection of a single type of machinery, but by opening up entirely new markets. This strategy does not make sense in the centralization hypothesis.

But we can account for NC machinery developments if we step back from the conviction that Japanese successes must be due to advances in mass production achieved through central direction and take another look at the evidence from a fresh perspective. As we argued in the Introduction, an

alternative theoretical framework would be that contextual variance between industrial cases could actually lead to divergence from mass production depending on the extent to which the flexible option was nurtured. If we think about Japan with this possibility in mind, a novel view of the country's industrial structure and of its competitive strengths may be obtained that makes better sense of markets, industrial transformations and international trade successes than the conventional argument. Large and small firm relations, market shifts, public equipment financing for small factories and the growth of regionalism converged in Japan to produce a hybrid industrial system: sophisticated, flexible manufacturers of high quality goods played a much larger role in the economy as compared to the U.S. cases. The expansion of flexible practices, in both large and small firms, moderated mass production and led to a large sector of firms that had continuous production developments as its basic operating strategy. Our claim is that by interpreting the Japanese economy in this way, we can account for Japan's NC market successes in particular and the country's more general postwar miracle.

Let us first consider how the historical transformation of the economy and the re-emergence of flexible producers after the 1950s affected *demand* for machinery in Japan as compared to America, leading to the development of unique NC products. The growth of a vibrant sector of both flexible small factories and smaller units within larger firms created an extremely strong market for inexpensive, general purpose NC tooling. Such equipment, we saw in Chapter Five, was especially suited for the production strategies and inter-firm cooperation pursued by Japanese small scale manufacturers. NC tools were reprogrammable, providing the owner with the general purpose flexibility needed for continuous product

development; they were also highly accurate, enhancing quality while providing even the smallest family operation with the ability to make extremely sophisticated goods. Furthermore the regionally organized practice of sharing machinery to advance into new markets and reduce large firm pressures could be more effectively carried out through the use of NC tooling; by taking a cutting tape to neighboring companies, a smaller factory could rapidly produce parts to specifications.

Developments in financing the equipment needs of these flexible firms, especially the smaller startup operations, made it possible for potential users to actually purchase the equipment they sought. As we saw in Sakaki, even the smallest flexible factories could afford NC equipment because the state provided financing; the **shokokai** or other regional authorities administered various programs so that local firms could upgrade their equipment. This eventually led to a cycle of small enterprise NC demand: smaller factories required NC equipment to operate as independent high-tech manufacturers. The fact that capital was available for equipment purchases promoted the movement of workers into self-managed companies; demand for smaller NC tooling rose. The fact that flexible producers were so developed in the Japanese hybrid economy meant that there was a clear and growing market for a new type of general purpose NC tool which machinery manufacturers explicitly sought to serve.

Let us contrast this to the American case. U.S. manufacturers operated in a market, as we shall see, in which neither the dominant industrial ideology nor actual industrial structure permitted machinery manufacturers to credit seriously the potential of small scale NC demand. From at least the late 19th century, as Hounshell has argued, machinery firms and the military had been engaged in an effort to provide ever more

sophisticated equipment for use in mass production; this effort led to both the intellectual foundation for mass production through the work of individuals like Taylor, and much later in the 1950s was the main force behind the first development of NC tools themselves.² These ideological trends were reinforced by the fact that in America, for reasons we will discuss later, centralized industries led by huge firms engaged in mass production dominated manufacturing; as compared to Japan, prewar measures of American manufacturing concentration were several times higher, and in the postwar ran at about 3-4 times the Japanese rate.³ This was coupled with strong military demand that unlike Japan was explicitly conceived of as a way to enhance mass production techniques through armaments manufacturing advances. American machinery producers naturally saw the larger firms and military contractors as the natural users of sophisticated equipment like NC tools; an attenuated flexible sector in the face of dramatic concentration did not sensitize them to other potential uses for their machinery.

We can see the effects of these influences at work in the structure of demand for NC tooling. U.S. producers made two basic kinds of machinery. One market was for hugely expensive, specialty equipment for military-related enterprises such as aircraft firms or for use by giant private companies engaged in mass production. The construction of this kind of equipment was part of the overall attempt to substitute machinery for labor skill inherent in economies of scale strategies.⁴ American NC tooling developments were mostly confined to this segment; indeed NC machinery research was first sponsored by the military to enhance the ability of private aircraft firms to make specially contoured aircraft wings, thus merging the interests of both the armaments sectors and the huge mass

producers in the economy. At the other extreme was unsophisticated equipment typified by small lathes or Bridgeport mills, general purpose machines for use by job shops whose basic design did not change for decades. The low technical standard of these machines reflected the idea that smaller job shops were retrograde elements in the economy, and thus could use only the most basic, standard equipment. Machinery producers, in treating this market lightly, mass produced these standard machines with essentially no modifications in their design over time.

The dichotomy between a technically sophisticated mass production sector using NC equipment and a much smaller market for general purpose machines reflected the basic divergence between the U.S. and Japanese economies. In America, mass production was a much more significant and a growing component of industry throughout the 20th century; the flexible sector failed to develop as in Japan. Thus, where the Japanese eventually built a conscious appreciation for the dynamism of the smaller scale factories, in America the idea that there could be a technically vibrant though small scale component of the economy never caught hold. Indeed given the extreme centralization and power of mass production throughout the economy, very little in American industrial experience provided a suggestion of the real potential of the flexible option as did regions like Sakaki in Japan. Unlike Japan, there was no pressure to redirect market thinking towards new possibilities.

Thus, the hybrid character of the Japanese manufacturing sectors provided machinery makers with an additional market for NC equipment. As in America, though with a much less strong military component, Japanese machine tool companies also serviced the needs of the mass producers with highly specialized equipment. But at the same time, the smaller factories

that had flourished as the flexible sector grew took up 70% of Japanese NC demand by the 1970s where users in large mass production firms accounted for 75-80% of the U.S. NC market. Japan's product range was thus more diverse than in America. Japanese machinery makers not only learned to build the kinds of tools mass producers required, but they became particularly attuned to the needs of the high-tech, small scale sector. This focus later became the basis for their movement into the U.S. market; the overlooked, latent demand for general purpose NC tooling was exploited skillfully by Japanese machine tool firms just as automakers had earlier proved that there was an untapped market niche for fuel-efficient smaller cars. Divergences in the general economic structure between the U.S. and Japan help account for differences in NC machine tool demand and product development.

Now let us turn to the effects of the hybrid economy as they have influenced the *production* of machine tools in Japan. Here too the general transformations that led to enhanced flexible production in manufacturing industries can be observed in a specific case. However, in one respect the machine tool industry occupies a position in the overall economy which may at first overemphasize the mass production aspect of Japanese production and obscure how flexible principles and operations play an important role. This problem arises from the fact that in an ideal-typical world, the machine tool industry would tend to be organized according to manufacturing principles inversely related to the dominant production strategy in the economy as a whole. In a purely mass production economy, for instance, machinery would be so specialized for single purpose applications that machine tool firms would have to make each tool separately. They would thus be driven of necessity towards craft

production while the rest of the economy engaged in mass production. In contrast, in an economy that was composed only of flexible small firms, machinery demand would focus on the general purpose machines necessary for rapid product shifts; the machinery industry would make *standard* goods that could, at least in theory, be mass produced.

In fact, precisely this sort of inverse relation can be observed in comparing the U.S. and Japan. Many Japanese manufacturers of machine tools have production runs and lot sizes that are from ten to one-hundred times longer than firms in the U.S.⁵ Plants such as Mori Seki's lathe operations in Nara have been featured as examples of "flexible manufacturing systems" (FMS) in studies of the Japanese "miracle;" they are used as proof of Japan's new superiority in mass production since FMS factories are highly automated. In contrast, as we noted above, U.S. firms tend to make highly expensive one of a kind products for the military or larger firms. Viewed from the perspective of these observations, it would appear that mass production is more advanced in the Japanese machine tool industry than in the U.S.

If this were the single differentiating point between American and Japanese machinery production it would sustain our overall argument that both countries differ systematically from each other. Mass production in machine tools is precisely what we would expect to find in an economy that is more influenced by flexible principles; specialist manufacture in the U.S. would follow from the greater degree of mass production in the economy as a whole. The inverse relation between the nature of machinery production and the manufacturing outlook of the firms that make use of machinery would tend to support our general argument by making an exception of the machine tool industry.

However, for a number of reasons the distinctions we have tried to make between Japan as a hybrid economy and the U.S. as much more heavily influenced by mass production are more significantly reflected in the machine tool industry. Indeed, it is somewhat misleading to speak of the NC market as a mass market at all. The total number of Japanese NC machine tools produced in 1983 was 26,398 *units*; in the U.S. about 8,945 units.⁶ If we look at figures in the most prolific NC product segments, NC lathes and NC machining centers, Japanese output was 10,020 and 7,833 respectively in 1983 while the totals were 1,203 and 893 units for America. Even if *one firm* were to have manufactured these products for each country, the total output would fall far below the huge, million unit annual production level associated with economies of scale in industries like automobiles or consumer electronics. But there is the additional feature that Japanese NC producers are much more numerous than in the US; where a handful of firms dominates American manufacturing, Japanese NC markets continue to become more fragmented over time as we saw in Chapter Three--new entrants flooded to promising areas. Thus, actual factory operations, when total production is diluted among the number of firms in production fall even more short of scale economies. Indeed, Mori Seki, the leader in NC lathe output makes just about 2,000 NC units per year. Though this is more than the entire US lathe output, it is nevertheless so small as to qualify as batch or flexible production all by itself. Consider the way an auto firm, for example, would treat the production of a 2,000 unit model: it would be seen as a unique, one of a kind offering made according to craft principles. And, Mori Seki's products are not all standardized; among the 2,000 units it makes are special orders and a variety of smaller and larger sizes. Though Japanese production may appear standardized in comparison

to America, it is not organized according to mass production principles alone.

Furthermore, the attempt to build machines in larger lots is moderated by several factors in Japan. First, firms like Mori Seki only make the most standard parts of their machines through the use of FMS systems or larger production batches. The well publicized Nara factory concentrates on the metal frames that support the machine tool. All of the other parts, the NC controllers, the motors that spin the cutting tools or work pieces, the air pressure motors that actually move the tool to the specifications indicated by the computerized or digitized cutting instructions, and most of the additional specialized gearing or metal components are bought from outside vendors.⁷ Thus, even the producers that are most associated with longer production runs in Japan rely extensively on the same kinds of flexible subcontractors that we have argued were crucial to Japanese successes in general. Mori Seki's operations are the most extreme case of standardization in the industry; other firms are much more flexible and produce machinery in small, changing batches in a manner associated with flexible manufacturing.

But the Mori Seki example highlights in one case the way the hybrid economy actually works in the Japanese economy. The mass producers, to the extent we can identify them in any given industry, make only one or a set of closely related parts; like Mori Seki, they are not vertically integrated. The mass produced components are usually structural or other very general goods that can be augmented or incorporated with other more specialized products. An example in electronics is microchips; mass produced, microchips can be incorporated into any number of computer or computer assisted products and programmed to do a variety of tasks--they

are the high-tech equivalent of the machine tool supports Mori Seki makes. The mass producers thus contribute the most basic, lowest value added parts of a final good. The more specialized, and higher value added components are attached to these standard products in various configurations as demand requires to create final goods for sale. By mixing and matching specialty goods with low cost basic structural parts or electrical components, Japanese machine tool producers--indeed Japanese manufacturers as a whole--can offer a more rapidly changing line of high quality goods than manufacturers in the U.S.

The main characteristics of the hybrid economy in Japan also can be observed in the creation of startup opportunities that enabled companies to find secure market niches in the first place. In Chapter Four we discussed that there were two basic ways independent manufacturers began operations in postwar Japan. The first was through the internal decentralization of larger firms as parent companies spun off subsidiaries that became, and were expected to become, autonomous over time. The second was as a startup enterprise run by former blue collar employees. Both of these patterns of development may be observed in the machine tool industry. Indeed, even the more mass production oriented firms in Japanese machinery sectors owed their initial chance in the market to the decentralizing mechanisms involved in new firm creation. The effect was to open the machinery sector in Japan to a broader range of entrepreneurs than in the U.S., thus helping to ensure that potential NC market trends were realized.

Consider first the process of large firms spinning off independent units. There are many examples of this method of developing a machinery company; as early as the 1920s Niigata Machinery was spun off from its

parent Nippon Oil as we described in Chapter Two. But perhaps the most important case was the formation of Fanuc, the pre-eminent manufacturer of NC controllers in the world. Fanuc was originally began as a research group in the huge electrical producer, Fujitsu. The head of the group, Inaba Seiemon, developed the first copies of U.S. NC equipment in collaboration with Makino Milling in the early 1960s. In order to exploit the market potential of NC equipment, Fujitsu spun the group off as an affiliated subunit, Fujitsu Fanuc, and then in the late 1970s the unit was made completely independent.⁸

Fanuc's creation was extremely important for the expansion of the NC market in Japan. The growth of small scale flexible machinery users in Japan skewed domestic production from the start towards very small, comparatively inexpensive machinery with standard interfaces. Standard data entry and manipulation controls were essential because neither the machinery firms nor their users could afford to develop or learn new techniques with each piece of machinery as was normal practice in the U.S. with the production of one of a kind equipment. A number of factors, some of them purely fortuitous, led to the adoption of Fanuc's designs as the industry standard. These included the simple fact that Fanuc was first in the market, its close initial ties to Makino, an influential member of the **gyokai**, and its singular concentration on controllers as opposed to competitors that were trying to build NC units as just a small fraction of their overall product mix. In any case, the diffusion of Fanuc's NC units ensured that potential users would have a rudimentary base from which to grow thus reducing educational costs borne by machinery manufacturers.⁹ Essentially, the creation of Fanuc enabled Japanese machinery makers to treat controllers as they did standard components and to mix and match

them with different designs or motors as the market shifted. The process of large firm internal fragmentation led in the case of NC products to the development of a specialized producer in a crucial niche.

We can also see evidence of startup firm creation in the machine tool case. The confluence of factors that led to rapid growth of new companies and permitted interested entrepreneurs to open factories in general was also essential for the technical development of Japanese machinery makers, especially in the NC market. Indeed, though several machinery firms had grown quite large by the late 1970s, with the exception of former **zaibatsu** affiliates all had once been smaller producers. Their existence was predicated on their ability to initiate operations through the influence of small firm business financing and the transformation of subcontractor/client relations as we saw in Chapter Four. Many of the most important NC makers were insignificant startup or subcontractor firms themselves as late as the mid 1970s, the best examples being Mori Seiki, and Matsuura, a specialist in NC machining centers.

Firms like these helped establish the continual modification of equipment through the introduction of foreign technology, the application of domestic research findings, or finally through internal company experimentation. Indeed, potential applications or uses that were ignored in the U.S. were eagerly seized by Japanese firms seeking a new niche or product. Machinery sizes were reduced; new tool changers were developed; programming was modified; speeds and electrical pulse capacities were increased or reduced as potential demand indicated. Indeed, ironically, American machine tool designers frequently turned to Japan for assistance in building their products because they could not find or set up a US firm interested in manufacturing their ideas; in the cases of Matsuura and Mori

Seiki, the irony was compounded since they used these spurned designs to export successfully back to America.¹⁰ Readily available ideas, techniques or applications ignored in America were eventually realized in the marketplace because smaller firms were able to open factories and attempt production more easily in Japan. The ability to supply users with small scale NC tools was thus partially conditioned on the structure of capital resources in the economy.

Again, the American case contrasts with the Japanese in several respects. There was no rapid entry of new firms as new technological possibilities developed, especially with the advent of NC equipment. Not only did the total number of US machine tool firms stay almost constant from the mid 1960s to the 1980s, and in absolute levels less than half that of Japan, but most of the major manufacturers were the same companies that had dominated production in the 1950s, or for that matter the 1920s as well.¹¹ Regular, steady demand for mass production equipment and the failure of the flexible sector to grow as in Japan had led to a stable machine tool industrial structure. Technical ideas or designs that had no immediate application for the dominant firms were ignored; frequently only military research programs (experimental subsidies dwarfing the scale of Japanese state research support) such as the project that led to NC tooling in the first place were the only source of product innovation. As a special edition of **Iron Age** put it bluntly, U.S. machine tool firms were "in the Stone Age;"¹² an academic study of the American response to NC developments was only slightly more diplomatic: "In some cases," the author noted, "[US machine tool makers'] methods have changed very little in the last century."¹³

Thus, the heightened ability of aspirant Japanese machinery manufacturers to open plants either as startup firms or as units of larger enterprises led to the introduction of a wider range of technical applications than in the U.S. Coupled with the greater internal flexibility of machine tool firms--all of the manufacturers interviewed reported labor management practices and machinery utilization that were congruent with the general themes we developed in Chapters Four and Five--increased market entry meant that latent small firm demand was catered to where it was ignored in the U.S. When we further consider the machinery markets in the two countries, the way that the more developed Japanese flexible sector generated a demand-pull towards new, general purpose, smaller NC applications, then the systematic way that Japan and the US differed becomes even more transparent. The hybrid economy in Japan created both a new set of users and a more flexible set of producers in the machinery industry, which was coupled with the mass production of standardized components. American firms had neither the strong demand of a sophisticated small scale manufacturing sector to address nor the internal industrial flexibility to change their operations as imports proved a new market did exist. Nor was there a system of new firm creation that could have led to companies that made new products. American mass produced goods, standard lathes and mills, proved to be technically inferior compared to new NC products from Japan and U.S. firms could not upgrade fast enough. They could not meet challenges from Japan that were based on the mix of partially mass produced, or at least batch produced goods, assembled with specialized electrical or mechanical components. Thus, the Japanese took advantage of American designs and were able to modify them to great success. Their ability to do this was predicated on the effects of the hybrid

economy in terms of both demand side pressures from small scale users and in the add capability of machine tool manufacturers to change operations to meet new needs.

This analysis of the machine tool industry suggests that if we step away from conventional ideas about industrial development and reject the centralization hypothesis in the case of Japan we can explain much more of the context and behavior surrounding the Japanese "miracle." Our research has shown that the idea that NC advances were the product of a concerted, successful effort by the bureaucracy to promote mass production is false; Japanese NC advances were based on new products, not reducing costs of standard goods. Further, if we think of industrial development as a process in which the political and market contexts of specific cases can lead to real divergence in manufacturing philosophies and organization, a whole world of Japanese experiences that has been overlooked--the flexible sector--can be directly related to the country's startling economic triumphs. Indeed, as we shall see in the next section, the specific findings of the machinery case suggest more general comparisons between the U.S. and Japan, emphasizing the systematic differences between the two countries.

A Generalized View: Japan and The US as Divergent Systems

In order to show how the contexts in Japan and the U.S. led to profoundly different manufacturing industries, we will compare American development to Japanese experiences. Then, drawing on this historical study, we will compare how production was organized in the U.S. and Japan to highlight the systematic differences between the two countries. It is beyond the scope of this essay to treat the complexity of the historical,

market and political circumstances that led to the growth of mass production in America with the same degree of attention that we paid to the Japanese case; all we can do here is to draw on suggestive work by other scholars and paint in broad strokes the stages of American development as they contrast with what we have argued was the case in Japan.

Let us begin with the prewar period. Japanese manufacturing industries were, of course, much less extensive than the American. Even a government sell off of assets in the 1880s to the **zaibatsu** failed to build up large scale manufacturers; real initial growth of machinery or other complex goods producers occurred after the Russo-Japanese War in the early 20th century, and was spurred by World War One. But as we saw in Chapter Two, Japanese industrial concentration was low as the **zaibatsu** shunned the engineering industries; smaller independent companies and later "new" **zaibatsu** like Nissan accounted for most machinery advances. Further the early cartel schemes of the 1930s did not halt the movement of smaller producers into industry despite the wishes of the central bureaucracy. Market fragmentation, the attitudes of the **zaibatsu**, and political support for small firms as we have argued above, were some of the contextual factors that combined to prevent the rapid introduction of mass production. The degree to which prewar Japan was not marked by huge firms engaged in economies of scale operations was perhaps most clearly revealed by the disorganization of the war effort; even in the midst of national emergency, neither the Japanese state nor the major manufacturers could set up integrated armaments production and the military was crippled by the necessity of relying on subcontractors for the majority of parts.

American development, it has been suggested by a number of compelling studies, contrasts with this pattern in many respects.¹⁴

Where the markets for consumer goods in Japan were fragmented, American tastes were notably homogeneous, as the midwest middle class proved willing to accept the crude items that resulted from early experiments with mass production; in Europe, as in Japan, class or regional preferences made the creation of mass markets more difficult. This market factor was enhanced by a number of additional developments, including the fact that labor could be recruited from farm communities which had no craft or guild traditions and the emergence of the railroads as an integrated model of a corporate structure under which market regulation, capital control and labor management suitable for mass production might take place. Further, the military was engaged in the support of basic research that would eventually form the intellectual underpinning for the assembly line system as it emerged in the 1920s. Given markets suitable for early mass production technology, a lack of labor impediments, an ideological model supported by the concrete experiences of the railroads as corporate pioneers, and military patronage, mass production in America grew much more rapidly than elsewhere.

By the early 20th century, the eventual synthesis of mass production practices in the auto factories in Detroit, and the political power of the larger mass producers to use state regulatory commissions to further stabilize their markets assured the triumph of mass production in the U.S. economy. Unlike Japan, there was no flowering of smaller producers in the 1930s in the wake of the Depression, nor was the government desperately seeking to promote economies of scale. Indeed, as we saw above, up to the war the concentration of American manufacturing typified by the Standard Oil trust or the American Tobacco monopoly was many orders of magnitude higher than in the Japan. More than 70% of U.S. manufacturing value added in

1936 was concentrated in firms of *5,000 or more* workers; in Japan, the much larger pool of firms of 1,000 employees or more produced just 35% of manufacturing value added.¹⁵ American prewar production was much more affected by economies of scale in operation and much more dominated by larger companies in manufacturing than in Japan.

In the postwar, as we argued, Japanese manufacturing underwent a series of transformations. Capital shortages and the newly established subcontractor relations between large and small firms--a product of the war--briefly threatened to grow into a "dual structure;" smaller firms were for a time organized around the larger ones as dependent producers whose markets waxed and waned with business cycles. But the attempts by the larger firms to perfect rapidly American-style mass production led to the internal adoption of flexible practices which were further enhanced by a system of independent subsidiary creation. At the same time, smaller manufacturers were given the space to try and develop their own independent operations, something which the confluence of new technologies, government financing and regional associations eventually brought about. Centralizing initiatives, whether mounted by MITI or by **gyokai** were defeated in the overall effects of this transformation. Market entry was extremely high and markets decentralized as new producers took up operations. A huge, sophisticated sector of flexible firms grew up with a much smaller set of mass producers.

In America the background domestic and international circumstances surrounding industry nearly all generated favorable conditions for the continued entrenchment of mass production in the 1950s and 1960s. Afterwards, when foreign competition threatened the survival of the system, additional factors failed to induce profound changes in the way U.S.

firms viewed their markets. Crucial in the early postwar period were the establishment of America as the international industrial hegemon, as exemplified in the Bretton Woods Agreement of 1944, and the influence of the 1948 GM-UAW settlement. The former limited the immediate freedom of foreign competitors because it forced them to use scarce dollars for international transactions, while the latter built up a system of shop floor regulation that tied a worker's identity, and interests in the factory, to specific jobs along specific assembly lines.¹⁶ International factors thus made it easy for U.S. mass producers to continue their operations while internal factory trends embedded mass production practices in the system of labor relations as well.

But as this manufacturing style was challenged by the growth of imports in the late 1960s and the 1970s, its structural rigidities were revealed. Mass producers could not shift to new markets rapidly, nor would labor accede to workplace modifications since worker rights were defined in terms of specific tasks that would be directly challenged by production changes. Further, instead of producing a new concern for flexibility, the American state helped create a set of conditions that made it feasible, if nevertheless painful, for U.S. firms to continue to employ mass production practices. In particular, the government repeatedly sacrificed both its international commitment to free trade and domestic free-market principles to defend mass producers. Thus, the first attempts to create exceptions to the free trade provisions of GATT or the Multi-Fiber Agreement were mounted by the U.S. in protection of challenged mass producers at home; further, celebrated bailouts or quota systems were set in place in steel, electronics and ultimately even comparatively healthy industries like computers attempted to gamble on this kind of political protection.

The result of these background factors and many more too numerous to discuss here was that the kinds of alternative manufacturing developments that led to the expansion of flexible producers in Japan never took place in the U.S. Indeed, potential pressures such as foreign competition that might have led to new manufacturing practices were reduced by explicit government intervention. We can now see how this divergence between Japan and the U.S. can explain previously puzzling manufacturing statistics discussed throughout this essay. Recall that large firms (250 employees or more) in America accounted for a growing share of value added in the postwar period, a total which reached 70% by 1982. In Japan, an opposite trend saw firms of just 0-300 workers claim more and more value added until they accounted for 60% of the total by the same year. Further, where American manufacturing market entry rates were all but stagnant, the number of manufacturing firms in Japan nearly doubled from 1954-1982. Nor was this due to the opening of other sectors rather than decentralization within industries; the highest degree of decentralization was found in high growth industries like general machinery, which represented 10% of all manufacturing, where the number of firms rose a whopping 350%.¹⁷ Consequently, average manufacturing firm size in the US in 1980 was about 52 employees; in Japan, it was just 15 workers.¹⁸ Even in mass production sectors like autos Japanese manufacturing was more diversified and occurred in smaller lots than in America: for the same unit of volume, Japanese auto firms on average made 3.5 times as many different engine types and 4.5 times as many distinct bodies--many auto producers exhibited even more striking evidence of low volume diversity.¹⁹ Where Japanese manufacturing was marked by the hybrid mixture of mass and

flexible producers, American industry was more highly attuned to a pure mass production model.

The dichotomy between the U.S. and Japan, a product of the distinctive contexts in which industry developed in each case, is reflected throughout both countries' manufacturing systems. First, the growing decentralization of Japanese production contrasts with the growing trend towards consolidation in America. For instance, where there was a continual emergence of new auto companies throughout the Japanese high growth period and resultant market fragmentation, the 1950s saw the gradual elimination of rival firms in the U.S. until three major firms, with GM as the price leader, dominated the market. Next, the emergence of high-tech, sophisticated small factories was the most dramatic feature of the Japanese economy, but is not as apparent in the U.S. Third, while larger firms in Japan internally decentralize and are typically not vertically integrated, until very recently vertical integration was the norm in America. Fourth, labor relations in Japan are marked in both large and small firms by the absence of job-specific work rules, industrial unions and the attempt to build up generally applicable high skill among the labor force. American mass producers usually negotiate with unions that defend specific work practices as a shop floor right, while the overall labor management strategy is to try and deskill labor and substitute machinery for human workers along the assembly line. Taken as a whole, the main features of the Japanese and American industrial systems may be best understood as following from the fact that Japan is a hybrid economy where the U.S. is not; the conventional view that Japan is simply more efficient cannot make sense of the differences we discussed without discounting or ignoring altogether many important features. The specific findings of the machine

tool case may thus be extended to a general comparison between American and Japanese manufacturing industries.

The structural differences between the U.S. and Japan are directly associated with distinctions in the way each nation's economy actually performs. The most important of these is the enhancement of technological diffusion leading to new products. Japanese firms, it has frequently been noted, rarely achieve market success through breakthroughs in technology; rather, they exploit ideas or techniques that have often been developed elsewhere, or follow from just marginal changes in existing designs or manufacturing practices. In autos, for instance, the stratified charge design, Wankel engines, rack and pinion steering or front wheel drives that Japanese firms successfully popularized had all been available to American producers for years. Similarly, technology to make general purpose small scale machinery was hardly unknown to US firms who had, in fact, developed most of it themselves in conjunction with the military. There is usually nothing epochal in the way Japanese firms apply technology to the market; a foreign observer rarely has trouble seeing how a product was designed or determining the way it was made. Thus, product variations result from often clever applications of more or less established technology, from the ability to realize intriguing ideas that are pushed aside elsewhere.

In terms of marketing and production strategies, Japanese firms were able to link economies of scale in certain basic goods with specialized production. They did not make thousands of one of a kind products involving utterly unique specialized parts but instead typically tried to create large temporary markets for slightly specialized goods that they expect will change rapidly. In contrast to the dominant strategy in the US, mass markets are treated as subdivided into sets of smaller, though still

extensive, specialty markets and the Japanese are willing to trade volume gains for the exploitation of these niches. Where in America the impulse is to produce a single product covering a large range of potential uses, in Japan the attempt is to modestly differentiate goods through the commercialization of relatively inexpensive technical applications, thus segmenting mass markets. If the US may be thought of as a more or less pure case of a mass production technology, Japan is a hybrid--and a very profitable one at that-- of mass production and flexible specialization.

The growth of the flexible sector in the postwar economy brought about this production style in Japan. Based on a number of convergent developments such as market instability, large firm fragmentation and government financial assistance, as we saw, a vast number of technically proficient small enterprises were able to establish themselves throughout the economy. They became, in effect, technological speculators; from a position of comparatively steady startup support, they could attempt to bring into the market products that were ignored in other countries, or that might have disrupted the stable operations of mass producers. Of course, many efforts failed, but many did not. The Japanese experience suggests that there were enough readily available industrial alternatives in given product lines such as autos, machinery or electronics that it was profitable to enable firms to take a chance and exploit them.

American mass producers cannot be as flexible as manufacturers in Japan in the exploitation of possible technical applications.²⁰ The costs of trying to evaluate even one idea's feasibility would be prohibitive for a firm seeking to cover its investments in dedicated machinery through volume expansion in fixed product lines. Vertically integrated mass producers on the American model have considerable incentives for *not*

exploiting possible market opportunities; dedicated machinery cannot be easily converted and new products could cut into established business. Further, as we have seen, the adaptation of other surrounding factors such as labor relations to specific practices in mass production factories make the costs of change even greater. A number of concerns therefore inhibit rapid product development or shifts.

But during the high growth period in Japan production was carried out by shifting groups of specialist subcontractors and much less in integrated factories. Indeed, the larger firms either decentralized internally, or they focused on specialized mass production while depending on vendors for the rest of their product needs. Introducing a new product making use of a new design or technological feature was a matter of finding a capable set of flexible producers willing to try and build necessary components. And in fact there was a continual increase in the supply of these technically proficient subcontractors. The result was that barriers to the introduction of new, slightly modified products were reduced in Japan, leading to a system of more rapid technical production.

In contrast, the American economy can be characterized as one in which there was a high degree of technical development and engineering experimentation, largely achieved in government research facilities or universities, but a very low degree of new product implementation. Through "big-ticket" engineering programs like those sponsored by NASA or through military or university research programs, Americans repeatedly led the postwar world in technical breakthroughs. But an exceedingly centralized manufacturing sector, coupled with a paucity of opportunities for new production firm entry meant that possibilities for the application of American technology were squandered. Market ideologies, the power of

existing producers and political conditions favoring stable manufacturing-- the American background or contextual factors affecting industrial development--converged to limit the extension of capital or the way entrepreneurs applied it to only those cases where mass markets seemed a sure thing. The idea that as in Japan a steady stream of new auto companies could survive and prosper in the 1960s and 1970s was unthinkable in the U.S. where the market was all but totally regulated by the Big Three oligopoly. Instead of seeking new niches or flexibly changing products, manufacturers sought to protect existing products, or to incorporate only the most marginal changes to reduce the chances of destabilization. A highly innovative economy exhibiting a very low rate of actual implementation resulted. In contrast, the Japanese system was one of less effective basic research but very high exploitation of technical possibilities.

It is on this basic dichotomy that the differential performance of the US and Japanese economies has been based. While there may be (as yet undemonstrated) divergent practices relating to mass production productivity and efficiency that is of decisive benefit to Japan, product flexibility was an unambiguous advantage. Indeed, this has been explicitly recognized by the US; when anti-Japan invective has momentarily been reduced, American industrialists have repeatedly wondered at the way their Japanese competitors made diversified product lines that changed so rapidly when their own adjustment seemed impossible.²¹ By slightly modifying designs, Japanese manufacturers constantly created temporary market niches that resulted in high profits as they eroded mass markets. Then, as the competition tried to recover rapidly and move into the new markets flexibility again came into play; Japanese producers tried to differentiate

their products again to avoid direct challenges. This has been the most important strategic element of Japanese postwar advance. In contrast, American firms tried to defend existing mass markets by either underpricing the competition, buying up challengers or, as recently has been the case, seeking political relief in the form of trade barriers or tariffs.

Thus, the specific explanation for why the machine tool industry grew as it did in Japan suggests more general features of the Japanese economy's manufacturing expansion: the creation of a high tech sector of flexible firms permitted manufacturers to adapt basic technology for unexploited purposes. This pattern seems to have been duplicated in most manufacturing sectors, particularly the complex goods industries that were so important to Japanese postwar advances. Japan diverged from the mass production model as the context surrounding its industrial development led to the continued growth of small scale factories; the whole manufacturing economy was decentralized, permitting more flexible adaptations to market changes. In the final section we will discuss the implications of this finding for our views of Japan, of the U.S. and of economic development in general.

Conclusion: Misunderstood Miracles and Overlooked Opportunities

If our view of the historical, structural and performance differences between the U.S. and Japan may be sustained, then a good deal of what we have come to accept as axiomatic about both countries' political economies needs to be reassessed. We will first review our study as it affects the general conception we have about how Japanese industry is organized, and of the political basis for the postwar "miracle." Then we will turn to the

analysis of American adjustment problems in light of Japan. Finally we will discuss the theories of political economic history that informed the competing visions of development that we have tested in this essay. Our claim will be that Japanese experiences broadly confirm the idea that contextual factors may affect more than a nation's relative industrial efficiency, while suggesting the limits of conventional arguments.

First let us look at the problem of the state and the economy in Japan. Our study has provided considerable evidence that conventional arguments are particularly misguided in their contention that the bureaucracy has centralized and coordinated economies of scale in Japan. The basis for this belief can be found in the fact that most analysts focused only on the bureaucracy and on legislation rather than the antecedent market pressures or politics surrounding industrial initiatives, nor did they look at the actual effects of these policies. Consequently, they assumed that a statement of intent by the bureaucracy actually translated readily into market transformations, leading to the conviction that the Japanese bureaucracy exerted considerable economic influence. But even proponents of the bureaucratic domination thesis have engaged in ever more complicated reasoning to sustain their arguments against a great deal of counter evidence. The fact that all of MITI's market revision initiatives and measures aimed at providing it with explicit power over private firms were crushed both in the prewar and postwar led them to the view that MITI did not actually control through command but rather through persuasion. This became the "administrative guidance" school of thought; firms followed MITI's lead because of their respect for the bureaucracy, or to obtain JDB loans. Then, when it became clear that industries in Japan were much more competitive and often less regulated than in the US, and that many plans

were ignored by targeted firms, the market itself was made an instrument of MITI; the bureaucrats, it was argued, used the market to achieve their own ends.²² This tortuous reasoning, frequently supported only by the self-serving pronouncements of the bureaucracy itself, ensured that *any* industrial activity was interpreted as the result of state planning.

But our findings point to a new view of Japanese economic regulation that avoids the difficulties inherent in the traditional argument. It starts with the assertion that, in several senses, the bureaucracy is not "strong" in Japan: it cannot resist claims made upon it irrespective of the industrial prospects of the sectors involved, and it cannot enforce compliance. As we saw in Chapter Three, outlays authorized by MITI covered the entire spectrum of enterprises and were actually most concentrated in *weaker* sectors, a pattern consistent with our view about the permeability of the bureaucracy. Further, as the prewar Important Industries Laws, **kogyo kumiai** movement, **toseikai** regulation and postwar efforts like the consolidation of the auto and machinery sectors and the attempt to build a state oil champion showed, industrial plans of primary concern to the bureaucracy were ignored by private firms and transformed into subsidization programs or embarrassing giveaways. MITI's ability to force firms to follow its plans, its compliance power, was extremely weak. Indeed, historical evidence showed that MITI often could not independently plan; it relied on the firms that it wanted to regulate for basic concepts of how to induce growth. Regulation in Japan thus does not seem consistent with strong state hypotheses.

Instead, the involvement of the government in the economy took place according to a different logic. In this system, the bureaucracy was not able to structure the economy, but was itself coerced to respond to demands for

protection or assistance. Weaker industrial interests, such as declining sectors for whom alternative financing opportunities were slim like shipbuilding, aluminum and agriculture, to name a few, made heavy demands on the bureaucracy for support. And indeed these economic "losers" found that MITI was an easy mark; up to 50% of their postwar capital needs were supplied by the state. Strong firms that had historic or well developed links to private banking capital as in the electronic or transportation industries treated the bureaucracy as an incidental supply of loan capital. Indeed, their interaction was often more defensive; as MITI sought to bring them under its jurisdiction, proposed regulation forced them to respond, usually leading to the defeat of MITI's programs though the provision of support typically was permitted to be implemented. In many sectors, both of these patterns of development obtained at the same time; machine tool producers, as we saw, actively sought intervention during the 1960s slump while MITI wanted to impose a restructuring plan in the wake of capital liberalization. But the outcome of the interaction was almost always the same: state control was not enhanced, although the government was forced to address the requests made by industrial actors, becoming more or less involved depending on the severity of the demand.

The advantage of viewing Japanese regulation in the light the weakness of the bureaucracy is that we can make better sense of industrial outcomes without the extreme contortions necessary under conventional arguments. MITI's supposed reliance on the market as a policy too was actually the product of its *inability* to control private firms' behavior. Its differential economic influence in various sectors is related to the demands placed by industrialists on the bureaucracy, not the product of bureaucratic control. Strong firms tolerated MITI involvement only as long as they could

draw benefit from it, opportunistically snapping up available resources but not complying with policy goals. Weaker sectors used the state to finance their adjustment. And groups that were suffering from structural biases such as small firms in prewar and early postwar capital markets were able to force the government to reshape the economy towards their needs.

But the more important problem with traditional arguments is not just that the role of the state was misconceived, but that the basic operation of the Japanese economy that was supposed to underlie the postwar "miracle" was also misunderstood. Our findings show that Japan's economy does not resemble the centralized structure conventional perspectives assert was the outcome of intelligent planning or guidance. Thus, the idea that Japanese successes were the product of enhancements in mass production efficiency is difficult to sustain because independent smaller firms account for the bulk of the country's manufacturing output. Indeed, while misconceptions about the structure of Japanese industry have arisen because most researchers apparently took bureaucratic or influential business leaders' plans for consolidation at face value, in fact the economy was decentralized.

The role that "high" political factors--the Diet or the bureaucracy--played in this process is important to clarify. While the consolidation schemes that the bureaucracy sought to force on industry were rejected, the weakness of the state did lead to the redirection of finance to smaller producers as we saw in Chapter Four. At first glance this may appear to validate the centralization hypothesis through other means: the Japanese state, it may be argued, controlled the economy through subsidies paid to smaller firms, thus providing an edge in economic competition.

But there are several problems with this view. The first is that the intent of the restructuring of small manufacturer financial markets that took place from the 1920s to the present was to force the eventual consolidation of the smaller producers into larger ones. From the inception of the **kogyo kumiai** movement in the Depression era to the late 1960s "rationalization" schemes sponsored by government loans, MITI wanted to achieve reductions in overall manufacturing enterprises; firms would be provided with funds and permitted to form "cartels" in the expectation that they would gradually merge to create a single, large scale entity suitable for mass production. But, as we saw was the case throughout the history of bureaucratic efforts in Japan, the recipients of these funds used them for other purposes, and eventually the prewar consolidation payments programs actually were converted into *startup* firm loan sources. Hence, if the state efforts played a role in the growth of the hybrid economy, it was unintentional; the original intent of the programs it set up was transformed.

A second problem is the actual importance of the government's loan support. Japanese smaller manufacturers did in fact make use of the new financial institutions the government was compelled to create, particularly in the early phases of their growth when alternative capital sources viewed them as too risky. It cannot be denied that this complemented more general trends towards flexibility in the economy. However, even if small firm financial institutions had not been established, it is hard to imagine that the flexible sector would not have emerged at all. If both large and small firms were pushing towards flexibility in their operations from the 1950s onwards, it is likely that companies would have pursued this goal through other financing arrangements. Indeed, Japan's historical capital surplus

from the 1960s made it increasingly probable that financing sources would have been found for the flexible entrepreneurs. Hence, if small firm support was a part of the industrial growth of Japan, it may not have been indispensable.

Finally, the association of government support with economic success in the case of the hybrid economy at first glance obscures the fact that in this case state intervention was connected to competitive advances in a much different way than usually conceived. In general, government assistance is thought to boost the performance of an economy relative to others by in some way reducing the costs of operating mass production factories; the state might subsidize prices, or capital costs and thus provide domestic firms with a price advantage over countries producing similar products. We think of this intervention as "unfair" when it violates certain principles of fair play and is apparently directed at a single market.

But we lack the vocabulary to describe a case where, as in Japan, the effects of government intervention were associated with a divergence from the way other nations produce goods, and where the competitive influence is not on price but on flexibility. What the financial support of startup companies achieved (despite the intentions of the economic bureaucracy) was not the reduction of mass production costs but the creation of an entirely different kind of market capacity, the ability to differentiate flexibly Japanese products from other nations. This process is very different from the idea that informs most criticisms of Japanese trading activity. Whether or not the state's assistance in the creation of flexible sector is "unfair" is an open question; if an entirely new production option can be achieved with marginal cost, then is it unreasonable for a government to help in its achievement? Should all countries forsake the

flexible option because nations that have more completely adopted mass production practices have done so? Thus, even if we think that the state was an essential part of the Japanese hybrid economy--a belief that is at best subject to doubt--the way that it affected the economy cannot immediately be fit into traditional trade conflicts based on the vision of national sets of mass producers confronting each other in the marketplace.

If the Japanese economy is more decentralized and has a broader industrial base than pure mass production, then what are we to make of the U.S. case? Our interpretations of ourselves, as we contended in the introduction, are shaped by how we understand events elsewhere; Japan has been used to justify the proposition that greater control, centralized management and discipline associates with consistent industrial growth. Based on "lessons from abroad," comments about "pampered" labor, a loss of the work ethic or venal managers as compared to what are thought to be more ideal Japanese practices form a large part of the popular "analysis" of US manufacturing decline. And in Europe, where dread of the Japanese challenge has coincided with a marked relative decline in economic performance, even today industrial leaders will try and reassure their constituents with observations that "the Japanese are no different from you or me; they just think differently. We must put aside thoughts of vacations and get to work."²³ Again, the idea that the Japanese economic engine is somehow super-charged by discipline and control has become almost reflex in referring to comparative industrial performance.

Nor have these ideas been limited to popular accounts; they have been at the core of academic research efforts as well. The characterization of Japan as a "strong state" lent support to the study of corporatism and economic development in the 1970s. This research effort tried to show that

some form of central authority limiting destabilizing competition between industrial groups--usually labor and capital--could foster smoother growth than was possible in countries like the US with "weaker" institutions.²⁴ Indeed, the critique of pluralism in social science, a movement mounted from both the political right and left, was animated in part by the notion that unrestricted political rights were "inefficient." Conservatives argued that societies were becoming "ungovernable", and that social claims were leading to inescapable tradeoffs between the (in any case unrealistic) ideal of "equality" and the rigorous demands of industrial "efficiency."²⁵ The left sought to show that an interventionist state could assure both greater social harmony and economic expansion than an unregulated political and industrial system.²⁶ Among the concrete results of these ideas were developmental studies purporting to show how a period of authoritarian rule was necessary to implement necessary economic practices;²⁷ research attempting to link positively social and economic harmony to corporatistic regulation;²⁸ and scholars raising the "tight policy networks" and intrusive bureaucratic regulation they found in smaller European states as models for achieving economic expansion.²⁹ The established categories and traditions of Japanese research dovetailed nicely with trends in comparative political economy.

Our findings, as we have seen, show that in practically every respect the authoritarian view of Japanese development is wrong. But because of the way Japan has been integrated into comparative research, this is not just a problem for Japan specialists; it bears on interpretations of other economies as well. In the United States the continuing misapprehension that Japan has moved "ahead" through enhancements in mass production made possible by centralized direction of some sort have supported

disasterous manufacturing policies. We saw how critical the problem of American production was in Chapter One, though the extent of the crisis has been somewhat masked by huge military programs, trade barriers and compensating growth in service industries, and exogenous, fortuitous factors like declining oil prices.

But despite the continued existence of a very weak manufacturing sector, the main thrust of American recovery policies remains the same: It is to try and reestablish mass production in an even more efficient way. This strategy has been based on the notion that the US has developed a regulatory structure and a set of social institutions that prohibits industrial autarky as enjoyed by Japanese economic elites and hence impeded the natural logic of industrial expansion. Labor, we have been taught, was allowed to take more from businesses than was economically justified; government, unlike the Japanese state which helps business, impeded efficiency through a number of civil, pollution or tax programs. This interference in the economy led to the inefficiencies in mass production which caused the US to deviate from the optimum path of development. The solution has been to try and strip presumed barriers so that American industrialists can once again rationally apply themselves towards intelligent market strategies--in other words to reapply the mass production model with a vengeance. Underpinning this vision is the conviction that in Japan, docile labor and centralized management permitted the economy to adopt the newest kinds of production techniques with less obstruction; the US needs to institute the same kinds of policies.

But if Japan is not structured as popular notions imply then analysis of industrial adjustment supported by comparative research might also be incorrect. And indeed, even a cursory consideration of the idea that

American firms are restrained from pursuing the greatest mass production efficiency as in Japan is difficult to sustain. Industrial concentration measures alone belie the idea that Japan is more centralized; Japanese manufacturing market concentration in the prewar and in the postwar never approached that of the U.S. suggesting that American firms enjoyed much larger economies of scale. Further, large Japanese companies usually faced both direct competition from other firms and competition from smaller producers, all of which reduced their market power below that of US firms in similar industries and led to much more volatile market share swings.

Indeed, as we saw above, the internal structure of Japanese firms further cuts against the notion that even as a corporate unit they are subject to greater central direction than in the US. American corporate managers enjoy much more power over the financial, technical and marketing operations of divisions or affiliates than in Japan. As Clark argued, most Japanese firms are decentralized internally much like the economy as a whole; divisions are spun off as autonomous units where planning and technical responsibility lies with the lower level managers.³⁰ And Clark's findings are echoed by managers in Japanese factories, where corporate personnel frequently know little about what their divisions are doing, and must even defer to branch staff when entering the plants under their control.³¹

Further, if we compare labor management we can see that the idea that American capital is held hostage by rapacious unions is nonsense. Both Japan and the US share the same, low rate of unionization, about 25% of the total workforce. But even in the sectors where supposedly dominant unions like the UAW in automobiles have "controlled" wages, economic crises quickly led to their defeat; wages were rolled back, work tenure was

shortened, layoffs were extensive, and firms moved into nonunion states. "Strong" unions were shown to be convenient targets on which economic reversals could be blamed, while they were unable to attain the "unrealistic" demands for which they had become infamous. Further, unlike Japan in the high growth era, US manufacturers made use of huge numbers of undocumented workers or expanded into mildly authoritarian countries notorious for their ability to keep wages low. Domestic union gains could be countered by the exploitation of new laborers for whom unions did not exist. A good example is the case of the "world car" where many US companies tried to cut costs by making standard components in Korea, Chile, the Philippines, Mexico or Brazil. In contrast, Japanese production until very recently was almost completely domestic.

Finally, real Japanese financial business burdens are at least as high as those in the US; in the case of corporate taxes real Japanese rates were much higher due to greater enforcement and a lack of depreciation loopholes.³² In the case of other U.S. policies even programs enjoying wide popular support like fuel economy standards were rolled back to support influential producers. The attack on welfare programs, equal opportunity, environmental and other concerns suggests that the ability of business to force relaxation of regulatory burdens is considerable. In contrast, Japanese environmental efforts intensified during the high growth era, including a celebrated cleanup of air pollution in Tokyo that directly affected the auto firms' largest single domestic market.³³ Indeed even the avidly free trade Reagan administration has been forced to accede to a massive retreat from its principles, which may yet instigate a crisis in US alliances with many developing nations, Japan, and Europe.

All of the evidence thus shows that industrialists in America were not subject to particularly onerous controls; their firms' market control was more concentrated, their governmental influence was high, and their sway over popular ideology--as measured by the enduring nature of the idea that they are unjustly constrained--was strong. We can see that popular analysis of industrial problems is misguided by the fact that intensive efforts to further business autonomy, reduce regulatory burdens, and provide incentives for "efficient" practices have done nothing to turn around manufacturing. Instead, sectors like autos took advantage of trade restraints and boosted prices, reaping windfall profits, and then spent all of the gains that they were supposed to use for retooling on dividends or diversification moves into electronics, military parts, aircraft and finance.³⁴ There has never been a successful instance where temporary relief from trade pressures coupled with direct support led to recovery on the basis of enhancing mass production; most of the time, the only long term winners were the foreign producers who flexibly moved around the barriers or adjusted by putting pressure on previously unaffected sectors with new products.³⁵ The few cases of American industries that did recover usually did so because they more or less consciously adopted the practice of flexible production: specialty steel, textiles, and fashion footwear are three examples.³⁶

The reason for this dismal record is that the analysis of the American manufacturing problem was incorrect; the difficulty was that mass production industries were not able to adjust. Faced with competitive market and product pressures, they could not redirect their output as rapidly as the Japanese, leaving them with unusable, expensive machinery, and huge debts. The result was layoffs, abandonment of traditional markets

and protectionism. And even before competitive challenges developed there was the latent problem that the American manufacturing structure grossly underutilized potentially lucrative technical designs or product ideas; US firms strove for only huge mass markets rather than a number of large, but diversified market segments.

The strategic problem America must solve, if Japan is our guide, is how to ensure that market opportunities are more fully realized, and to try and make it possible for US manufacturers to become more flexible. If the US took advantage of the same technical ideas that Japan used to achieve market strength, the difficulty of leaving potentially lucrative markets unexplored would be eliminated; if manufacturers were more flexible, painful choices between economic decline or protectionism could be avoided. But what the Japanese case shows is that the key to building a more fluid economic structure is decentralization rather than consolidation, and the fragmentation of economic authority rather than centralized management by either the state or private interests. Not only are conventional interpretations of the manufacturing decline misguided, but their prescriptions are exactly the opposite of what our comparative analysis suggests. The irony is that Japan has become a symbol of the industrial benefits of discipline and authority even though its own success was built on the restraint of both of these qualities.

That encouraging the flexible option is a practical alternative to continued efforts to "perfect" mass production through the restraint of supposedly destabilizing or illegitimate interfering factors is suggested by the remarkable resurgence of the European machinery industries, particularly in Germany and Italy. As late as 1983 German machine tools had become an example of all that was distressing about European

adjustment; once dominant in global markets, machinery makers lagged in both NC applications and in the ability to respond flexibly to the market despite an extremely decentralized structure. But by importing or borrowing basic NC technology, and through regional support programs designed to encourage entry into new markets, the Germans began to beat the Japanese at their own game: they made a large range of sophisticated, small NC tools that offered special qualities for segments of the market.³⁷ By 1982, though Japanese machine tools were flooding Europe, German and Italian producers had secured safe product niches.

There are even examples of American flexibility: the computer industry offers additional evidence that decentralized economic power in combination with appropriate strategic, market and financial opportunities can create industries organized on flexible manufacturing principles. American advances in computers have been based on the sort of rapid exploitation of technology combined with regionalized small scale enterprises that we have seen in Japan. This led to continual rapid advances in production, and to the speedy exploitation of market possibilities that normally are ignored in the U.S. By capitalizing on the inherent hardware and software potential applications of industry and university research, the American computer industry forced the Japanese to adopt a mass production, derivative approach to manufacturing.

Americans built their lead through a variety of institutions that created the similar kinds of safe development hamlets that emerged in manufacturing sectors in Japan. The industry grew up around major universities which supported future entrepreneurs through research grants and military projects. The developer of a new product could survive in school or meet other engineers and thus bring the idea to fruition. Then

interfirm cooperation, reminiscent of what we saw in Sakaki Township, was crucial; through cross-licensing or development agreements, chip designers, hardware producers and software writers cooperated in building an integrated set of products. Indeed, without cooperation a given idea would fail; a computer design, no matter how sophisticated stood little chance of success if software development lagged; a chip whose architecture failed to grasp the imagination of hardware or software developers was surely doomed. While the reliance of the computer industry on public, and regional support and an ethic of interdependence was muted in contrast to Japanese experiences it was nonetheless crucial for the sector's expansion.³⁶

Thus, the same kinds of advantages enjoyed by the Japanese during the high growth period could be achieved elsewhere as well. In Europe, pockets of small firms or internally decentralized large ones survived through regional political institutions to ultimately begin to beat back Japanese imports. Significantly, their strategy was to attack flexibly markets and create even more specialized, rapidly changing goods than Japanese manufacturers could. American growth in computers was based on regional institutions and support that was subtly political in nature; whether the US will act to foster these kinds of relationships in all industries, or whether it will continue its misguided attempt to "enhance" already deeply entrenched mass production practices will also depend on future choices.

This brings us to our final point, our theories of economic change. Our study of Japan cuts against the conventional idea that developments in mass production efficiency set the basic pace of economic growth, that political or social factors affect only the rate at which particular countries speed up, or retard industry's continued refinement. As we saw, this idea

frequently led scholars in the Japanese context to ignore or overlook important aspects of that country's industry such as competitive strategies or the role of smaller factories. Further, even the subjects that received extensive attention were misunderstood, such as the effects of the bureaucracy in the economy. Perhaps the best example is the almost complete misapprehension scholars had of the "cartels" in the machine tool industry of the 1960s; though the popular belief was that these "cartels" were a government sanctioned consolidation effort, they were in fact explicitly designed to thwart centralization, and actually not cartels at all--hence the name "group" was applied to them by the **gyokai**. If our alternative perspective does nothing else but call attention to the possibility that surface relationships may conceal a much different reality, and that ignored industrial factors may be much more important than originally assumed, it will have served its purpose.

But an additional point is that the notion of alternative, indeterminate industrial outcomes is particularly important in understanding Japan in contrast to other cases. The conventional perspective is built on the idea that economic change is self-motivated through logical, apprehensible increases in mass production efficiency; to move ahead, one must discover and then cause these enhancements to be implemented. Instead, we suggested that in any given case precisely how to organize the economy, particularly in terms of the mass or flexible components, is an open question ultimately decided in the interplay of political decisions taken among industrial actors, labor, and finally in the sphere of the "high" politics of the state as well. Out of these contextual elements an industrial system will form; it may generate a more or less

pure "flexible" order as in Northern Italy, a hybrid as in Japan, or a mass production system on the American model.

But if the contexts in each case are important, both the analytical method and policy implications of comparative research need to be reformulated. The traditional attempt to isolate a single factor such as "the state" or a particular policy and link it to efficiency outcomes makes no sense if we think of industrial systems as embedded in particular contexts. As we saw above in our discussion of Japanese state finance, isolated elements cannot account for industrial outcomes by themselves; for instance, support for startup firms would not by itself lead to flexible companies in the U.S. because the ideological, market and political background in which these firms would operate would still be conditioned by mass production. Or, to take another example, where protectionism in the U.S. only enhanced the degree of mass production commitment of the affected sectors, early restraint of foreign entry in Japan led to the precise opposite outcome. There, the lack of dominant, mainly American mass producers as in Europe cleared additional space for the flexible sector, and a host of convergent factors meant that under conditions of protection decentralization occurred. In the U.S., a context in which mass production remained the dominant organizing principle of the economy would not permit a flexible sector to grow under protected conditions. Thus, we can say little about particular policies or institutions in the absence of the overall background in each case.

As a consequence, the task involved in building a flexible sector is necessarily more complex than trying to adopt other national experiences in a piecemeal manner. Though analyzing cases from the perspective of a fundamental ambiguity in industrial order makes it possible to comprehend

more any one system than under traditional assumptions, we are at the same time limited in what we can point to as prescriptive policies. The development of the flexible sector, just as that of the mass production economy, is contingent on favorable ideologies, regional institutions, financial opportunities and the like. Comparative case studies cannot indicate the specific path a nation might take in transforming the economy; indeed, any such attempt would almost certainly foreclose hidden opportunities or unseen potential developments.

Yet, if policy prescriptions or predictions are not possible, our study of Japan does help us to formulate future choices with more clarity than conventional ideas permit. By correcting the theoretical and empirical mistakes concerning Japanese industrial development, we at least are able to account for international variance by employing a more accurate picture of how economies work than before. We have shown that if Japan can teach us anything, it is that a decentralized economic structure composed of high-tech, flexible factories can not only be "modern" in terms of technology, but a powerful competitor. In the Japanese high growth system, technology diffused faster in the economy, and flexibility was enhanced. The Japanese case illustrates one way that this outcome can be attained though all we can learn from it are general principles rather than a blueprint for policy. Indeed, the growth of small firms was if anything an unanticipated outcome of conservative politics, large firm strategies and market opportunities and thus was suspended in a unique context with little relation to conditions in other countries. As German, Italian and even American experiences suggest, similar developments may emerge from extremely different circumstances.

But we can point out that if countries look to Japan for support of efforts to increase the authority of centralizing economic elites regulating mass production enterprises to effect an industrial revival, they will be tragically mistaken. Not only will they have misinterpreted Japanese economic history, but they will have unnecessarily foreclosed alternatives to continued stagnation or trade conflict. The Japanese case shows that if the flexible alternative to mass production can be enhanced, so too can the overall strength of a national economy. It may be that America, Europe, or even Japan will deny this history and blindly try to push towards an ephemeral "perfect" mass production economy. If so, the future will indeed be bleak for global trade harmony and for the individuals caught up in what will be chronic manufacturing adjustment difficulties. But we will at least know that nothing in Japanese experience justifies this outcome. And drawing on comparative knowledge it would still be possible to show that, should appropriate political will be harnessed, there would yet be a better alternative.

¹From MITI, *Nihon no Kogyo Tokei*, op cit.

²The best account of the intellectual and practical connections between military research programs and the rise of the assembly line is David Hounshell, **From the American System to Mass Production 1800-1932**, (Baltimore: Johns Hopkins University Press, 1983).

³Prewar American statistics from **Census of Manufactures**; Japanese prewar data as compiled in Nakamura, (1983) pages 198-207; postwar Japanese data from MITI, *Nihon no Kogyo Tokei*, op cit.

⁴See the discussion in Piore and Sabel, (1983) op cit., Chapter Eight.

⁵See the study by Paul Ong, "NC Machine Tools" in **Industry and Trade Strategies**, (Office of Technology Assessment Report # 333-2840, 1983).

- ⁶US Machine Tool Builders Association, **Economic Handbook of the Machine Tool Industry**, (Virginia: NMTBA, 1983) pages 106, 111, 198.
- ⁷Interview, Mori Seki, **op cit**.
- ⁸See Inaba Seiumon, **op cit**.
- ⁹Interviews with JMTBA officials, Kawashima Yuzo, Technical Department Manager, and Murakami Masahiro, International Department Manager, November, 1984.
- ¹⁰The technical developments of Matsuura and Mori Seki as they related to U.S. designs were confirmed in confidential interviews in Japan and the U.S.
- ¹¹See machine tool firm data in US Machine Tool Builders Association, **Economic Handbook of the Machine Tool Industry**, various years.
- ¹²See "Are Machine Tool Builders Cutting It With Industry?" **Iron Age**, August 24, 1981, page 87.
- ¹³Clifford W. Fawcett, **Factors and Issues in the Survival and Growth of the US Machine Tool Industry** (Ph.D. Dissertation, George Washington University, 1976), pp. 2-5.
- ¹⁴The best single treatment of the American case is Sabel and Piore (1984) **op cit.**, especially Chapters Three, Four and Five. The following discussion is based on these sources.
- ¹⁵c.f. Nakamura (1983) **op cit.** page 207; **Census of Manufactures**, various years.
- ¹⁶See Sabel and Piore, **op cit**.
- ¹⁷As calculated from *Nihon no Kogyo Tokei*, **op cit**.
- ¹⁸Japanese data from *Nihon no Kogyo Tokei*, **op cit.**; US data from **Census of Manufactures**, **op cit**.
- ¹⁹See Friedman, **op cit**, pages 362-364.
- ²⁰The problems of adjustment problems of mass production have been discussed at length in William Abernathy, **The Productivity Dilemma**, (Baltimore: Johns Hopkins Press, 1978); Sabel and Piore(1983), **op cit.**, and Friedman, **op cit**.
- ²¹In correspondence from General Motors chief economist, Marina V.N. Whitman, July 1983, it was pointed out that the flexibility of Japanese producers was the one clear advantage they held over American car manufacturers.
- ²²See Pempel, Johnson and Vogel, **op cit**.
- ²³Remarks made by West German Chancellor Helmut Kohl, as quoted by Joseph Kraft, "Helmut Kohl Talks Like A Winner" in the **Los Angeles Times**, October 14, 1985, part III page 5.
- ²⁴See Suzanne Berger, ed., **Organizing Interests in Western Europe**, (New York: Cambridge University, 1981) especially the article by Schmitter.

²⁵A typical tradeoff argument may be found in Arthur Okun, **Efficiency Versus Equality**, (Washington: Brookings Institute, 1975); the view that political authority was a necessary prerequisite for "modern" economic practices was brilliantly put forward by Samuel Huntington, **Political Order in Changing Societies**, (New Haven: Yale University Press, 1978); and Huntington, Michel Crozier and Joji Watanuki, **The Crisis of Democracy** (New York: New York University Press, 1975).

²⁶An example is Schmitter and Lembruch, eds., **Trends to Corporatist Intermediation**, (London: Svege, 1979).

²⁷See Huntington, **op cit.**

²⁸See Schmitter, **op cit.**

²⁹See Peter Katzenstein, **Corporatism and Change in Austria and Switzerland and the Politics of Industry**, (Ithaca: Cornell University Press, 1984).

³⁰See Rodney Clark, **op cit.**

³¹Factory Interview, Minebea, **op cit.**

³²See footnote 29, Chapter 1.

³³c.f. Julian Gresser, eds., **Environmental Law in Japan**, (Cambridge: MIT Press, 1981).

³⁴See "How the Big Three Automakers are Diversifying" **Los Angeles Times**, October 9, 1985, Section IV page 1.

³⁵An excellent discussion is in Zysman and Tyson, eds, **American Industry in International Competition**, (Ithaca: Cornell University Press, 1983) pages 313-314.

³⁶See the account in Sabel, **op cit.**, Chapter 4.

³⁷See the discussion by Gary Herrigel, **German Machinery Industries**, forthcoming.

³⁸See the discussion in Sabel and Piore (1984), **op cit.**, Chapter 11.