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INFLATION IN YUGOSLAVIA, 1962-72: AN EMPIRICAL ANALYSIS
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Abstract

Inflationary trends observed in Yugoslavia during the past ten years have fostered many unverified hypotheses about the implications of workers' self-management for macroeconomic stability. This dissertation investigates some of these hypotheses in an effort to identify the major determinants of the Yugoslav inflation. After a brief history of the political and economic reforms which shaped the contemporary Yugoslav economy, the analysis turns to an examination of the so-called wage-push theories which explain inflationary pressures as the product of excessive nominal wage growth at the enterprise level. Several models of the Yugoslav firm are developed and are used to evaluate the assumptions about microeconomic behavior on which the wage-push theories are based. An empirical investigation of the wage-price nexus focuses on the estimation of wage and price equations for the Yugoslav industrial sector.

The second half of the dissertation studies the links between monetary policy, money supply changes and inflation in the Yugoslav economy. First, a model relating money supply changes to real output and price changes in a self-managed economy is developed. Next, a detailed discussion of the structure of the Yugoslav banking system is presented, with the aim of explaining how political and economic contradictions in Yugoslavia have fostered money supply growth and inflation. Finally, inflationary pressures and monetary policy are related to the recurrence of illiquidity crises in the Yugoslav enterprise sector. A model of enterprise asset-holding behavior is derived to explain changes in enterprise holdings of cash and trade credit. The dissertation concludes with an examination of the political and ideological contradictions which are shown to be the basic causes of inflation in Yugoslavia.

Thesis Supervisor: Evsey D. Domar
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CHAPTER 1

THE YUGOSLAV INFLATION AND ITS CAUSES:
AN OVERVIEW OF PREVAILING THOUGHT

Introduction

More than twenty years ago the Yugoslav Commu-
nists began to build a modern, industrial economy, based
on the twin pillars of market socialism and workers' self-
management. The goals which the Yugoslavs hoped to attain
through these institutional forms were twofold: first,
to provide the working people with true control over the
means of production, thus realizing Marx's ideals of
participatory socialism and workers' democracy; and sec-
ond, to design an economic environment conducive to rapid
growth and the correct allocation of scarce economic
resources. In the years since 1950, when the fundamental
law on workers' self-management was adopted, the Yugoslavs
have struggled tirelessly to make these goals a reality.
In doing so, they have attracted considerable interest
among statesmen and scholars who are searching for new
forms of economic and social organization.

At first, the Yugoslav experiment with market
socialism and workers' control was greeted with widespread enthusiasm, especially because of its apparent success in bringing the Yugoslav economy to the forefront in the race for economic development. By the end of the fifties, gross national product in Yugoslavia was growing at an annual rate of 12%, which was far above the rates reached in other developing countries. Rapid growth was accompanied by reasonable price stability. In contrast to the high rates of inflation which often toppled development efforts in other economies, the average annual increase in the cost of living from 1953 to 1960 was only 4.0%. Encouraged by these results the Yugoslavs pressed ahead, while leaders of other developing areas began to ponder the feasibility of the Yugoslav solution for their own economic problems.

After 1960, however, enthusiasm for the Yugoslav system was dampened by its increasingly poor economic performance. In what appeared to be a very short time, the Yugoslav economy slipped from a regime of rapid growth and price stability to one in which rapid growth could be purchased only through severe price inflation. Table 1.1 reveals the striking contrast between the two regimes. In the earlier period, extending roughly from 1952 to 1960, an average annual rate of growth of 8.2% in GNP gave rise to a 4.0% inflation rate while in the later
period, from 1960 to 1971, a lower average growth rate of 7.0% led to substantial price increases, which by the end of the period were equalling the highest in the world.

Just as observers sought the source of Yugoslavia's economic success in its institutions, so did they seek to blame these same institutions for its economic failures. Consequently, the scholars and statesmen who once greeted the Yugoslav experiment enthusiastically now consider it cautiously, some concluding from its results that both market socialism and workers' self-management are not superior—and may be inferior—to traditional forms of economic organization be they capitalist, communist or socialist. Because of the potentially far-reaching implications of this conclusion for the future development of societies, its validity should be tested and firmly established before being used as a guide to policy decisions. As yet, however, no satisfactory step has been taken in this direction and opinions continue to be founded on casual empiricism and intuition rather than on a careful and complete analysis of the facts. In this paper, I try to remedy the current situation by studying the Yugoslav inflation in some detail, with the aim of determining the relative importance of institutions, and particularly of workers' self-management, in its initiation and continuation over time. I try to use
available aggregate data to answer three questions: first, to what extent have the goals of market socialism and workers' self-management been realized in the Yugoslav economy; second, to what extent have these institutions caused or aggravated the tradeoff between economic growth and price stability; and third, how have other economic and political factors influenced macroeconomic stability.

Inflation in Yugoslavia: The Empirical Evidence

As noted above, Yugoslav economic performance is usually divided into two main subperiods: a period of rapid real output growth and relative price stability ranging from 1953 through 1959 and a period of slower real growth and significant price pressures beginning in 1960. The basic characteristics of both of these periods are revealed in table 1.1, and graphs 1 and 2. Price fluctuations are measured by changes in two major price indexes, the retail price index and the producer price index for industrial goods. The former is a weighted average of the prices of industrial and agricultural goods and services flowing through retail trade channels. This index provides the best available comprehensive measure of price change in Yugoslavia, and it is used, in the absence of a GNP deflator, as the main indicator
GRAPH 1

Annual Rates of Growth of

- retail prices
- producer prices
- real output

real output

Annual Rates of Growth

Annual Rates of Growth of

retail prices

producer prices

nonagricultural production
of inflation in this study. The producer price index is a weighted average of the prices of industrial commodities, as charged by enterprise producers in their transactions with retail and wholesale trade outlets. As graphs 1 and 2 indicate, the retail and producer price indexes have tended to move together in the same direction, with the former exhibiting higher growth rates, except in 1970 and 1971, when producer prices rose at the same annual rate as retail prices. Of the two indexes, the retail price index is a better measure of inflationary trends, both because it includes the effects of demand and supply changes in important non-industrial markets, such as agriculture and services, and because the prices on which it is based have been relatively free from federal controls. In contrast, producer prices have been significantly controlled throughout the period, as evidenced by table 1.2, which shows the share of industrial commodities subject to various forms of price regulation.
TABLE 1.1

AVERAGE ANNUAL RATES OF GROWTH OF PRICES AND OUTPUT

<table>
<thead>
<tr>
<th></th>
<th>1953-60</th>
<th>1956-60</th>
<th>1960-65</th>
<th>1965-68</th>
<th>1968-71</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Gross National Product</td>
<td>8.2%</td>
<td>12.0%</td>
<td>6.9%</td>
<td>.7%</td>
<td>10.2%</td>
</tr>
<tr>
<td>Industrial Production</td>
<td>13.7%</td>
<td>16.8%</td>
<td>10.7%</td>
<td>1.0%</td>
<td>11.3%</td>
</tr>
<tr>
<td>Retail Prices</td>
<td>4.0%</td>
<td>2.1%</td>
<td>11.9%</td>
<td>10.5%</td>
<td>11.0%</td>
</tr>
<tr>
<td>Producer Prices</td>
<td>0.0%</td>
<td>.5%</td>
<td>4.8%</td>
<td>4.7%</td>
<td>8.9%</td>
</tr>
</tbody>
</table>

TABLE 1.2

SHARE OF INDUSTRIAL OUTPUT SUBJECT TO PRICE CONTROLS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1958</td>
<td>31.2%</td>
<td></td>
<td>60.0%</td>
<td>70.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1962</td>
<td></td>
<td>67.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1962-65</td>
<td>60.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>49.0%</td>
</tr>
</tbody>
</table>


As table 1.1 and graphs 1 and 2 illustrate, after a short-lived but sharp inflation in 1955, prices remained quite stable in Yugoslavia throughout the rest of the decade. During this period, industrial production grew rapidly at an average annual rate of 16.8% and gross national product, although fluctuating considerably due to variations in agricultural production, also grew
quickly at an average annual rate of 12.0%. This period of price stability and rapid growth fostered enthusiasm for continued structural change in Yugoslavia and paved the way for the 1961 economic reform, which was designed to bring the economy closer to full realization of the goals of market socialism and workers' self-management. As a closer look at graph 2 reveals, however, during the last quarter of 1959, prices were already beginning to rise sharply and they persisted in doing so throughout the period preceding the reform measures introduced in June 1961. Moreover, the rates of growth of industrial production and gross national product declined during 1960 and 1961, thus reversing previous trends. As a result, the reform itself was bolstered by several short-term policies to stabilize the price level and to stimulate growth in real output. As graph 2 indicates, these measures did succeed in slowing prices down, but their success was probably more apparent than real, since price stabilization was accomplished by a price freeze at the end of 1961 and by tightening price controls in 1962. When controls loosened up slightly, price increases again accelerated, and in the period from 1963III to 1965II, the average annual rate of growth of the retail price index increased sharply from 4.4% to 18.9%. At least part of this increase was the product of pent-up
inflationary pressures flowing over from the period of price control in 1961 and 1962, so that it is possible to view the entire period from 1960 to 1965 as one of significant but temporarily controlled inflation.

The second major economic reform introduced in the summer of 1965 included a number of stabilization policies to cool off the economy. The initial effect of the reform, however, was to give rise to further inflation, through a series of relative price changes which caused the absolute price level to increase at an average annual rate of 44.1% in 1965IV, 41.7% in 1966I and 37.7% in 1966II. It is essential to note that a significant, though unmeasurable, portion of this price expansion was not the result of endogenous forces operating in the economy but the product of a series of administrative price changes imposed by government decree.¹ The introduction of such changes makes it difficult to measure the actual inflationary pressure in the economy during that period and additionally, complicates the task of explaining future price trends to the extent that they were influenced by expectations arising out of the reform experience.

After the 1965 reform the average annual rate of growth of prices gradually declined and fell to a low of 3.6% in the first quarter of 1968. The slowdown in
prices was accompanied by a sharp fall in the rate of growth of real output which naturally elicited policy measures to restore economic activity. In response to these measures, the economy moved into its most recent phase of expansion characterized by an average annual inflation rate of 11.0% and an average annual growth rate of 10.2%. During this expansion the rate of inflation accelerated steadily from quarter to quarter and reached an average annual rate of 18-20% in the last quarter of 1971. In other words, despite two economic reforms, a severe economic recession from 1966 to 1968, a muted and unsteady recovery in real growth, several price freezes (August-December 1970, and November 1971-March 1972), and widening price controls, at the end of 1971, the Yugoslav economy was struggling with one of the highest inflation rates in the world. These macroeconomic developments led many observers to conclude that the Yugoslav economy was no longer capable of rapid growth except at unacceptable rates of inflation.

Yugoslav Institutions: Ideals v. Reality

Before making a judgment about the performance of market socialism and workers' self-management on the basis of Yugoslav macroeconomic experience during the last twenty years, we must first determine the degree to
which these institutions have been incorporated into the Yugoslav economy. Chapter 2 examines this issue by describing the actual decision-making and planning mechanism which has evolved in Yugoslavia since the first economic reform in 1952. Two distinct but interrelated questions are considered: first, to what extent did the structural changes introduced by law provide the institutional framework necessary for the market allocation of economic resources on the one hand and workers' self-determination on the other; and second, how and why did the actual pattern of economic behavior differ from that foreseen by the law? An answer to the first question is found by studying each of the three major reforms and by tracing the gradual transfer of areas of economic decision-making from the competence of federal political authorities to the competence of enterprise management bodies and local political leaders.\(^2\) The analysis reveals that by 1966—*but not before*—the laws governing the economy entrusted all major microeconomic decisions to legally autonomous enterprises and a legally autonomous banking and finance system, while macroeconomic tuning, indicative planning of major proportions, and foreign trade policy were left to the federal government. By 1966, an effort had also been made to reduce interference with free price formation, by lowering price
controls and subsidies and by setting a uniform exchange rate. In theory, then, the framework needed for a well-functioning market economy was completed. However, the actual situation was quite different. The gradual destruction of formal economic controls, supervised by federal political authorities and the Yugoslav League of Communists, was closely paralleled by the spread of informal political controls emanating from republican and communal governments. This second group of controls, enforced directly by local government representation on enterprise and bank management boards and indirectly by the implementation of local economic policies, significantly distorted the pattern of economic decision-making at the enterprise level. Distortions were introduced in several ways: first, local and republican governments upset market allocation signals by imposing systems of differential subsidies designed to aid faltering enterprises or favored sectors at the expense of other more profitable activities; second, government authorities meddled in the distribution of bank credits and investment funds, superimposing political criteria over much-needed economic criteria; and third, government officials directly influenced enterprise plans in such crucial areas, as mergers, contractual agreements with other enterprises, and bankruptcy. These and other forms of
political interference continued to have important implications for economic development, even after the 1965 reform, which, in theory, represented the final step in the realization of the market ideal. The evidence thus suggests that because of persistent, albeit informal and decentralized, political intervention, the Yugoslav experience does not provide a good standard by which to judge the "ideal" institutions of market socialism and workers' self-management.

This conclusion applies with particular force to questions about the macroeconomic properties of each of these institutions. As noted in the introduction, the increasingly poor macroeconomic performance of the Yugoslav economy in recent years has dampened enthusiasm for its institutional structure and especially for workers' control of enterprise decision-making. In light of the evidence presented in chapter 2, however, it is difficult to accept the proposition that it is this structure alone which has produced macroeconomic problems. Although the analysis in chapter 2 does not deny that institutional elements, such as enterprise control over prices and wages, may have played a critical role in the generation of inflation, it does identify other independent factors which have been equally important. Of these factors, perhaps the most significant has been the growing
contradiction between local and republican influence over economic activity and effective central control over money and credit conditions. Chapters 2, 6, and 7 examine the ramifications of this contradiction for overall monetary developments and hence for overall macroeconomic stability. The results reveal that continuous political pressure on the local and republican banking system and on the National Bank has made the task of regulating credit conditions a difficult one and has often produced large gaps between target and realized expansions in the volume of money and credit. This conclusion provides a cornerstone for one of the main theses to be advanced in this paper--namely, that political and social conflicts within Yugoslavia, particularly among local and republican government organizations--have frequently been resolved by recourse to the monetary system with predictable results for macroeconomic stability. The following chapters develop this thesis and contrast it with other theories of inflation which have been applied to Yugoslavia. Before proceeding in this direction, however, it is necessary to examine these alternative theories and to consider various methods of testing them.

Current Beliefs about the Yugoslav Inflation

In recent years the major starting point for an
evaluation of self-management as a form of economic and social organization has been the conviction that workers' control over prices and wages has either caused or intensified inflationary pressures in Yugoslavia. This conviction has found support in a variety of sources, ranging from official League of Communist statements that "socialist immorality" in enterprise income distribution is responsible for price increases,\(^3\) to OECD Annual Reports which argue that

the Yugoslav institutional structure which permits worker managements to establish both the prices of their products and the amount of income to be distributed to their personnel provides a built-in inflationary bias.\(^4\)

A large number of academic economists have also expressed similar ideas. In Yugoslavia, Branko Horvat, an economist of national and international reputation, has been the main spokesman for the belief that nominal wage increases in excess of productivity increases are covered by product price increases, even when demand conditions will not support the existing levels of output and employment at the new prices.\(^5\) For a time, Aleksander Bajt, another well-known and respected Yugoslav economist, also identified wage behavior as the major determinant of price changes. Bajt described the wage-price nexus, operating through the channels of inter-enterprise wage competition, in the following manner:
In the Yugoslav economic system, enterprises are autonomous in their personal income policy. Although there is no strict proportionality, personal incomes are dependent on enterprise profitability. As some enterprises enjoy better natural resources, stronger monopoly power, (and) more efficient technology, their income per employee, and therefore their personal incomes, are higher than incomes and personal incomes in less favorable conditions, all, of course, for equal work. In equilibrium, there cannot exist different personal incomes for equal work in the economy. Enterprises with low personal incomes constantly have to adapt their personal incomes to enterprises with higher personal incomes unless they want to face a declining supply of labor.  

Bašt went on to argue that inter-enterprise wage competition forces poorer enterprises to increase personal incomes beyond productivity increases to maintain their relative position in the income hierarchy and to prevent their workers from going off in search of alternative employment. These wage increases in turn lead to price increases via the traditional cost markup channels. Bašt therefore concluded that the Yugoslav inflation is mainly (but not exclusively) due to autonomous wage and price determination at the enterprise level.  

His conclusion has been supported either explicitly or implicitly by a number of western economists who also believe that in a cooperative system (such as Yugoslavia) workers may push up their selling prices directly (to validate money wage increases) and the government (may) then permit or engineer a rise in total money expenditures sufficient to equate supply to demand at the higher price level.  

All of the above arguments share the common conviction that enterprise wage behavior has been an
important, if not the crucial, factor behind inflation in Yugoslavia. In traditional, but currently unfashionable, economic jargon this conviction can be reinterpreted as a suggestion that the Yugoslav inflation is one of the cost-or wage-push variety, where autonomous wage increases adopted by powerful worker management bodies at the enterprise level have burdened the economy with a tradeoff between full employment and price stability. If this proposition is true, then one of the fundamental attributes of Yugoslavia's institutional scheme--workers' control over price, wage and production decisions--has acted as a barrier to its economic development and macro-economic stability.

**Traditional Wisdom and Yugoslav Reality**

Chapters 3 and 4 analyze two separate hypotheses which characterize conventional wisdom about the Yugoslav inflation. These hypotheses can be summarized as follows:

**H.1** Autonomous wage increases in excess of productivity increases have caused inflation of the aggregate price level.

**H.2** Enterprise wage behavior has exacerbated inflationary pressure and has worsened the trade-off between full employment and price stability.

It is important to distinguish between these two hypotheses because of their different implications for an evaluation of Yugoslav economic institutions. If H.1
is true, then workers' control over enterprise wage decisions is an inherent structural defect in the Yugoslav economy which accounts for inflation and the real economic costs incurred in stabilizing the aggregate price level. If H.2 is true, then workers' control is not an independent force generating inflation, but rather a reacting factor, which temporarily complicates the problem of restoring economic balance, once it is distributed by an inflationary shock. In this case, the Yugoslavs are best advised not to alter their institutions, but to search out the real source of inflationary shocks, in the meantime temporarily introducing wage and price controls to cut into a wage-price spiral which develops after such a shock has occurred.

Hypothesis H.1 is a strong statement of the wage-push theory in its purest form. This theory is best understood as an alternative to the traditional Keynesian or quantity theories of inflation which identify excess aggregate demand as the cause of increases in the aggregate price level. In other words, if H.1 is taken as the null hypothesis then the alternative hypothesis becomes

H.3 Excess demand on product and labor markets causes both price and wage increases.

In theory, either of these hypotheses can be tested by observing whether its predictions are consistent with the data. However, for a variety of reasons, first discussed
by Samuelson and Solow over a decade ago, "the empirical identifications needed to distinguish between these hypotheses may be quite impossible from the experience of the macroeconomic data available to us." Therefore, during the past ten years economists have avoided analyzing the causal mechanism underlying inflation on the grounds that simple hypotheses of causality are operationally meaningless, because they are empirically unverifiable. Instead, efforts have focused on identifying the parameters of the short-run tradeoff between real output and price stability. This approach has fostered the investigation and estimation of Phillips Curves and simultaneous wage and price systems, both of which describe the tradeoff between real economic variables and nominal wage and price changes, while successfully dodging the issue of causality. Many economists agree that these methods provide an indication of the importance of cost or wage-push factors to the extent that they allow the formulation of answers to the following questions:

a. What will be the output and employment response to an aggregate demand policy designed to hold the price level constant.

b. What will be the rate of inflation produced by a demand policy designed to maintain a certain level of output.
As the traditional argument goes, the larger the tradeoff the greater the importance of cost or wage factors in a given inflationary situation.

In keeping with the conclusions of this discussion, especially the conclusion about the "untestability" of alternative causal theories of inflation, the analysis presented in chapters 3 and 4 does not provide a statistical test of H.1, the simple wage-push hypothesis, or of its alternative H.3. Because of the popularity of the wage-push theory in the literature about the Yugoslav inflation, however, the meaning of wage-push pressures in a self-managed system is considered with a view toward establishing the proposition that workers' self-management is no more conducive to wage-push inflation than other forms of microeconomic organization. This proposition is important because it appears that despite their protestations to the contrary, many economists believe (a) that workers' pressure on nominal wages "causes" inflation; (b) that the institutions of self-management provide wider scope for the development of such pressures; and (c) that, as a result, workers' self-management as a form of microeconomic organization imposes a higher cost on macroeconomic stability than other forms of enterprise organization.

Chapter 4 presents the empirical results obtained
from the estimation of several price and wage equations for the Yugoslav economy and compares the trade-off between employment and price stability in Yugoslavia with the trade-offs observed in other economies. The comparison does not support hypothesis H.2: workers' self-management does not appear to have worsened the trade-off between inflation and unemployment in Yugoslavia.

Inflation, Excess Demand and the Money Supply

Although the prevailing explanation of the Yugoslav inflation has focused on wage-push pressures in the enterprise sector, a minority view has identified excessive monetary growth as the source of price increases.10 Chapters 5 and 6 present the arguments and statistical evidence supporting the minority position. Two questions are posed and considered in detail: first, why have the Yugoslav monetary authorities adopted monetary policies conducive to rapid inflation; and second, how have money supply increases led to increases in price and real output.

Chapter 5 presents a simple Keynesian model for the Yugoslav economy and derives a theoretical relationship between nominal income changes and current and lagged changes in the money supply. Empirical estimation of this relationship indicates that money supply changes
from the estimation of several price and wage equations for the Yugoslav economy and compares the trade-off between employment and price stability in Yugoslavia with the trade-offs observed in other economies. The comparison does not support hypothesis H.2: workers' self-management does not appear to have worsened the trade-off between inflation and unemployment in Yugoslavia.

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were a significant determinant of nominal income changes over the 1962-72 period. Chapter 6 examines the factors underlying changes in the money supply. The basic conclusion is that money supply increases have been employed to cover excess credit demands generated by artificially low interest rates. The Yugoslav monetary authorities have engineered money supply expansions to reduce or eliminate the gap between the demand for and the supply of loanable funds at interest rates set by administrative decree. Periodically, in response to inflationary pressures engendered by such policies, efforts have been made to cut back on monetary growth by restricting central bank credits to the commercial banks. These efforts have usually been short-lived because of widespread dissatisfaction with their short-run effects on output and employment and because of the political difficulties encountered in rationing the limited volume of credit among competing users. On balance, then, the monetary authorities have followed an excessively expansionary policy which has had predictable effects on the level of aggregate demand and prices. Chapter 6 identifies some of the political and economic pressures which have forced the monetary authorities to take such a course. The discussion focuses on the institutional structure of the banking structure, illustrating how
local and republican political control has interfered with effective monetary management.

**Trade Credit, Illiquidity Crises and Inflation**

Efforts to control the rate of inflation by restrictive monetary policy have led to the recurrent appearance of liquidity crises in the Yugoslav economy. Such crises have been characterized by a huge expansion in the outstanding volume of defaulted trade bills and by the threat of bankruptcy in the enterprise and banking system. Chapters 7 and 8 examine the liquidity crises in greater detail and attempt to relate them to changes in monetary policy and changes in the rate of inflation. Chapter 7 begins with a theoretical analysis of inter-enterprise trade credit and then presents some evidence on the use of trade credit in the Yugoslav economy. A model of trade credit is developed and estimated for the Yugoslav enterprise sector to test the responsiveness of trade credit extension to changes in monetary policy. Chapter 8 discusses how trade credit expansion has aggravated economic contractions and how growth in the volume of unpaid trade bills has eventually forced the monetary authorities to reverse restrictive monetary policy to prevent widespread bankruptcy. Particular attention is given to the role of local political
authorities and local banks in protecting local enterprises from legal sanctions against tardy debtors, thereby encouraging unsustainable growth in inter-firm indebtedness.

Conclusions

The theoretical, empirical and institutional analysis presented in the following pages points to a simple conclusion: the sources of inflationary pressure in Yugoslavia have been the unresolved political and ideological contradictions which influence the government's ability to formulate and execute the macroeconomic policies required for price stability. Contrary to prevailing opinion, the results presented in chapters 3 and 4 reveal that the price and wage setting practices of self-managed firms have had little impact on the inflationary process. Rather, the important factor, as identified in chapters 6 through 8, has been the deep-felt ethnic and regional rivalries which continue to threaten the existence of a unified Yugoslavia. Until these rivalries are resolved, or until the ability of competing groups to further their economic interests through recourse to the monetary system is eliminated, the prospects for macroeconomic stability are likely to remain poor.
Footnotes

1. The 1965 reform did not have as its aim an increase in the general price level but rather a series of relative price changes. However, downward price rigidity meant that relative price changes could be effectuated only with an increase in the aggregate price level.

2. Local political leaders include members of communal and republican governments. Communes are the smallest units of government organizations in Yugoslavia and correspond roughly to municipalities in the U.S. Republics, the next level in the administrative structure, correspond to states. For a full discussion of government organization in Yugoslavia see chap. 2.


7. In recent publications Bajt has revised his position, identifying demand factors as the source of price and wage pressures. His new views and empirical support for them are found in "Dohoci Stanovnistva i Cene," Gospodarska Gibanja, June 1972 (Ljubljana: Ekonomskii Institut, Pravne Fakultete).


CHAPTER 2

ECONOMIC AND POLITICAL DEVELOPMENTS IN YUGOSLAVIA:
MYTH VERSUS REALITY

Introduction

Early in the fifties the Yugoslavs began to create a new economic order based on the principles of market socialism and workers' self-management. According to the ideals underlying the new system, autonomous groups of workers, employing state-owned tools of production, were to direct all aspects of enterprise activity, and government control was to be limited to indirect supervision of the use of socially owned capital via taxation, investment planning and finance, and indicative or aggregate planning techniques. In the twenty years since the introduction of these ideals, the Yugoslavs have struggled to make them a reality despite substantial economic and political obstacles. The story of this struggle is instructive both because it identifies the main structural changes which have occurred in the Yugoslav economy and because it suggests the types of problems which liberalizing reform movements in
Eastern European economies are likely to encounter. Additionally, it provides the general economic and historical perspective necessary for a more detailed analysis of the specific problem of macroeconomic balance and inflation in the Yugoslav economy.

Both economic and political reform movements in Yugoslavia have been directed at reducing the role of the central government in political and economic life, and correspondingly, at increasing the scope of independent decision-making at the level of the individual economic unit and at the level of the individual local government. The first steps along this path occurred during the 1950-53 period when soviet-type methods of central planning were replaced by a modified market system in which each enterprise was instructed to make its own output and purchase plans, based on an evaluation of its market prospects and motivated by the goal of profit maximization, and when federal supervision over enterprise activity was largely superseded by the supervision of local political authorities. In designing the economic content of this first decentralization reform the Yugoslavs unconsciously imitated the blueprint for market socialism elaborated by Oskar Lange in his classic work on the theory of socialism. The Yugoslavs deviated from this blueprint in their decision that enterprises should not be guided by
independent managers, whom they thought were likely to become either government figureheads or profit-hungry capitalists, but by associations of working people or so-called workers' councils, representing all of the workers employed in each firm. The Yugoslavs found support for this decision in the works of Marx and earlier socialists who had developed the idea of communal forms of economic production and decision-making. According to the Yugoslav theorists who offered this support, workers' control at the enterprise level, accompanied by extensive political control at local centers of government, was the logical step in the progression from capitalism through state ownership to true communism. Other communist states had therefore erred in not reducing autocratic methods of economic planning and, as a result, private capitalism had been transformed into "state capitalism," the Yugoslav term for the Soviet form of central control in which all economic and political agents were stripped of independence by a new class of bureaucrats.

The process of economic decentralization set into motion by the 1950-53 reforms was accompanied by an equally extensive process of political decentralization which placed local government organizations, called communes, in new and more responsible economic positions through the "gradual substitution of bodies of local
self-government for the (federal) state apparatus and its competence." Under the new laws the communes, which had hitherto been the main government organizations responsible for executing federal economic policy, themselves became the authors of such policy. Thus, communal officials were granted the right to establish enterprises, to supervise the establishment of enterprises by non-governmental groups, to oversee the appointment of enterprise managers, to audit enterprise financial transactions and to levy taxes on enterprise profits and income. In general, the functional decentralization of economic policy-making in this fashion strengthened the role of the communal authorities at the expense of the federal authorities while leaving the role of the republican authorities more or less unchanged. By law, the republics retained their right to tax enterprises, to oversee their activity to guarantee conformance with prevailing economic laws, and to take part in the planning and financing of investment. In practice, however, the decentralization process worked to enhance the competence of the republican governments in economic affairs, because, with the expansion of communal authority, coordination of local enterprises and local governments became one of their major pre-occupations. Thus, the political and economic reforms served to widen the scope of communal
and republican government influence in economic activity while reducing the scope of federal influence. Overall, of course, both the political and economic reforms meant a major reduction in the role of government in all aspects of economic life.

At first glance the apparent decision of the Yugoslav Communists to forego their power in favor of greater autonomy among a much larger, and hence less controllable, group of economic decision-makers appears surprising. Why, after all, did the centralized League of Communists wish to opt for decentralization when central domination promised more influence for each individual in the League and for the leadership as a whole? The answer to this question lies both in the political pressures exerted within Yugoslavia by external political crises, such as the Comecon blockade and expulsion from the international communist alliance, and in dissatisfaction with the economic results of central planning. The political crisis of the early fifties was precipitated by the expulsion of Yugoslavia from the Cominform in 1948, and by the economic blockade which followed. Stunned by Stalin's unexpected rejection of their political and economic system, the Yugoslav leadership at first tried to alter that system so that it conformed even more closely to the Soviet paradigm. Thus, in the months
Following the Cominform resolution the Yugoslavs tightened up their industrial planning controls and ushered in a more rapid phase of collectivization in agriculture. By late 1949, however, these efforts had borne little success and the Yugoslav party leaders switched to a policy of criticizing rather than emulating Soviet political and economic organization. At least part of the motivation underlying this policy switch was the fear of the party chiefs that pro-Stalinist elements might gain control if the current situation continued. Party leaders also feared the possibility of an armed Soviet invasion and the necessity of another partisan war. Under these circumstances, outspoken criticism of Soviet institutions and the development of unique Yugoslav institutions could serve as a rallying point to enlist political support for the war effort. Out of such motivations and out of a growing belief among Yugoslav thinkers that the undesirable aspects of Soviet foreign policy in Eastern Europe were the necessary byproduct of the centralization of political and economic power in the Soviet Union, arose a new examination of socialist theory by Yugoslav Marxists, an examination which supported the conclusion that only self-management in the enterprise and self-government in the commune were consistent with the true socialist model.
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The poor economic performance of the Yugoslav economy added fuel to the fire of economic reform first ignited by the political events of 1948 and 1949. In 1952, national income barely exceeded 1947 levels despite the initial successes of the first Five Year Plan (1947-51) and despite a high rate of investment in the ensuing years. In fact, industrial production stagnated in 1950 and actually declined in 1951 and 1952. Declining growth in the industrial sector was accompanied by reductions in agricultural output caused in part by drought and in part by the negative response of the peasants to forced collectivization. Moreover, the economic situation was clearly aggravated by the sharp drop in foreign trade and aid caused by the Comecon blockade. Before the blockade, 48.3% of Yugoslav imports came from the Soviet Union, Czechoslovakia and Hungary; in 1950, trade with these countries was virtually non-existent. As a result of these and other factors, the Yugoslav economy failed to attain its targeted growth rate. The Yugoslav party leaders, dissatisfied and disappointed by this failure, began to look for its causes not only in the specific economic conditions of the time but also in the organizations of planning and political control which they had adopted from the Soviets. Thus, the political and economic crises coalesced to encourage growing criticism of
central planning and growing interest in organizational alternatives for political and economic life. The result was the elaboration and introduction of the principles of self-management, market socialism and socialist democracy.

Contradictions in the Yugoslav Reform Movement

Although the preceding discussion sheds some light on the causes of the first reform movement in Yugoslavia, it does not indicate why the reform took the shape of massive decentralization of both economic and political power. To understand why the reform took this course, it is necessary to recall the multinational character of the Yugoslav state and the long tradition of ethnic rivalries and political suppression which marks its bloody history. Centuries of foreign domination made the Yugoslavs suspicious not only of state machinery but of the state itself. Deeply felt ethnic rivalries made cultural homogeneity politically infeasible and made the spectre of strong government in Belgrade a spectre of Serbian nationalism disturbing to other national groups. Under these circumstances, the 1950-53 reforms represented an attempt by the Communist leaders to stabilize and control the existing situation by increasing the local participation of the individual in both economic and political life. The reform's emphasis on decentralization is therefore at least partly explainable in terms of the
exigencies of the political situation which forced the party leaders to recognize the principle of ethnic sovereignty and independence in order to maintain control over the heterogeneous groups making up the Yugoslav population. 10

The blueprint for the new economic and political structure presented in the reforms of the early fifties has served as the cornerstone for the various piecemeal changes and the major economic reorganizations which have occurred since then. The bewildering array of institutional changes adopted formally or informally in the past twenty years has been the product of persistent endeavors to translate this blueprint into reality. The difficulty which the Yugoslavs have encountered in making this transition stem from contradictions within the reforms themselves and from contradictions between economic and political decentralization on the one hand and continued party control on the other. The major contradiction within the reform movement has been the contradiction between independent economic decision-making guided by the principle of profit maximization at the level of the individual production unit and the increased role of communal, and to a lesser extent, republican governments in enterprise operations. Thus, instead of independent enterprises making production and input decisions on the basis
of impersonal market signals, the Yugoslav economy has fostered local or "territorial" enterprises whose economic choices are heavily influenced by the needs of the communal or republican economy or by the economic and political aspirations of its leaders. Moreover, local government agencies have acted as a shield to protect local enterprises from unfavorable economic policies adopted by the federal government in Belgrade. Thus, the federal authorities have found it increasingly difficult to carry out their recognized function of coordinating the macro-economic development of the entire economy.\(^{11}\)

The second major contradiction blocking the realization of the goals of economic reform has been the contradiction between party dominance over economic and political life and decentralization of political and economic decision-making. Frequently, this contradiction has been reflected in a split of League of Communist members into two factions: the so-called "centralizers" who favor the consolidation of economic policy making at the federal level, and the "decentralizers" who argue for greater independence in policy formation and execution at the enterprise level. These two factions have struggled with one another over the past twenty years and, depending on the prevailing economic or political situation, one or the other has gained ascendancy. Under
the impetus of external and internal political pressure in 1948 and 1949, the factional struggle temporarily abated, subdued by the need for a political consensus. Once external threats subsided, however, consensus gave way to conflict and conflict led to a step by step recentralization of power. The resulting pattern of massive decentralization followed by gradual reconsolidation of economic decision-making at the center has occurred after each major reform in 1952, in 1961, and in 1965. Undoubtedly, in the process real progress has been made at extending the realm of economic behavior lying beyond formal government interference. Nonetheless, the inconsistencies both within each reform and between reform guidelines and economic policy measures adopted shortly thereafter, have meant that economic decisions have taken place in an environment of conflicting economic signals and expectations where political and not economic criteria have been of overriding significance. Consequently, the performance of the Yugoslav economy in recent years has been less a testimony to the effectiveness of market socialism and workers' self-management than a testimony to the fact that political dissension about economic structure can produce a structure so distorted as to have serious implications for aggregate economic activity and stability. In light of this conclusion, any study of a
seemingly "pure" economic phenomenon such as inflation must begin with an analysis of the contradictions in the Yugoslav economy and of the political conflicts creating them.

**The Yugoslav Economic System: Ideal v. Reality**

*First Reforms, 1950-61*

Behind the slogans of enterprise autonomy and workers' self-management the true pattern of economic decision-making in Yugoslavia has been shaped by an ever-changing balance between political authorities and individual enterprises. Throughout most of the fifties, this balance remained securely tilted in favor of political bodies at both the federal and local levels of government. Although in 1952, enterprises gained considerable control over production and sales decisions, their independence in the field of net income distribution and personal income payments (the Yugoslav analog to wages) was severely restricted by a series of taxation measures which siphoned off nearly 60-65% of firm gross income (defined roughly as profits inclusive of wage payments). (See table 2.2 of this chapter for data on the distribution of enterprise income from 1952 to 1972.) These measures were reinforced by a number of direct controls over the volume and the range of wage payments. Until 1955, federal government directives specified both the
average level of the "fixed" or "accounting" wage, and
the distribution schedule for the total wage bill for
each industrial sector. After 1955, wages and salaries
were no longer determined directly by the government,
and in principle, at least, each enterprise could inde-
dependently determine both the size and the distribution of
its wage bill, subject only to the approval of the compe-
tent communal government and to the supervision of the
Confederation of Trade Unions. Because the trade union
organization, and to a lesser degree, the communal govern-
ments, were at that time spokesmen for the wishes of the
Party and its leaders, this system meant the de facto
continuation of political control over wage determina-
tion. In addition to supervision over wages, the fed-
eral and local governments maintained direct or indirect
control over the shares of profit paid out to workers by
constantly altering the profit-sharing legislation in
their favor. Thus, during the 1954-57 period, only 4.8-
9.2% of enterprise profits were paid out to workers,
while the remainder went into federal or local govern-
ment budgets and compulsory enterprise funds. After
1958, in response to worker demands for greater autonomy
in income distribution, the system of wages and profit
sharing was changed and a compromise solution was
reached. As described by Horvat, this compromise took
the following form:

The accounting or fixed wage schedules (set by the firm) remained and were still subject to the approval of local authorities and trade unions. The enterprise income was treated as a single whole and was distributed by workers' councils into wages and contributions to various funds. The difference between income and accounting wages (called minimum personal income) was progressively taxed.15

This system remained unchanged until the 1961 reform when both progressive taxation and outside tutorship by communal authorities were abolished, thereby giving the workers' councils full control over wage determination.

The counterpart to control over firm income distribution during the fifties was the centralization of investment resources in the hands of the political authorities. With federal and local governments culling off the largest share of potential enterprise savings and with personal savings at low levels because of low personal incomes and a poorly developed capital market, the state played the main role in the collection and disbursement of investment resources. As table 2.1 indicates, the share of all levels of government in total investment finance, while constantly falling, nevertheless remained substantially larger than the enterprise share throughout the decade. Consequently, the distribution of credits for the expansion of existing factories and the building of new ones remained at the government's initiative, with the expected result that political
standards often outweighed economic ones in the allocation decision. Loans were frequently granted not to the projects with the highest discounted flow of returns but to those which won the most political support, either because of their prestige value or because of their employment prospects. Political considerations therefore led to the creation of "political factories" a term which the Yugoslavs themselves coined for the many enterprises which were funded primarily for political reasons and which proved to be incapable of profitable operation in the market.

While it is impossible to get a quantitative measure of the importance of "political factories" in terms of capital and other scarce resources wasted in their development, some anecdotal evidence does indicate just how significant political rather than economic criteria were in many crucial investment decisions. For example, during the fifties, each republic had built or was planning to build a steel mill. The Yugoslavs estimated that to break even one such mill should produce at least two million tons annually. Yet by 1965, as a result of republican and local government pressure for their own steel mills, Yugoslavia had five mills, scattered over four republics, together producing 2.2 million tons.\(^{16}\) In the late 1950's, when duplication of product facilities
caused by the political investment craze reached its peak, there were also several plants manufacturing automobiles and a number of electronics concerns in Serbia, Croatia, and Slovenia, each producing a different kind of television (and each producing a different kind of computer by the 1960's). Perhaps political investment and duplication in facilities reached its most absurd level in the field of public transportation, where one republic established its own airline company to compete with the Yugoslav national airlines and where bus service among the republics suffered from duplication and lack of coordination. The trend of political investment characterizing this period was summarized quite aptly by the authors of the recent Yugoslav Government Capital Market Study, in the following statement:

By using their influence, the DPZ's (local and republican governments) obtained bank credit for the financing of projects which had no adequate economic basis, . . . . and in return, the DPZ's (would) protect them in cases of application and implementation of sanctions foreseen in the case of violations of policy rules as regards liquidity and . . . . other credit policy measures.

The "political factories" phenomenon was largely the product of the spread of political decentralization which accompanied the economic reform. As noted earlier, an accepted reform goal was the transfer of political control from central to local organs of government, a transfer which was completed in many fields during the
1952-60 period. The resulting shift of power placed many crucial economic activities—such as the establishment of new industries, enterprise taxation and financial supervision, investment allocation and some aspects of price policy—under the competence of both republican and local or communal organs of government. Ordinarily, such a shift might be presumed to produce desirable effects, by breaking the hold of central domination and by reducing the need for costly information flows about local conditions between the center and the periphery. However, special conditions in Yugoslavia, most notably the existence of historical ethnic rivalries and huge disparities in the development levels of different republics and communes, complicated the decentralization procedure and reduced its potential benefits. From the beginning the center of controversy in the decentralization scheme became the allocation of central investment funds among competing communes and republics. As table 2.1 illustrates, although decentralization was accompanied by an increase in locally controlled investment funds, particularly at the commune level, the federal government continued to hold the largest volume of investment resources and their distribution became the object of attack from all sides. The struggle was especially severe in the less developed republics and communes, where
available investment funds were scarce because of the small enterprise tax base\textsuperscript{21} and where there was no hope of improving the situation until that base was broadened by the establishment of new industry and the expansion of old. In such circumstances local political authorities used their power to pursue their own interests.

\begin{table}[h]
\centering
\begin{tabular}{lrrrrrrrr}
\hline
&  &  &  &  &  &  &  &  \\
ampers Budgets & 98 & 64 & 52 & 59 & 36 & 16 & 16 & 15 \\
\hline
\textbf{Federal} & 50 & 47 & 37 & 30 & 7 & 6 & 9 & 8 \\
\textbf{Republican} & 41 & 9 & 7 & 9 & 8 & 3 & 3 & 4 \\
\textbf{Communal} & 7 & 8 & 18 & 20 & 21 & 7 & 4 & 4 \\
\textbf{Enterprises} & 2 & 35 & 37 & 38 & 32 & 46 & 37 & 34 \\
\textbf{Banks} & - & 1 & 1 & 3 & 32 & 38 & 47 & 51 \\
\hline
\end{tabular}
\caption{The Composition of Investment by Source of Finance (\%s)}
\end{table}


narrowly conceived as obtaining investment funds for the construction of industry and protecting it regardless of cost. In the resulting conflict the federal government was forced, cajoled, or otherwise convinced to allocate a larger share of its own resources to projects where the expected rate of return fell short of the potential maximum. This was particularly true in the 1957-61
period, when the social plan embodied the goal of equalizing regional differences and where the allocation of federal investment funds was chosen as the main method for attaining this goal. Not surprisingly, political considerations often held firm sway over federal investment decisions during these years, and the same conclusion applies without exception to decisions about the allocation of local and republican investment funds as well.²²

The political factories phenomenon was a predictable consequence of the contradiction between political decentralization and independent economic decision-making, a contradiction which was identified earlier as an inherent flaw in the political and economic reforms. Under the system of decentralization local government authorities were made dependent on their local economic base for continued survival and autonomy. Not unexpectedly, then, these authorities showed an interest in building up this base as fast as possible through the process of capital expansion and investment. In the rush for resources, each communal or republican government struggled to gain the largest possible share of federal resources and continued to invest its own resources in territorial projects despite the fact that projects in other areas of the economy might be more
profitable. Thus, the decentralization scheme created a number of noncompeting territorial capital markets, within each of which funds were allocated among projects and enterprises on the basis of independently determined criteria. Traditional ethnic rivalries and suspicions undoubtedly played a role in the development of territorial capital markets as well. In such a situation, the federal government was the only agent in a position to allocate investment resources on purely economic criteria and since the lion's share of such resources fell into the hands of the federal authorities, the potential for economic rationality in resource allocation decisions did exist. However, this potential was blunted for two reasons. First, the federal government had committed itself to the goal of equalizing per capita income differences across republics. To achieve this goal, the government frequently allocated its investment resources in ways which favored the less developed areas while simultaneously reducing the pressures for efficiency in the use of these resources. Thus, recipients of federal funds in a less developed republic received preferential access to certain funds, subsidized interest rates and tax rebates, and in some instances, funds were even received as outright grants. Second, because of its dependence on the precarious coalition of divergent and
historically hostile ethnic groups, the federal government was forced to fashion its investment policies so as to give a "fair" share to each republic and ethnic group. To the extent that such ethnic considerations yielded allocation decisions which conflicted with the decisions consistent with economic indicators, the federal government was forced to sacrifice economic efficiency for political stability.

Quite often the power of local political leaders extended beyond the investment allocation procedure into other areas of economic activity. Certainly the law fore-saw such an extension of power by granting to communal governments the right to establish enterprises within their territories and to supervise these enterprises in their business operations. Thus, the new regulations made the communal government the sole link between local enterprises and overall federal plans and directives for the functioning of the economy. The actual degree of control which communal officials came to exercise probably far outweighed what the designers of the reform laws had envisioned. Gradually, communal governments came to oversee nearly every aspect of enterprise decision-making, either directly by appointing their representatives to enterprise self-management bodies or indirectly by employing economic measures such as price
policy or licensing arrangements. Often the overlap between local government officials, local Party members and local enterprise directors was so large that indirect methods of control proved unnecessary. Moreover, in many areas the interests of the communal government and the enterprise were naturally coincident. For example, government officials wished to expand the size and production line of local businesses in order to increase their tax base and to insure local employment opportunities. In this they were supported by enterprise managers and workers, both of whom expected larger personal incomes and more community status from a growing enterprise. In other areas, of course, the interests of government and business diverged. Often this divergence went beyond the traditional issues of taxation and financial control to such crucial matters as whether an enterprise should purchase its material inputs from costlier local sources or from cheaper extra-territorial producers. In such matters, the government's local outlook came into direct conflict with the cost-minimization or net-revenue-maximization goals of the enterprise and in the ensuing struggle, the government often won.

The symbiotic relationship between commune and enterprise had two important consequences: first, it tended to exacerbate underlying ethnic rivalries within
Yugoslavia by reinforcing local as opposed to national attitudes in decision-making; and second, it interfered with the correct allocation of scarce economic resources according to economic criteria. Both consequences had important implications for future economic development, the former by undercutting the political concensus necessary for consistent economic policy formulation and the latter, by burdening the economy with a number of unprofitable enterprises whose continued existence depended on the kind of state budgetary and protective support which directly contradicted the goal of market socialism.28

Second Reform Efforts, 1961-65

By the end of the fifties actual economic activity was exceeding planned levels despite numerous political and economic distortions, and this, combined with growing dissatisfaction with the system of investment allocation, stimulated new efforts at further economic reform. Unfortunately, these efforts were made more difficult by the local and republican attitudes which had become firmly entrenched in the minds of local government leaders. Basically, these attitudes divided decision-makers into two groups, the so-called liberals who favored greater enterprise freedom and more dependence on market criteria and the conservatives, who demanded a recentralization of economic power and greater emphasis
on the planning mechanism. The liberals tended to represent the more developed republics whose governments and enterprises could function effectively and profitably within a market framework, while the conservatives found most of their support in the less developed areas whose prospects for growth were threatened by the imposition of pure price signals. This liberal-conservative (rich-poor, north-south) split within both the League of Communists and the nation meant that any acceptable package of economic reforms would necessarily be a compromise between policies directed at enlarging the scope of the market and policies which guaranteed non-market resolutions of sensitive economic problems. Furthermore, the precarious foundation of such a compromise meant that any temporary setback in economic performance, following the adoption of reform measures, would probably cause their hasty reversal. In short, without widespread political agreement, the task of designing and implementing an internally consistent, permanent economic reform became difficult, if not impossible.

The pitfalls encountered in reform execution first became apparent in 1961, when the government introduced important changes in three areas of economic policy—wage control, foreign trade and the banking system. These changes were aimed at increasing enterprise autonomy
by eliminating external supervision over the distribution of personal incomes, and at sharpening market signals both by subjecting domestic producers to foreign competition at uniform exchange rates, and by replacing the centrally controlled credit apparatus with a decentralized banking system. The impact of the new economic structure on economic performance was confounded with the effects of simultaneously imposed stabilization policies, directed at reducing the rate of inflation which had reached 10% in 1960. These policies included an overall credit and monetary restriction, a dinar devaluation, and a series of relative price changes designed to remove dis propor tions in prices and personal incomes of different branches of production, thereby making the dinar a universal measure of value for economic decision-making.

The combined results of reform and stabilization were disastrous. By the end of 1961, the rate of growth of industrial production had fallen from 12% to 4%, while prices had continued to increase at 6-9%, and final product inventories had begun to accumulate at an annual rate of 20-25%. These and other adverse economic manifestations brought immediate political reaction in the form of a temporary reintroduction of trade union and government guidance over wage increases, a reimposition of substantial price controls, and a gradual reappearance
of protection in foreign trade via subsidies and multiple exchange rates. The official interpretation of the economic crisis which motivated such policy changes focused on the wage and price behavior of individual enterprises as the source of inflationary pressure. Thus, government spokesmen blamed the inflationary surge on the workers' councils' lack of socialist morality, as manifested by increases in the share of enterprise net income distributed to workers and corresponding reductions in enterprise retained earnings.³¹ According to this interpretation, administrative intervention in the field of wage determination and enterprise income distribution was necessary, and government commissions were rapidly set up at the communal, republican and federal levels to "advise" the enterprises on the distribution of their revenues.

By the end of 1962, much of the reform had been reversed, and in some areas, such as price formation, the economy was actually more control-ridden than it had been before the reform's introduction.³² In other important areas, however, the liberalizing effects of the reform lingered, most notably in the field of wage formation, where formal government regulation was finally permanently suspended in 1963 and informal supervision slowly gave way to total enterprise autonomy.³³ This
structural change had significant implications for macro-
economic stability because it provided the basis for a
possible price-wage spiral, in which initial price in-
creases caused by excess aggregate demand would stimu-
late continuing rounds of wage and price inflation. Ad-
ditionally, the transfer of control over wages to workers
introduced the theoretical possibility of a traditional
cost-push inflation, whereby autonomous wage increases
would generate price increases and output reductions in
the absence of excess demand. These relationships be-
tween structural changes in the field of wage formation
and inflationary pressures are discussed in greater de-
tail in chapter 3.

In the years following the 1961-62 crisis new
reform ventures were limited to restructuring the banking
and investment loan mechanism, with the aim of replacing
the much criticized system of central political control
with a new system of decentralized political control.
The first step in this direction had occurred in 1961,
when the communal banks had taken over all short-term
loan and deposit operations from the National Bank.34
Thereafter the National Bank terminated its direct credit
relationships with enterprises and began to function as
a traditional central bank, regulating the policies of
the communal and republican banks35 by reserve requirements,
rediscount measures and the like. Because under the new arrangements bank lending decisions were entrusted to groups of managers nominated by enterprises and other local interest groups and appointed by local political authorities, the transfer of credit activity to communal banks resulted in the formalization of still another channel linking local government officials and local industry. This institutional structure produced several predictable distortions in lending behavior. These distortions are discussed at length in chapter 6 and are only summarized here. First, political criteria exercised a significant but unmeasurable influence on the allocation of short term credits, an influence which was all the more important because interest rate controls made non-price rationing essential for distributing credits among competing users. Second, unprofitable local businesses which failed to satisfy the minimum credit-worthiness requirements of the National Bank nonetheless continued to obtain bank loans, because local banks were forced to accept local government "guarantees" that such loans would be repaid. Third, local banks frequently violated National Bank directives about the terms under which short term credits could be granted with the result that National Bank efforts to maintain macroeconomic balance by the imposition of qualitative credit standards
were often rendered ineffective.

Each of these distortions highlighted the existence of the underlying contradiction between macroeconomic monetary stability and the efficient distribution of scarce credit on the one hand and local political control over the banking system on the other. Of course, had the National Bank found itself capable of strictly regulating the local bank network, this contradiction would have disappeared, but particularly in the 1961-65 period, the "real bills" credit policy which virtually guaranteed the extension of central bank credit for clearly specified purposes made strict regulation impossible. Even after the National Bank introduced a more easily enforceable policy of direct quantitative controls in 1965, there were still numerous violations and actual credits exceeded planned limits. In such circumstances, pressures for credit expansions, initiated by local borrowers and supported by local banks, complicated the task of overall monetary control. Consequently, the contradiction between local control of the banking system and effective macroeconomic monetary management became an important structural factor enhancing the susceptibility of the economy to inflationary pressures generated by excessive money and credit increases. The role of this factor in the initiation and generation of inflation is discussed
in further detail in chapter 6.

The localization of the banking network was accompanied by renewed efforts, especially within the liberal, developed republics, to force the liquidation of centrally controlled investment funds. These efforts finally produced some results at the end of 1963, when the federal government transferred the assets of its General Investment Fund to the three specialized banking institutions—the Yugoslav Investment Bank, the Yugoslav Bank for Foreign Trade and the Yugoslav Agriculture Bank—which had previously supervised their distribution. Thereafter, these institutions were allowed to disburse investment resources as they saw fit, provided they upheld certain general credit directives specified by the federal government. This transformation led to another in 1965, whereby a share of federal investment funds and all republican and communal investment funds were placed in the hands of the communal banks which became responsible for their allocation. All of these transfigurations, however, did little to break the sway of political influence over the field of investment planning and finance, because banks continued to employ government funds in close accordance with contractual agreements which defined either the purpose or the project for which such funds were to be used. As Bićanić notes, under the process of financial
decentralization which occurred in the 1962-65 period, the politicians able to influence communal banks gained power at the expense of the politicians at the federal level. Since the communal banks were small, numerous, and territorial in nature, they were easy prey to control by local political officials who persisted in maintaining their own banks as financial adjuncts to their policies.  

Major Economic Reforms, 1965

The above paragraphs indicate that on the eve of the 1965 reform the Yugoslav economy was still far from the goals of market socialism and complete enterprise autonomy. The main obstacle lying between these goals and their attainment was the persistent play of political factors in economic life. After the dismantling of the central planning apparatus in 1952, this politicization had taken on new forms which, because of their highly informal nature, were more difficult to identify, but often equally as effective as some of their more formal predecessors. Direct guidance of important enterprise decisions by detailed plan directives had been replaced by indirect supervision exercised in a variety of ways, ranging from overlapping membership in government bodies and enterprise workers' councils to local government subsidization of faltering industries. Allocations of investment funds through the federal budget had been
followed by the accumulation and distribution of government money through a politically submissive banking system. These and other changes in form did little to eradicate the negative effects which political interference had on both the efficient use of economic resources and the macroeconomic stability of the economy.

By 1965, widespread dissatisfaction with deteriorating economic performance provided the impetus for the introduction of still another economic reform. Basically, this reform reconfirmed the policies which had been adopted in 1961, only to be reversed or ignored in the ensuing economic crisis, specifically, the policies of freeing international trade, increasing the autonomy of the banking and credit system, and reducing the constraints on enterprise behavior. In order to provide the economic environment conducive to the realization of reform aims and in order to restore macroeconomic balance, several measures were adopted. First, a massive devaluation of the dinar brought the official parity from 750 dinars to the dollar to 1250 dinars to the dollar. The devaluation represented an effort to stem growth in the balance of payments deficit which had doubled in size between 1963 and 1964. Second, the entire price and personal income structure was reshaped to correct the distortions in relative prices caused by lingering price controls.
Because of substantial downward price rigidity, relative price distortions were corrected by compulsory price increases in many important sectors of production, such as agriculture, services, and raw materials. As a result of these administrative price increases, the average price level rose by 25% between July and August 1965, and nominal personal incomes were marked up by a similar amount to maintain real living standards. Third, changes in taxation increased the share of net income left to the enterprises. These changes represented the continuation of a trend begun in the fifties to transfer discretionary control over net income to the workers. As table 2.2 indicates, the 1965 reform was a major step forward in this direction and therefore brought the economy closer to the self-management ideal whereby workers freely dispose of the profits of their own production efforts.

The expansion of the share of net income remaining within the enterprise was also intended to bolster another reform goal, namely, further "depoliticization and de-statization" of the capital market. By reducing the flow of funds from gross enterprise receipts to government coffers, the designers of the reform hoped to reduce the economic power of the state and to increase the economic rationality of investment decision-making.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Value-Added</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Depreciation</td>
<td>62.3</td>
<td>9.5</td>
<td>8.1</td>
<td>9.5</td>
<td>8.8</td>
<td>8.7</td>
<td>10.8</td>
<td>10.1</td>
</tr>
<tr>
<td>Legal and Contractual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obligations</td>
<td></td>
<td>55.6</td>
<td>51.7</td>
<td>51.2</td>
<td>39.9</td>
<td>36.2</td>
<td>38.1</td>
<td>37.9</td>
</tr>
<tr>
<td>Turnover Taxes</td>
<td>-</td>
<td>11.7</td>
<td>10.0</td>
<td>11.7</td>
<td>9.0</td>
<td>9.5</td>
<td>10.5</td>
<td>10.1</td>
</tr>
<tr>
<td>Taxes on Wages</td>
<td>-</td>
<td>13.8</td>
<td>12.6</td>
<td>17.8</td>
<td>19.2</td>
<td>16.8</td>
<td>16.2</td>
<td>14.5</td>
</tr>
<tr>
<td>Other(^a)</td>
<td>-</td>
<td>30.1</td>
<td>29.0</td>
<td>21.7</td>
<td>11.7</td>
<td>9.9</td>
<td>11.5</td>
<td>13.3</td>
</tr>
<tr>
<td>Net Personal Incomes</td>
<td>32.9</td>
<td>25.8</td>
<td>28.1</td>
<td>28.7</td>
<td>31.9</td>
<td>34.8</td>
<td>35.9</td>
<td>36.5</td>
</tr>
<tr>
<td>Allocations to Funds:</td>
<td>4.8</td>
<td>8.8</td>
<td>12.1</td>
<td>10.6</td>
<td>19.4</td>
<td>20.3</td>
<td>15.2</td>
<td>15.5</td>
</tr>
<tr>
<td>Enterprise Funds</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>9.4</td>
<td>18.5</td>
<td>19.4</td>
<td>14.5</td>
<td></td>
</tr>
<tr>
<td>Joint Reserve Funds(^b)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.5</td>
<td>.9</td>
<td>.9</td>
<td>.6</td>
<td></td>
</tr>
</tbody>
</table>


\(^a\)Includes interest on bank credits, the tax on business funds and other taxes on enterprise income before 1965.

\(^b\)Joint Reserve Funds are compulsory funds held by enterprises to cover temporary losses. See chap. 8 for a full discussion of these funds.
In pursuit of this goal they also restructured the banking system, replacing communal banks, whose operations had been geographically restricted, with commercial banks empowered to carry on short- and long-term deposit and loan business throughout Yugoslavia. Besides enlarging the territorial horizons of individual banks, the reformers also changed the composition of their managing boards so that major enterprise borrowers and depositors received the majority voice in determining bank policies. Of course, the transfer of bank supervision to business clients was matched by a reduction in government influence over bank behavior, at least as exercised through formal channels.

All of the above reforms had as their broader goal the ultimate realization of the free market ideal. In order to attain this ideal political leaders at first expressed a willingness to bear the necessary short-run costs, and the 1966 "purge" of Ranković, Tito's heir-apparent and the figurehead of conservative opposition to the reform, symbolized the decision of the ruling liberal majority in the League of Communists to press ahead despite initial economic setbacks. Some of these setbacks had, in fact, been anticipated, particularly the increasing pressure on unprofitable enterprises, whose existence depended on the subsidies, price controls, and
political intervention which the reform hoped to eradicate. The exact number of such enterprises is unknown but estimates indicate that nearly 30% of all social sector firms, employing more than 16% of the social sector working force could not survive in the new market structure. These estimates may be excessive because restrictive monetary measures, combined with abrupt changes in relative prices, undoubtedly caused short-run adjustment problems and losses in otherwise profitable enterprises. However, even in 1964, despite an inflationary boom, one out of every seventh Yugoslav enterprise ended the year with a net loss, and one out of every five employed Yugoslavs, or about 580,000 workers, belonged to such enterprises. In light of this evidence and in view of the evidence presented in table 2.3 about losses at the end of the sixties, it seems reasonable to assume that anywhere from 10 to 20% of Yugoslav social sector enterprises employing from 7 to 10% of the labor force cannot operate profitably under existing conditions. The complete success of the reform depended largely upon whether the federal government could confront the social and economic problems arising as a result of the bankruptcy of these firms and the dismissal of their workers. In any economy, but particularly in a socialist one dedicated to full employment, such a confrontation is a
trying task. In Yugoslavia, this task was further complicated by the efforts of local government to preserve local enterprises at all costs, because local tax revenues depended on local business receipts, and because, in the case of bankruptcy, local governments became the principal debtors, obliged to pay minimum personal incomes to enterprise employees during liquidation and to honor all creditor demands for debt repayment. In such circumstances, local government officials tried to save existing enterprises, no matter how unprofitable in the short run. \(^42\) It is difficult to judge the effectiveness of their actions in this matter, because bankruptcy data are not published in Yugoslavia. However, the fact that the total number of enterprises in the social sector showed no decline in the 1965–67 period\(^43\) indicates that bankruptcy was limited to private sector enterprises, not falling under government protection.\(^44\) Nevertheless, some adjustment did occur in the social sector in the form of reductions in the total number employed. Thus, the total number of employees in social sector enterprises fell from 3.58 million in 1965 to 3.47 million in 1967.\(^45\) However, this adjustment did not rid the economy of unprofitable firms as evidenced by the data presented in table 2.3, which shows the extent of losses incurred in 1970, a year of widespread economic prosperity.
### Table 2.3

**Net Losses in Social Sector Enterprises, 1970**

<table>
<thead>
<tr>
<th>Sector of Production</th>
<th>% of enterprises with year-end losses</th>
<th>% of labor force in enterprises with year-end losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>All economic activities (avg.)</td>
<td>11.5b</td>
<td>7.9</td>
</tr>
<tr>
<td>All industry (avg.)</td>
<td>13.4</td>
<td>10.5</td>
</tr>
<tr>
<td>Electrical energy</td>
<td>7.8</td>
<td>2.4</td>
</tr>
<tr>
<td>Coal</td>
<td>42.9</td>
<td>19.4</td>
</tr>
<tr>
<td>Oil</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Ferrous metals</td>
<td>18.2</td>
<td>9.1</td>
</tr>
<tr>
<td>Non-ferrous metals</td>
<td>20.8</td>
<td>9.3</td>
</tr>
<tr>
<td>Non-metallic materials</td>
<td>10.2</td>
<td>4.4</td>
</tr>
<tr>
<td>Metals</td>
<td>11.8</td>
<td>8.0</td>
</tr>
<tr>
<td>Shipbuilding</td>
<td>15.8</td>
<td>50.0</td>
</tr>
<tr>
<td>Electrical equipment</td>
<td>17.1</td>
<td>9.9</td>
</tr>
<tr>
<td>Chemicals</td>
<td>12.8</td>
<td>15.3</td>
</tr>
<tr>
<td>Construction materials</td>
<td>7.9</td>
<td>4.3</td>
</tr>
<tr>
<td>Wood</td>
<td>9.9</td>
<td>6.9</td>
</tr>
<tr>
<td>Paper</td>
<td>22.7</td>
<td>20.0</td>
</tr>
<tr>
<td>Textiles</td>
<td>13.3</td>
<td>9.2</td>
</tr>
<tr>
<td>Shoes and leather</td>
<td>22.1</td>
<td>12.8</td>
</tr>
<tr>
<td>Food processing</td>
<td>23.0</td>
<td>11.2</td>
</tr>
<tr>
<td>Printing</td>
<td>6.1</td>
<td>10.0</td>
</tr>
<tr>
<td>Tobacco</td>
<td>34.1</td>
<td>25.0</td>
</tr>
<tr>
<td>Agriculture</td>
<td>17.7</td>
<td>18.7</td>
</tr>
<tr>
<td>Construction</td>
<td>5.1</td>
<td>4.0</td>
</tr>
<tr>
<td>Transport</td>
<td>9.4</td>
<td>4.3</td>
</tr>
<tr>
<td>Trade and catering</td>
<td>11.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Sector of production</td>
<td>% of enterprises with year-end losses&lt;sup&gt;a&lt;/sup&gt;</td>
<td>% of labor force in enterprises with year-end losses</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>Crafts</td>
<td>7.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.6</td>
</tr>
<tr>
<td>Communal services</td>
<td>12.9</td>
<td>7.1</td>
</tr>
</tbody>
</table>

<sup>a</sup>According to Yugoslav accounting practice, an enterprise has a year-end loss if net receipts during that year are less than the total of (1) paid monthly wages or minimum wages (when actual wages are not paid); (2) legal and contractual obligations; and (3) allotments to the collective consumption fund to be used for consumption rather than for investment purposes.

<sup>b</sup>The percentages are calculated as follows: the number of enterprises in each sector operating with a loss and the number of workers in that sector employed by such enterprises are taken from an editorial article entitled "Gubici Radnih Organizacija u 1970," appearing in Ekonomска Politika, February 21, 1972, p. 25. The total number of enterprises in each sector and the total number of workers employed in each sector are taken from SZS, Statisticki Godisnjak, (1971), table 106-5, pp. 116-17.
The job of phasing out unprofitable enterprises in the years just following the reform was further complicated by an overall macroeconomic contraction, manifested by falling rates of growth of industrial production—from 8.1% in 1965 to -1.3% in 1967—and persistent, though moderating rates of inflation, which declined from 25.6% in 1966 to 7.0% in 1967. In addition, the balance of trade steadily deteriorated, final product inventories, measured at constant prices, increased dramatically by 21% in 1966 and 27.7% in 1967, and the registered unemployment rate jumped from 4.8% in 1965 to 6.3% in 1967. As the contraction spread throughout the system, unprofitable enterprises began to default on bill repayments, thus forcing their suppliers either to finance unexpected additions to their stock of accounts receivable or to default themselves. In this process, the volume of mutual indebtedness in the economy, as measured by the real value of the outstanding stock of trade credit, increased by 10.4% in 1966 and 29.6% in 1967.

As chapter 3 suggests all of these developments could have been anticipated as the immediate consequences of the stabilization policies which accompanied the structural economic reforms. The coincidence of reform and stabilization, however, clearly exacerbated the situation and inflamed opposition against further liberalization.
The government apparently ignored this opposition, at least temporarily, and the basic reform changes in enterprise taxation, the capital market, and the foreign trade regime were maintained while short-term policies, such as price controls, tariff adjustments, and changes in National Bank credit guidelines, were introduced to end the macroeconomic contraction. In this regard, the 1965 reform differed from its 1961 predecessor, which had been quickly sacrificed at the first signs of economic recession. Like its predecessor, however, the newest reform failed to fully attain its stated goal, namely the "marketization" or "depoliticization" of economic life. This failure was particularly acute in the fields of banking and investment finance. As chapter 6 describes in some detail, the new banking structure guaranteed continued local control over credit decisions and intensified the struggle between local demands for credit on the one hand and the efforts of the National Bank to regulate macroeconomic performance on the other. In this struggle, the local banks continued to violate National Bank directives about reserve requirements, credit limits and the like. In the capital market, the transfer of government funds to banks did not lead to any real change in the locus of decision-making power, since banks invested these funds in accordance with contractual obligations.
Moreover, in October 1969, this relationship was replaced by a new system under which banks granted credit in the name and on behalf of the federal government and not, as before, in their own name. This structural change served notice to formal federal government control over the use of the bulk of its investment resources.

Despite reductions in the level of enterprise taxes and a corresponding increase in the self-financing capacity of the business sector, government funds for financing investment projects and other economic activity were largely unaffected, because of offsetting increases in other tax revenues. As table 2.4 shows, the real investment resources of all levels of government increased in the post-reform period, while government budget revenues for "intervention in the economy" (mainly subsidy payments) and investment, rose sharply in 1970 and 1971, after an initial decline in the two preceding years. Armed with the necessary funds, government bodies continued to exert their influence over economic activity by financing investments, by subsidizing faltering enterprises or favored sectors, and, on the local and repub- lican levels, by sharing in enterprise production, employment and price decisions. 50 Particularly within communes, government officials and enterprise managers continued to overlap and both were represented on bank management boards.
### TABLE 2.4
REAL GOVERNMENT RESOURCES FOR INVESTMENT

(millions of dinars, 1971 prices)

<table>
<thead>
<tr>
<th>Year</th>
<th>Real value of government funds for investment</th>
<th>Real value of government revenues earmarked for investment and intervention in the economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962-63</td>
<td>105365</td>
<td>-</td>
</tr>
<tr>
<td>1966</td>
<td>63370</td>
<td>2058.4</td>
</tr>
<tr>
<td>1967</td>
<td>68654</td>
<td>1740.8</td>
</tr>
<tr>
<td>1968</td>
<td>71357</td>
<td>1528.5</td>
</tr>
<tr>
<td>1969</td>
<td>84133</td>
<td>1433.6</td>
</tr>
<tr>
<td>1970</td>
<td>93476</td>
<td>1682.3</td>
</tr>
<tr>
<td>1971</td>
<td>80076</td>
<td>2862.4</td>
</tr>
</tbody>
</table>

**SOURCES:** Nominal values of government investment funds and revenues from SDK, Statisticki Bilten, no. 2 (February 1972), tables 9 and 23. Deflated by retail price index, December 1971 = 100.

Within the communes, of course, each of these groups vied with one another to protect its own interests, but in relations between the commune and the rest of the economy, these interests tended to merge, so that local government bodies and local bankers often served to protect local businesses against the implementation of policies deleterious to their future development. A similar process occurred on the republican level with republican assemblies, economic chambers and other government organs acting to thwart federal measures which threatened the performance of the republican economy. Communal and republican governments intermediated between local
economic interests and federal government economic policy in one of two ways; first, they tried whenever possible to block passage of undesirable federal legislation and second, if such legislation were adopted, they frequently failed to enforce it. After 1969, the first method was employed more extensively, as deteriorating relations among the republics and Tito's attempt to strengthen the veto power of each republic at the federal level gradually immobilized the central policy-making apparatus. Moreover, even those laws which were enacted continued to be widely disregarded. For example, local governments continued to license local investment projects which did not provide the legally required down payment; local banks "guaranteed" larger volumes of investment credits than their funds permitted under the law; and local enterprises running with losses failed to reduce personal income payments to the legally specified minimum and failed to present "sanacion" or rehabilitation plans to the communal assemblies, which in turn failed to force them to do so. Such flagrant violations of the law, and especially of those laws introduced from 1969 to 1971, to cool off inflationary tendencies, meant not only that political intervention in economic life was restored to pre-reform levels but also that, in the process, macroeconomic balance was being destroyed. Viewed alternatively, this
conclusion suggests that the conflict between local and federal government authorities and between local and federal economic interests, enhanced the susceptibility of the economy to accelerating inflation and thus acted as a structural factor worsening the tradeoff between real economic growth and price stability.

Conclusions

The above sections outline the reforms undertaken in the Yugoslav economy during the past twenty years. Each of these reforms had as its major goal the establishment of worker autonomy at the enterprise level and market socialism at the national level. On balance, the reforms have been successful in many areas of economic life. In industry, the bureaucratic manipulation of enterprise activity by detailed plans specifying input sources, output volume, prices and wages, has given way to a new pattern of decision-making which has allowed workers to play an important role in shaping enterprise behavior. The working collective of each enterprise has become formally responsible for price, wage, output and investment decisions, subject only to the constraints imposed by macroeconomic policies, such as price and wage controls and changes in credit availability. In practice, enterprise leaders have shared their responsibility with communal or republican government representatives but in
the process of sharing they have not been stripped of all real power as they were throughout much of the fifties. In the agricultural sphere, too, reform efforts have placed the weight of control with individual producers, who have supplied nearly 85% of total agricultural production, since the abolition of state-run collective farms in 1954. On a national level, the reforms have caused a substantial decentralization of economic policy making which has also had some beneficial results. For example, republican and communal government bodies have taken the initiative in important social welfare areas, such as health and education, and their knowledge of local conditions has aided in the formation of effective, successful policies. In addition, the decentralization of economic power has provided the foundation for a widespread decentralization of political control which has freed Yugoslavia from the kind of monolithic, and therefore autocratic, party structure characterizing the remaining socialist countries. Local government organizations and economic interest groups have won real authority in Yugoslavia as well as a real power base from which to criticize and influence central policy decisions.

Although the reform movement has made considerable progress in expanding political and economic freedom, it has failed to reach its ultimate goal of complete
enterprise autonomy in a functioning market economy. As noted earlier, this failure can be explained by two major contradictions which have characterized each reform effort—the contradiction between independent economic decision-making at the enterprise level and the wider role of local government authorities in economic affairs, and the contradiction between party dominance over economic life and the decentralization of political and economic power. Of these two contradictions, the first has become increasingly important over the course of the sixties, as the traditional ethnic and national rivalries between the groups forming the Yugoslav state have reappeared with a new emphasis on economic issues and on the "fair" allocation of economic resources. Ironically, the reappearance of the "national question" has been fostered by the egalitarian aims of the socialist government which has brought the differences between republican development levels into sharp focus.

The political contradictions inherent in the reform movement have influenced the impact of economic reform measures on the course of economic activity in a variety of ways. Of particular interest in this study, however, are two specific questions related to the role of these contradictions in economic developments. First, in the presence of such contradictions, has the Yugoslav
economy achieved the ideals of workers' self-management and market socialism to a sufficient degree to allow us to use the Yugoslav example as a test case for various propositions about the macroeconomic features of these institutional forms? And second, how have these contradictions influenced the susceptibility of the Yugoslav economy to inflationary pressure? The discussion in this chapter provides preliminary answers to both of these questions. On the basis of the evidence presented here, it seems reasonable to conclude that the performance of the Yugoslav economy has been so distorted by special economic and political factors, that the Yugoslav case should not be used as a test case for an ideal self-managed system of workers' self-management. Therefore, any conclusions about the inherent inflationary bias of this system based on Yugoslav experience should be viewed with suspicion. In reference to the second question, the analysis of this chapter indicates the many institutional channels whereby political pressure and conflicts have affected macroeconomic performance in the Yugoslav economy. The discussion suggests that one of the most important institutional factors producing inflationary pressures has been the ability of local governments, local enterprises and local banks to thwart efforts for effective central control over monetary and credit conditions. As noted above, local
banks, operating as the intermediaries between central efforts to regulate aggregate money and credit conditions and the local economy, have complicated the task of management from the center, both by exerting substantial political influence in favor of excessively expansive policy and by violating restrictive policies whenever adopted. In the period before 1965, the ability of local alliances between banks, governments and enterprises, to frustrate monetary policy was strengthened by the "real bills" policy which guaranteed increases in National Bank credit to cover commercial bank loans provided such loans adhered to certain qualitative guidelines laid down by the federal government. Because the National Bank could not police loan decisions at the local level, and because local banks had no interest in doing so, loans were often granted despite their failure to comply with the relevant guidelines. After 1966, local banks had a harder time thwarting the National Bank because the new policy of quantitative control over National Bank credit was more easily enforced. However, the deterioration in the political situation and the effective immobilization of political control by the federal authorities in the late sixties meant that outright violation of credit requirements became more acceptable and hence more prevalent. Both before and after 1966, therefore, local banks,
backed by local government and enterprise borrowers, could reduce the effectiveness of a restrictive monetary policy, at least temporarily, and in so doing, could reduce the ability of the National Bank and the federal government to control inflation. Moreover, the initial failure of local economic agents to adjust to or comply with restrictive policies set at the center led to the appearance of certain economic problems, such as enterprise and commercial bank insolvency, whose solution ultimately forced the federal authorities to reverse these policies or bear the risk of widespread bankruptcy and unemployment. The role of these problems---referred to by the Yugoslavs as the "illiquidity crisis"---in the generation and acceleration of inflation during the post-1961 period is discussed more fully in chapters 6, 7, and 8.

An economist of monetarist persuasions reading the above paragraph might be tempted to reduce its content to the simple proposition that the inflationary process in Yugoslavia has been caused by an excessively expansive monetary policy pursued by a weak and incompetent central bank. Such a simplification, while correct in its broad outlines, obscures the important relationships between political and economic developments in Yugoslavia. Over twenty years ago, Henri Aujac presented a model of inflation which, while monetarist in nature, attempted to
root monetary developments in the political and social environment in which they occurred. His basic hypothesis was that conflicts between social, economic or political groups within a society will lead to inflation if one or all of these groups gains control over the process of money creation. One of the major goals of this study is to relate Aujac's hypothesis to Yugoslavia by carefully describing how political dissensions have expressed themselves in the monetary process and in the generation of inflation in the Yugoslav economy during the 1960's. The examination of inflation as the product of political conflicts played out within the confines of the monetary system lays open to question the widespread belief that the Yugoslav inflationary experience is testimony to the inherent inflationary bias of the institution of workers' self-management.
Footnotes

1. Apparently the Yugoslav theorists who designed the first economic reforms in 1950 and 1952, were familiar with the models of socialist economies developed by Oskar Lange and others in the thirties and forties, but most of these theorists agreed with Samardzija, a leading Yugoslav economist, who stated that "the discussion about the socialist economy among Western European economists, which took place after 1920, did not have, and still does not have, any direct influence on economic practice nor on the leading theoretical conceptions of economists in socialist economies." Despite such protestations, a comparison of Lange's proposals for a market socialist economy with many of the features of the early Yugoslav reform reveals some major similarities between the two. Samardzija's quote is translated by D. Milenkovich, Plan and Market in Yugoslav Economic Thought (New Haven: Yale University Press, 1971), p. 128.

2. For a discussion of some of the theoretical propositions developed by Yugoslav Marxists in defense of the introduction of workers' councils, see chap. 1 of Branko Horvat's An Essay on Yugoslav Society (White Plains: International Arts and Sciences Press, 1971). See also chaps. 4 and 5 of Milenkovich, Plan and Market.

3. "State capitalism" as a form of economic organization was identified by Kidrić, a Yugoslav Marxist who developed part of the rationale for the Yugoslav economic reform in the following way:

   (In the transition from capitalism to communism)

   "the state appears first in the capacity of collective manager and simultaneously as the factual and legal owner of the means of production . . . " (But state socialism can represent) "only the first and shortest step of the socialist revolution." (If state socialism were retained too long) "it would become state capitalism of the 'pure' type (without ownership by middle classes but with a parasitic bureaucratic class)." Kidrić's quotes appear in translation on pp. 78-79 of Milenkovich, Plan and Market.


6. In fact, not all levels within the Party supported the reform movement. Bičanić, a noted Yugoslav economist, argues that the process of decentralizing party control from the top created a middle layer of state and party officials who were anxious to preserve their positions and therefore became pillars of dogmatism. Tito himself addressed a letter to the communist organizations attacking the behavior of these little "marshalls." Thus, the struggle for decentralization appears to have been waged mainly by the upper echelons of the party. See R. Bičanić, *Economic Policy in Socialist Yugoslavia* (Cambridge: The University Press, 1973), p. 69.

7. For more on this hypothesis, see Fisher, *Yugoslavia*, p. 146.


10. Fisher draws an even more extreme conclusion when he notes that

"The development of the communal system in Yugoslavia was made possible by the post-1948 policies but it was made necessary by the heterogeneous groupings of nationalities, the varying levels of economic and social development and the long shadow of the past."


11. For an extended discussion of these propositions, see chaps. 6 and 8.


13. As Ward described the situation in the 1950's, the trade unions were expected to function as watch dog agencies for the state and for the League of Communists. The trade unions exercised their supervision in many ways, perhaps the most important of which was
their virtual monopoly over the nomination of workers to the organs of decision making within the enterprise. Ward cites figures indicating that in at most 11% of worker councils elections, there was some choice of candidates, while in at most 6% there was a choice of candidates not sponsored by the trade unions. B. Ward, "Workers Management in Yugoslavia," JPE (1957), pp. 373-86. Bičanić also discusses the supervisory role of the trade unions over workers councils. See Bičanić, Economic Policy, pp. 106-7.


18. Ibid., p. 243.


20. Disparities in per capita national income levels by republics are shown by the following figures.

<table>
<thead>
<tr>
<th>Republic</th>
<th>1947</th>
<th>1964</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yugoslavia</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Slovenia</td>
<td>169.7</td>
<td>195.1</td>
</tr>
<tr>
<td>Croatia</td>
<td>107.9</td>
<td>118.9</td>
</tr>
</tbody>
</table>
Per Capital National Income, as a Percentage of the National Average

<table>
<thead>
<tr>
<th></th>
<th>1947</th>
<th>1964</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serbia Proper</td>
<td>96.8</td>
<td>96.4</td>
</tr>
<tr>
<td>Kosovo</td>
<td>50.4</td>
<td>37.1</td>
</tr>
<tr>
<td>Vojvodina</td>
<td>116.9</td>
<td>115.0</td>
</tr>
<tr>
<td>Bosnia-Herceg.</td>
<td>79.8</td>
<td>71.1</td>
</tr>
<tr>
<td>Montenegro</td>
<td>71.1</td>
<td>73.2</td>
</tr>
<tr>
<td>Macedonia</td>
<td>68.6</td>
<td>69.4</td>
</tr>
</tbody>
</table>


21. According to the laws determining the functions of the communal and republican governments, separate revenue sources were identified for each independent government organization. Additional revenues were available through a complex system of revenue sharing, by which grants were extended from units of higher to units of lower rank. These grants were generally intended for balancing deficit budgets. The importance of enterprise income and wage bills as a source of local government revenues is suggested by the following figures.

Government Revenues: Type of Revenue Source as a Percentage of Total Revenues

<table>
<thead>
<tr>
<th></th>
<th>Republics</th>
<th></th>
<th>Communes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1952</td>
<td>1956</td>
<td>1960</td>
<td>1952</td>
</tr>
<tr>
<td>Taxes on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Enterprises</td>
<td>43.3</td>
<td>49.8</td>
<td>32.3</td>
<td>58.0</td>
</tr>
<tr>
<td>2. Wages and personal in-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>comes</td>
<td>47.8</td>
<td>44.7</td>
<td>65.0</td>
<td>25.8</td>
</tr>
<tr>
<td>Grants and shares</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>from other government</td>
<td>7.9</td>
<td>5.5</td>
<td>2.7</td>
<td>16.2</td>
</tr>
<tr>
<td>units</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: Percentages are calculated from data presented in Hondius, Community of Nations, pp. 234-35.

22. On the local level, Bičanić notes that "decentralized" investment funds were strictly confined within the boundaries of the territorial government. Thus, their allocation was highly dependent on corresponding territorial government officials. The splitting of investment funds on administrative lines did not secure a proper functioning of effective government investment policies. See Bičanić, Economic Policy, p. 347.

24. Bićanić notes that the only link between enterprise microeconomic plans and overall macroeconomic plans during the 1950's was secured by having each enterprise submit projections of its plan for the coming year to the Communal Plan Department. These plans were discussed, alternatives suggested, and the revised plans passed on to the republican and federal planning institutions. Bićanić, "Macro and Micro-economic Decisions," pp. 247-48.

25. Communal government influence over enterprise management was legally guaranteed by a procedure which gave communal political officials a direct voice in the selection of enterprise directors. Beginning in 1953, the selection of such directors was entrusted to committees of representatives of the enterprise and representatives of the commune. Gradually, the commune lost its majority control of these committees, and in 1957, committee membership first became evenly divided between enterprise representatives and communal representatives. Though competition among potential directors was open, political considerations, as voiced by local political leaders on the selection committee, often took precedence over professional qualifications as the standard for choosing among competing candidates. See H. Wachtel, *Workers' Management and Workers' Wages in Yugoslavia* (Ithaca: Cornell University Press, 1973), pp. 70-71.


27. See Shoup, *Communism and the National Question*, pp. 243-44 for a discussion of some of the more bizarre examples of communal government interference in local business activity.

28. See pages 73-76 of this chapter for some rough estimates of the importance of unprofitable enterprises in total industrial production.

30. Milenkovich, Ward, and Vucinich argue that beneath the split between liberals and conservatives lay national or ethnic tensions which were much older. Vucinich notes that "Two opposing groups (could) be discerned in the nationalistic bickering. The official line supported by Serbia and the underdeveloped republics of Macedonia, Montenegro, and Bosnia-Hercegovina favored further economic centralization; the opposition, consisting of the more advanced republics of Slovenia and Croatia, favored decentralization." See W. Vucinich, "Nationalism and Communism," in W. Vucinich, ed., Contemporary Yugoslavia, Twenty Years of Socialist Experiment (Berkeley: University of California Press, 1969), p. 265. Ward argues that "the issues dividing the "liberal, northern faction" and the "conservative, southern" faction were economic and focused mainly on the allocation of resources among republics and on the appropriate level of centralization. However, economic policy differences were strongly reinforced by the still pressing national problem." See Ward, "Political Power," p. 570. Milenkovich makes a similar argument on page 168 of Plan and Market.

31. See Pavlovitch, Yugoslavia, p. 286, and Bićanić, Economic Policy, pp. 112-13, for a full discussion of official reaction to the 1961 economic crisis.

32. See table 1.2 of chap. 1 for the percentage of prices which were controlled before and after the 1961 reform.

33. The establishment of government agencies to advise workers' councils on the distribution of income in 1962 was considered to be an encroachment on the rights of self-management and in 1963, the government set up machinery by which an agreement was reached between the Federal Secretariat of Labor, the Confederation of Trade Unions, and the League of Communists on the indicators to be applied in that part of the internal distribution of enterprise revenues left to the workers councils. However, these indicators were very general and the workers' councils were left to make distribution decisions using the indicators only as non-binding guides. See Bićanić, Economic Policy, p. 113.

34. Before the 1961 banking reform, the National Bank directly granted about 45% of the total short-term loans held by the enterprise sector. With the exception of foreign trade enterprises, the National
Bank directly and monopolistically credited all large enterprises until the reform transferred this crediting activity to the communal banks. See Milan Goljanin, "Regulisanje Volumena Novca i Kredita u Jugoslaviji," bk. 1 (Beograd National Bank, June 1970).

35. According to the new banking legislation, each republic and commune was to have its own bank with a monopoly position over all short-term loan and deposit operations within its territory. The republican banks proved to be short-lived institutions and were gradually phased out in 1963-64. The quick disappearance of the republican banks was the result of the obstacles they presented for the effective central control of the National Bank. Ibid.

36. Guarantees were government or bank promises to complete payment of a bill or expired credit in the event that the original business contracting the debt was unable to provide the necessary finance. According to the law first introduced in 1954, government guarantees were permissible in the following circumstances: (a) if a local enterprise wanted to obtain bank credit and its liabilities exceeded its assets or its expenditures exceeded its receipts, the bank granting the credit could request a guarantee from the local communal assembly; if the commune in turn did not have sufficient resources, it could request resources from the republic; and (b) if a local government needed credit to cover its temporary deficit it could obtain a guarantee from the republic. Guarantees became increasingly popular after the 1961 banking reform which established the satisfaction of certain credit-worthiness criteria as a precondition for the receipt of bank credit. Under this new system, local enterprises which did not satisfy these requirements could not obtain bank credit unless they first obtained a government guarantee. For a further discussion of the guarantee system see, Franjo Belak, "Drustveno-Gospodarske osnove sustava financiranja drustvenih potreba u samoupravnom socijalizmu," University of Zagreb, 1971.

37. See Bićanić, Economic Policy, p. 126.

38. R. Bićanić described the aims of the 1965 reforms as 'decentralization, de-etatization, de-politicization, and democratization.' See B. Horvat, 'Yugoslav Economic Policy,' p. 86.
39. See chap. 6 for a complete picture of bank management institutions both before and after the 1965 reform.

40. Pavlovitch estimates that in 1965, 600,000 people were employed in enterprises which operated at a loss and in 1966, 30% of all enterprises were unprofitable under the new market conditions. See Pavlovitch, Yugoslavia, p. 355.

41. These figures are taken from various issues of Borba, the official paper of the League of Communists and quoted in N. D. Popovic, Yugoslavia, The New Class in Crisis (Syracuse: Syracuse University Press, 1968), pp. 173-74.

42. Thus, as the Yugoslav Capital Market Study quote appearing on p. 9 indicates, local governments tried in a variety of ways to protect unprofitable enterprises from possible economic sanctions for illiquidity and bankruptcy.


44. Private sector enterprises accounted for 1.7% of national output in 1967. In that year it is estimated that approximately 99 businesses were liquidated, and that the majority of these were small trading and artisan organizations and small agricultural supply and distribution cooperatives. This estimate is cited by Gorupić and Paj in their book, Workers' Self-Management in Yugoslav Undertakings, Radovi 9 (Zagreb: Ekonomski Institut, 1970), pp. 183-84. The authors argue that in the years preceding and following 1967, the number of bankruptcies remained close to the 1967 figure.

45. See SZS, Statisticki Bilten #733, Zaposlenost, 1977, table 1-10. The reduction in employment was not accomplished by an increase in worker layoffs, which actually declined, but by a failure to refill working places as they became vacant for natural reasons, such as worker retirements. For figures on workers layoffs and an extended discussion of employment and layoff practice in Yugoslav firms, see chap. 3.

46. For more on each of these developments and on the data used to make the estimates presented here, see chaps. 4 and 5.
47. These estimates are based on end-of-year accounts receivable data for social sector firms for 1966 and 1967. The data are taken from worksheets provided by the Ekonomski Institut, Ljubljana. For a full discussion of the data, see tables 7.1 and 7.2 of chap. 7.

48. For evidence of commercial bank violations of National Bank guidelines both before and after the 1965-67 banking reform, see chap. 6.

49. In Yugoslav terminology, government investment funds form part of so-called extra-budgetary resources, which are quite separate from the government budgets funded by tax receipts and expended for general government purposes such as defense, administration and the like. The extra-budgetary resources, in contrast, are earmarked for specific types of activity, such as investment, and they are collected by special taxes designed for the express purpose of accumulating such resources. The category of spending entitled "intervention in the economy" in table 2.4 refers to budget resources earmarked for expenditure on certain economic policy programs of individual levels of government. The most important of such programs are various subsidy policies.


51. For a full discussion of the various interrelationships between local governments, enterprises and banks, see chap. 6. Ward also discusses the "we-they" posture taken by local governments and local enterprises when they confronted the rest of the economy in an effort to get a larger share of economic resources. See Ward, "Political Power," pp. 568-79.

52. D. Rusinow, the American Universities Field Staff Reporter for Yugoslavia, notes that in the years from 1969 to 1971, widespread political disaffection among increasingly powerful republican and communal leaders made resolution of controversial economic issues impossible, especially given the veto powers of republican authorities at the federal level. Thus, for example, in 1970, the Croatian leadership
blocked passage of a federal package of stabilization measures, thereby paralyzing federal efforts to deal with growing inflationary pressure. During that year, only one important measure was actually carried through, namely the devaluation of the dinar. It took a national political crisis in Croatia and deteriorating economic performance at the end of 1971 to bring the government to a position where it could again find support for the implementation of needed policy measures. D. Rusinow, *AUFS Staff Reports*, Southeast Europe Series: "The Price of Pluralism," vol. 18, no. 1 (1972) and "A Note on Yugoslavia: 1972," vol. 19, no. 3 (1972).

53. In an interview with the IBRD mission to Yugoslavia in the autumn of 1972, Dimitri Dimitrijević, a director of the National Bank, estimated that approximately 50% of all enterprises stood in violation of one or more of the federal government's policies designed to deal with the problems of defaulted bills and growing insolvency.

54. For a discussion of the degree of the overextension of guarantees by banks, see chap. 6. For a discussion of enterprise violations of the law requiring insolvent enterprises to present "rehabilitation programs to their local governments, see chap. 8.

CHAPTER 3

WAGE-PUSH INFLATION AND THE SELF-MANAGED ECONOMY

Introduction

Although the simple wage-push theory of inflation, as summarized in chapter 1, attempts to provide an explanation of macroeconomic activity, it depends on assumptions about the behavioral principles underlying output, price and employment decisions at the microeconomic level. These assumptions identify profit maximization as the rule guiding resource allocation within each enterprise. With this rule as a given, it is easy to explain the link between wages and prices within an enterprise. Starting from an initial point of equilibrium, where all factors of production are employed at their profit-maximizing levels, a nominal wage increase will increase the real wage of labor, thereby inducing managers to cut back on labor employment and output; the reductions in output will in turn lead to a price increase, provided the firm does not face an infinitely elastic demand curve, or in other words, provided the firm does not sell in perfectly competitive markets.
Moreover, even if the firm sells in a competitive market, if all the firms in that market are faced with the same increase in nominal wages, then the rise in average costs caused by that increase will shift the industry supply curve upward, thereby reducing industry output and increasing industry price. In either case, the link between wage increases and price increases runs through profit-maximizing output and employment changes carried out in less than perfectly competitive product and labor markets. If each microeconomic unit or each industry operates in such markets and responds to a given nominal wage increase in the appropriate profit-maximizing manner, then the total effect of all such responses on the macroeconomic level will be some reduction in aggregate supply and some increase in the aggregate price level.1

Because the wage push theory is clearly based on assumptions about patterns of microeconomic decision-making, its usefulness in explaining Yugoslavia's inflationary experience depends crucially on whether these assumptions are suitable for Yugoslavia's microeconomic structure. Therefore, the relevance of the wage-push model as a theory of aggregate price inflation in Yugoslavia depends on the relevance of certain types of resource allocation rules to the behavior of the Yugoslav self-managed enterprise. In the following
pages, I attempt to evaluate this issue of relevance by examining two major hypotheses about Yugoslav enterprise behavior and by determining the price-output and wage links which these hypotheses imply. My discussion indicates the modifications necessary to make the wage-push theory a realistic theory for the Yugoslav economy and points out the assumptions which must be accepted if we are to establish a causal link between wage changes and price changes in a self-managed enterprise. The purpose of my analysis is twofold: first, to describe the actual price and wage behavior of the Yugoslav enterprise and to identify the channels whereby wage increases may influence price increases; and second, to determine whether an organizational form, such as workers' self-management, which increases the role of workers in wage formation, necessarily widens the scope for wage-push inflation.

The discussion in this chapter is premised upon the supposition that the simple theory of wage-push inflation cannot be empirically verified by available economic data. Therefore, no attempt is made to directly test this theory by examining macroeconomic wage and output data. Instead, a statistical study of aggregate price and wage interactions in the Yugoslav economy is postponed until chapter 4, where several simultaneous
price and wage equations are developed and compared with similar equations applied to other economies where workers have less control over wages and prices. In this chapter, the empirical investigation is limited to a comparison of Yugoslav inflationary trends with trends observed in other countries during the same period and to an examination of wage, price and productivity increases within individual sectors of production in Yugoslavia. Both the cross-country comparison and the inter-sectoral price and wage analysis provide some rudimentary evidence about the role of wage pressures in the generation of the Yugoslav inflation.

Wage-Push Inflation in Yugoslavia--Some Simple Empirical Evidence

Perhaps the best way to begin a study of the Yugoslav inflation is to compare Yugoslav price and output trends with the price and output trends of other economies which have different institutional and ideological foundations. Such a comparison reveals whether institutional differences have had a major impact on differences in macroeconomic behavior or alternatively, whether, despite these differences, macroeconomic activity has followed broadly similar lines in countries which have broadly similar economic characteristics. If cross-country comparison shows that Yugoslavia's
macroeconomic performance parallels the performance of countries of similar development levels over relatively long periods of time, then this supports the conclusion that Yugoslavia's unique form of microeconomic organization has not noticeably distorted its macroeconomic behavior.

Table 3.1 provides the data necessary for comparing Yugoslav price growth with price changes in three other types of economies—industrialized, rapidly growing economies, which are Yugoslavia's European neighbors, less developed, rapidly growing economies, which share Yugoslavia's per capita income level, and semi-developed Latin American economies, which have struggled with the highest inflation rates in the world. The data support the following conclusions:

1. in both time periods considered, Yugoslavia exhibited the highest average annual rate of inflation and the highest average annual rate of growth of the money supply outside of the high-inflation Latin American economies;

2. in both periods, the Yugoslav price and output experience was quite similar to those recorded in Spain, Turkey, and Israel, economies which shared common levels of development and common geographic and climate conditions; in this group, Yugoslavia consistently realized
### TABLE 3.1

COMPARATIVE PRICE, OUTPUT AND MONEY SUPPLY PERFORMANCE IN SELECTED ECONOMIES, 1953-65 AND 1967-71 (PERCENTAGES)

<table>
<thead>
<tr>
<th></th>
<th>1954-65</th>
<th>Average annual rate of growth</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Real GNP</td>
<td>Money GNP</td>
<td>Cost of living</td>
<td>Money supply</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Austria</td>
<td>5.5</td>
<td>9.2</td>
<td>2.8</td>
<td>8.4</td>
</tr>
<tr>
<td>Italy</td>
<td>5.0</td>
<td>9.0</td>
<td>3.3</td>
<td>11.6</td>
</tr>
<tr>
<td>Netherlands</td>
<td>5.0</td>
<td>9.1</td>
<td>3.3</td>
<td>6.3</td>
</tr>
<tr>
<td>Greece</td>
<td>6.0</td>
<td>10.9</td>
<td>3.4</td>
<td>16.2</td>
</tr>
<tr>
<td>Israel</td>
<td>10.5</td>
<td>18.7</td>
<td>6.1</td>
<td>16.7</td>
</tr>
<tr>
<td>Mexico</td>
<td>6.4a</td>
<td>9.1b</td>
<td>6.9b</td>
<td>13.5b</td>
</tr>
<tr>
<td>Turkeyc</td>
<td>3.8c</td>
<td>11.5c</td>
<td>7.5c</td>
<td>11.4c</td>
</tr>
<tr>
<td>Yugoslaviac</td>
<td>9.5</td>
<td>20.6</td>
<td>8.8</td>
<td>24.9</td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|        | 1967-71 | Average annual rate of growth |        |        |
|        | (1)     | (2)       | (3)         | (4)        |
| Austria| 6.0     | 9.9       | 4.8         | 9.0        |
| Italy  | 5.8     | 9.5       | 3.5         | 18.6       |
| Netherlands | 5.8  | 11.6      | 5.6         | 11.3       |
| Greece | 3.0     | 5.1       | 2.2         | 9.7        |
| Israel | 12.1    | 18.2      | 5.6         | 14.0       |
| Mexico | 7.0     | 10.4      | 3.3         | 11.9       |
| Spain | 6.8     | 11.4      | 5.3         | 12.2       |
| Turkey | 5.6     | 12.0      | 9.1         | 16.6       |
| Yugoslavia | 7.2 | 16.7      | 9.6         | 16.7       |
| Brazil | 10.3    | 34.7      | 21.9        | 33.4       |
| Argentina | 4.2 | 16.7      | 17.6        | 21.3       |


'\(a\)_{1956-64} \quad \text{b}_{1955-64} \quad \text{c}_{1958-64} \quad \text{d}_{1967-70} \quad \text{e}_{1967-69}'}
the largest increase in the money supply, the largest increase in prices and, except for Israel, the most rapid increase in real output;

3. In the 1967-71 period, Turkey and Yugoslavia registered almost identical increases in prices and money supply, despite the fact that Yugoslavia was growing more rapidly in both real and money terms. In general, these and other conclusions based on a reading of table 3.1 do not suggest that the Yugoslav inflation has been appreciably more severe than those encountered in other economies of similar development levels. Taking into account increases in the money supply and real output as well as increases in prices, the Yugoslav economy has fared no worse than its neighbors or its development partners, all of which, in theory at least, are less vulnerable to wage-induced price increases and cost-push pressures. Naturally, this evidence is not conclusive but it is suggestive of the fact that whatever the effects of workers' self-management, it has not significantly distorted price and output behavior in the Yugoslav economy as compared to the behavior observed in other economies, at least over relatively long periods of time. On a more positive note, table 3.1 reveals that although not strictly proportional, the rate of growth of the money supply and the rate of growth of
prices are highly correlated for all the countries considered, thus suggesting that excess demand, as supported by monetary expansion, may have played the crucial role in determining price increases. I will examine this possibility as it refers to Yugoslavia at greater length in chapters 5 and 6.

Another indirect and admittedly inconclusive test of wage-push pressures in Yugoslavia can be devised by comparing price increases and unit labor cost increases across individual industrial sectors within Yugoslavia. As noted in chapter 1, the comparison of price increases and unit labor cost increases on an aggregate level is not a reliable test of wage-push pressures because observed labor cost increases may well be the product of prior increases in the aggregate cost of living index or the product of excess demand on the labor market. In either case, unit labor costs rise in response to the prior appearance of excess demand on one or more product markets. Now consider the possible links between sectoral price increases and sectoral unit labor costs. Because the relationship between sectoral price growth and changes in the aggregate price level or changes in the conditions of aggregate labor availability is likely to vary over time, an observed, statistically significant, positive correlation between prices and unit labor costs
within each sector provides somewhat firmer ground for arguing that sectoral unit labor costs influence selling prices rather than vice versa. Even in this case, though, the possibility that sectoral price increases lead or cause sectoral unit labor cost increases cannot be dismissed, since product price increases in turn increase the marginal value product of labor employed in that sector (assuming labor productivity is constant), and marginal value product increases may be translated into wage increases. Despite the difficulties inherent in establishing the direction of causality between sectoral unit labor cost increases and sectoral price increases, however, it seems worthwhile to examine the relationship between these two variables for a number of sectors.

If the data indicate the absence of any significant correlation between these variables, the results call into question the wage-push hypothesis that labor cost conditions influence price formation in individual industries or enterprises.

The data necessary for an examination of cost-push pressures within individual sectors of production are contained in table 3.2. Because my purpose is simply to determine whether the data attest to the existence of a positive, statistically significant relationship between unit labor costs and prices within sectors of
## Table 3.2

### Rates of Growth of Prices, Unit Labor Costs and Output in Industry

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Prices</th>
<th>Unit labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical energy</td>
<td>-3.5</td>
<td>34.5</td>
</tr>
<tr>
<td>Coal and coke</td>
<td>1.7</td>
<td>6.7</td>
</tr>
<tr>
<td>Oil</td>
<td>0.0</td>
<td>-7.0</td>
</tr>
<tr>
<td>Ferrous metals</td>
<td>0.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Non-ferrous metals</td>
<td>1.9</td>
<td>3.6</td>
</tr>
<tr>
<td>Non-metallic products</td>
<td>0.0</td>
<td>4.3</td>
</tr>
<tr>
<td>Metal products</td>
<td>-1.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Electrical equipment</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Chemicals</td>
<td>-1.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Construction materials</td>
<td>1.8</td>
<td>6.9</td>
</tr>
<tr>
<td>Wood</td>
<td>1.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Paper</td>
<td>2.6</td>
<td>7.5</td>
</tr>
<tr>
<td>Textiles</td>
<td>-2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Shoes and leather</td>
<td>0.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Rubber</td>
<td>1.2</td>
<td>2.3</td>
</tr>
<tr>
<td>Food processing</td>
<td>0.0</td>
<td>11.3</td>
</tr>
<tr>
<td>Tobacco</td>
<td>.6</td>
<td>3.8</td>
</tr>
</tbody>
</table>

**Sources:** See table 3.3, notes.
<table>
<thead>
<tr>
<th></th>
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<td>1.0</td>
<td>0.0</td>
<td>7.0</td>
<td>-2.2</td>
<td>27.2</td>
<td>-6.0</td>
<td>5.6</td>
<td>9.8</td>
<td>9.2</td>
<td>9.2</td>
<td>11.1</td>
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<td>1.5</td>
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<td>14.0</td>
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<td>23.5</td>
<td>9.6</td>
<td>8.5</td>
<td>11.9</td>
<td>5.9</td>
<td>.8</td>
<td>3.0</td>
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<tr>
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<td>0.0</td>
<td>0.0</td>
<td>36.1</td>
<td>11.4</td>
<td>20.0</td>
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<td>9.9</td>
<td>16.5</td>
<td>5.2</td>
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<td>10.0</td>
<td>6.1</td>
<td>29.0</td>
<td>4.0</td>
<td>12.7</td>
<td>19.0</td>
<td>11.1</td>
<td>7.4</td>
<td>2.8</td>
</tr>
<tr>
<td>0.4</td>
<td>2.1</td>
<td>17.0</td>
<td>12.1</td>
<td>34.3</td>
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<td>15.6</td>
<td>3.7</td>
<td>6.2</td>
<td>4.9</td>
</tr>
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<td>3.2</td>
<td>5.9</td>
<td>10.0</td>
<td>17.3</td>
<td>3.2</td>
<td>11.3</td>
</tr>
<tr>
<td>1.2</td>
<td>1.0</td>
<td>8.0</td>
<td>7.7</td>
<td>15.2</td>
<td>6.4</td>
<td>9.5</td>
<td>7.1</td>
<td>23.8</td>
<td>6.2</td>
<td>13.9</td>
</tr>
<tr>
<td>1.3</td>
<td>1.0</td>
<td>3.0</td>
<td>6.4</td>
<td>23.5</td>
<td>7.0</td>
<td>5.6</td>
<td>8.0</td>
<td>27.2</td>
<td>10.1</td>
<td>12.0</td>
</tr>
<tr>
<td>1.1</td>
<td>0.0</td>
<td>2.0</td>
<td>-7.7</td>
<td>20.6</td>
<td>-2.5</td>
<td>- .4</td>
<td>1.2</td>
<td>22.4</td>
<td>15.2</td>
<td>18.1</td>
</tr>
<tr>
<td>1.2</td>
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<td>-8.3</td>
<td>14.4</td>
<td>5.1</td>
<td>1.2</td>
<td>13.8</td>
<td>14.6</td>
<td>9.8</td>
<td>9.6</td>
</tr>
<tr>
<td>1.2</td>
<td>4.7</td>
<td>22.0</td>
<td>4.6</td>
<td>19.6</td>
<td>10.7</td>
<td>13.9</td>
<td>18.9</td>
<td>15.4</td>
<td>4.1</td>
<td>8.2</td>
</tr>
<tr>
<td>1.0</td>
<td>1.0</td>
<td>23.0</td>
<td>12.1</td>
<td>22.0</td>
<td>9.2</td>
<td>17.8</td>
<td>15.6</td>
<td>22.6</td>
<td>7.8</td>
<td>7.0</td>
</tr>
<tr>
<td>1.0</td>
<td>1.0</td>
<td>5.0</td>
<td>5.1</td>
<td>21.7</td>
<td>6.1</td>
<td>8.9</td>
<td>12.2</td>
<td>13.7</td>
<td>3.0</td>
<td>5.0</td>
</tr>
<tr>
<td>1.7</td>
<td>2.2</td>
<td>6.0</td>
<td>7.1</td>
<td>21.9</td>
<td>12.7</td>
<td>6.7</td>
<td>18.0</td>
<td>21.8</td>
<td>.5</td>
<td>-1.9</td>
</tr>
<tr>
<td>1.6</td>
<td>0.0</td>
<td>7.0</td>
<td>-4.3</td>
<td>12.6</td>
<td>1.8</td>
<td>6.0</td>
<td>10.0</td>
<td>23.9</td>
<td>2.0</td>
<td>8.9</td>
</tr>
<tr>
<td>1.1</td>
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<td>15.1</td>
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<td>13.9</td>
<td>19.1</td>
<td>1.7</td>
<td>11.9</td>
</tr>
<tr>
<td>1.0</td>
<td>2.1</td>
<td>0.0</td>
<td>7.5</td>
<td>21.3</td>
<td>7.2</td>
<td>25.8</td>
<td>7.0</td>
<td>27.3</td>
<td>3.1</td>
<td>2.5</td>
</tr>
</tbody>
</table>
production, I employ the method of rank correlation coefficients to test the null hypothesis that these two variables are positively correlated against the alternative hypothesis of zero correlation. The tests are carried out for seventeen sectors of production and are re-estimated for each of five years: 1962-63, 1963-64, 1967-68, 1968-69, and 1969-70. The statistical results are reported in table 3.3. The results indicate that in four of the five years examined, the data do not support the null hypothesis. Only in 1969-70, does the rank correlation coefficient test indicate that prices and unit labor costs within sectors were positively and significantly correlated. These results suggest that if pure wage-push pressures have developed in Yugoslavia, they have done so quite recently and have not played a major role in earlier inflationary episodes.

Table 3.2 also contains calculations of the rank correlation coefficients between output growth and price increases, and between price increases and price control. These calculations lead to the following conclusions:

a. price increases and output increases, while negatively correlated, are not significantly so, indicating that demand and cost increases have offset downward price pressures stemming from growth in productivity and product supply;
TABLE 3.3

PRICE, OUTPUT, AND UNIT LABOR COST RELATIONSHIPS IN 17 INDUSTRIAL SECTORS (RANK CORRELATION COEFFICIENTS)

1. Correlation between real output increases and price increases:

<table>
<thead>
<tr>
<th></th>
<th>1963-64</th>
<th>1967-68</th>
<th>1969-70</th>
<th>1960-70</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.28</td>
<td>.29</td>
<td>-.24</td>
<td>-.20</td>
</tr>
</tbody>
</table>

All coefficients are insignificant at the .05 significance level.

2. Correlation between unit labor costs increases and price increases:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.23</td>
<td>.15</td>
<td>-.20</td>
<td>.09</td>
<td>.69</td>
</tr>
</tbody>
</table>

All coefficients are insignificant at the .05 significance level with the exception of the 1969-70 figure, which is significant at the .01 significance level.

3. Correlation between price increases and price control (share of sectoral product subject to legal supervision of price formation):

<table>
<thead>
<tr>
<th></th>
<th>1960-70 average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.38</td>
</tr>
</tbody>
</table>

Correlation is significant at the .05 significance level.

SOURCES: (1) Real output for each industrial sector, 1966 prices; SZS, Statisticki Godnisjak (SG), 1970, p. 99; (2) producer price index for each sector (1969=100); SZS, SG, 1970, p. 261; (3) unit labor costs equal average net personal income per employed times the number employed divided by real output; average net income per employed taken from SZS, SG, 1971, p. 268; number employed taken from SZS, SG, 1970, p. 86; (4) share of prices in each sector covered by some form of price control (measured by the share of sales made at controlled prices in total sectoral sales) taken from S. Popov,
b. price increases and price control (as measured by the share of sectoral product subject to some form of legal supervision over price variations) are negatively correlated at borderline significance, indicating that different price controls have probably distorted the relationships between unit labor costs and prices somewhat, and may explain the observed lack of significance between these variables; however, given the fact that significance was not achieved in four years when price controls had very different sectoral implications and very different degrees of enforcement, the presumption remains that the sectoral data do not verify the simple cost-push hypothesis.³

Neither the comparison of the Yugoslav inflation with inflations observed in similar economies, nor the examination of the relationship between intersectoral unit labor cost and price changes within Yugoslavia indicates that wage-push pressures arising out of workers' control over wages and prices have caused inflation in Yugoslavia. As suggestive as these results may be, however, they remain inconclusive, as do the results of all
other tests which try to distinguish between the wage-push and demand-pull theories of inflation. Therefore, rather than spend any more time devising such tests, it seems wiser to turn to a complete study of the actual process of wage and price formation in the Yugoslav economy. By contrasting this process with the theoretical assumptions of the wage-push theory, some conclusions can be made about the appropriateness of this theory for Yugoslav institutions and for an explanation of the occurrence of inflation within this institutional framework.

The Wage-Push Theory and the Yugoslav Enterprise

The pure wage-push theory of inflation as stated in hypothesis H.1 and as developed in the economic literature usually combines three major propositions.

A. Aggregate nominal wage increases in excess of increases in labor's marginal value product occur autonomously as the result of efforts by workers to increase real wages at constant product prices.

B. Unit labor cost increases, which stem from nominal wage growth at constant prices and constant labor productivity, lead to higher prices either directly through cost markups or indirectly as profit maximizing capitalists cut back on labor employment and output until at the reduced volume of output, the realized marginal value product of
labor just equals the new real wage. The cutback in output produces excess product demand at prevailing nominal prices and stimulates the price increases necessary to restore market equilibrium.

C. The actual extent of the resulting price rise and output reduction depends on changes in aggregate real demand. The greater the demand increase either because of monetary actions undertaken to prevent the unemployment threatened by higher real wages or because of increases in the velocity of money, the greater the increase in price and the smaller the reduction in output. In the crudest wage-push theories, this proposition is replaced by the simple assertion that the monetary authorities always act to validate the inflation caused by autonomous nominal wage increases. This assertion guarantees that the price increase will just equal the difference between the increase in nominal wages and the increase in the real productivity of labor, provided that the shares between profits and wages in total income remain constant. In this case, following an autonomous increase in the level of nominal wages, the economy will reach a new equilibrium characterized by a higher level of nominal prices and wages, and the original level of real wages, output and employment.

These propositions are simply and concisely
expressed by the following relationship

$$\frac{\dot{p}}{p} = \frac{\dot{w}}{w} - \frac{\lambda}{p} \frac{\dot{\lambda}}{\lambda}$$  \hspace{1cm} (3.1)$$

where \( p \) = the aggregate price level
\( w \) = the level of nominal wages
and \( \lambda_p \) = the marginal productivity of labor.

Expression (3.1) is merely the dynamic version of the real wage-marginal productivity equality assumed to govern supply and demand on the labor market. What transforms this equality into an inflation theory is the assumption that the nominal wage term varies exogenously and that price responds directly to restore the equilibrium real wage, under product market conditions which keep real aggregate demand at the level needed to insure continued full employment of resources. Behind this theory lies the further assumption that the labor market is initially in a position of equilibrium where labor receives the full value of its marginal product so that any increase in nominal wages at the initial price level causes the real wage to exceed the value consistent with full employment.

Using this theoretical framework as a basis for analysis I now want to judge the relevance of its constituent parts for an explanation of the price and wage experience of the Yugoslav economy. I am particularly
interested in examining propositions A and B in the context of a typical Yugoslav self-managed enterprise. Therefore, I will put off to a later chapter (see chapter 5) a more extended discussion of proposition C and of the debate about the role of the monetary authorities in a wage-push inflation. This debate has already received eloquent attention from members of the monetarist school, who have emphasized the crucial link between monetary expansion and a sustained inflation caused by nominal wage increases.

Models of Firm Behavior in Yugoslavia

Recently two major theories have been developed to explain the price, wage and output decisions of a self-managed, Yugoslav enterprise—the so-called labor cooperative theory first introduced by B. Ward (1958) and later expanded by Domar (1966) and Vanek (1971), and the limited profit maximization theory presented by B. Horvat (1967). Stated most simply the labor co-op model assumes that each enterprise maximizes net income per laborer, where net income is defined as gross business revenues less current operating costs (e.g., costs of all intermediate inputs and fixed and working capital charges) and taxes. With this objective function the equilibrium condition for labor employment in each enterprise becomes:
\[ p_i \frac{dX}{dL} = \frac{(p_i X_i - OC_i - T_i)}{L_i} = \frac{Y_i}{L_i} \quad (3.2) \]

where \( i = 1, \ldots, n \) and refers to the \( i \)th enterprise;

\( p_i \) = the selling price of output;

\( dX/dL \) = the marginal productivity of labor;

\( X \) = the volume of output;

\( OC \) = the value of intermediate costs, including depreciation, incurred in producing output \( X \);

\( T \) = the value of fixed taxes paid out of enterprise income;

\( L \) = the amount of labor needed to produce output and \( Y_i/L_i \) = net income per worker.

This condition indicates that in equilibrium the value of the marginal product of labor will just equal average net income per worker within each firm. A similar conclusion holds, even if workers are paid a fixed wage per production period, as they are in most Yugoslav enterprises. 5

In this case, income per worker is defined as

\[ \frac{(p_i X_i - OC_i - T_i - \bar{w} L_i)}{L_i} = \frac{(TY_i/L_i)}{L_i} \quad (3.3) \]

where \( \bar{w} \) is the fixed nominal wage during the production period.

Differentiating this expression with respect to labor yields equation (3.2), thus indicating that fixed wage
payments do not change the character of the optimum conditions in a labor co-op enterprise.

In contrast to Domar, Ward, and Vanek, Horvat argues that Yugoslav firms try to maximize total profits rather than profits per worker. According to Horvat's theory, for each period in the future the enterprise plans some increase in its nominal wage rate and beyond that, it behaves like a capitalist firm maximizing its profit at the given wage rate. The objective function in this case is

\[
\max \pi_i = \max(p_i^x_i - OC_i - T_i - \tilde{w}_i^i L_i) \tag{3.4}
\]

and the equilibrium condition for labor employment is

\[
p_i \left( \frac{dX}{dL} \right)_i = \tilde{w}_i \tag{3.5}
\]

where \( \tilde{w}_i \) is the predetermined nominal wage. Horvat defends his model by reference to the fact that since 1961, individual enterprises have been given greater responsibility for providing a share of their own investment funds. As self-financing has gained in importance, Horvat argues that enterprises have taken a greater interest in maximizing their collective savings or retained earnings during each production period and that they have attempted to do so in the manner described by equations (3.4) and (3.5).
Horvat's argument about the importance of collective saving and self-financing can be incorporated into the labor co-op theories by assuming that workers allocate a predetermined share of realized net income per worker to enterprise savings, distributing the residual in the form of individual bonus payments. For example, the firm may choose to retain \((1-B_i)(Y_i/L_i)\) in savings per worker and pay out \((B_i)(Y_i/L_i)\) in incomes per worker. In this case by choosing a value for \(B_i\), workers as a group decide on the optimal value of enterprise savings just as they do in the Horvat model by choosing the fixed value of current wages. The distinction between the two models does not lie, as Horvat claims, in their differing emphasis on savings but in their different views about how the firm makes its decisions. What differentiates the pure co-op theory from other theories about firm behavior is its explicit assumption that each member of the firm has a voice in enterprise decision-making and a share in profits, wages and collective savings. A glance at Yugoslav reality and at the many studies which attempt to measure the decision-making power of individual worker groups within the firm suggests that this assumption is unsuitable for many Yugoslav firms. Frequently, decision-making power has been localized among a much smaller group of enterprise members who either
occupy the top management ranks or who are production workers of high seniority. In many cases this managerial group consists of the enterprise director and his technical staff who are selected by the enterprise workers to act as their agents in formulating enterprise business policy. These officials are free to act as they see fit to attain the objectives set by them in conjunction with the workers' councils, provided their actions do not run counter to the wishes of the workers who elected them. In the event that the managerial agents fail to fulfill the expectations or violate the directives of the workers' council, they are subject to dismissal and replacement. In this way, then, the workers ultimately retain a ruling voice in the decision-making process of the firm.

To the extent that actual enterprise decision-making power is localized among a managerial group of the type discussed here, the actual number of workers playing a role in enterprise policy formation may be considerably smaller than the total number of employees and considerably more stable over time. For firms which satisfy these conditions, the labor co-op theory of income maximization per laborer reduces to a modified co-op theory of income maximization per decision-maker, which, with a constant number of decision-makers, becomes equivalent to Horvat's theory of overall profit.
maximization. Therefore, for many Yugoslav firms, Horvat's theory may be a more realistic picture of enterprise behavior. Nevertheless, in other firms where the majority of workers have a voice in certain crucial issues, such as the distribution of net income between savings and wages, the labor co-op theory remains a good approximation of reality. Because individual Yugoslav enterprises may be better represented by one or the other of these theories, depending upon the skill and age composition of their labor forces, the strength of their managers, the control of local government and trade union officials and other unique non-economic characteristics, I will examine the price and wage link or propositions A and B of the wage-push theory for both models of behavior. Before doing so, however, I will analyze each of the models more carefully in order to reveal some of their important similarities. That such similarities exist has already been suggested by Vanek who has noted that under certain assumptions about the determination of the fixed wage in the Horvat theory, the two models yield almost identical conclusions about labor incomes, employment, and output in the long run.⁹

Similarities in the Labor Co-op and Horvat
Models of Firm Behavior

The labor co-op and profit maximizing theories
are similar in their treatment of questions about short-run employment and wage dynamics. Neither theory guarantees that the marginal value product of labor will be equalized across firms at equilibrium output levels. On the contrary, the labor employment equilibrium conditions indicate that in the labor co-op case, the marginal value product of labor within each firm will depend on enterprise profitability while in the profit maximizing case it will depend on previously specified nominal wage rates, which in turn depend on the autonomous decisions of enterprise workers' councils. In either case, there is no automatic mechanism generating equal labor payments and hence equal labor productivity across enterprises and industries. In the long run, though, with all firms charged the same price for capital, its marginal value product will tend to be equalized and if the technologies accessible to all firms are the same, this will lead to the equalization of labor's marginal value product as well. In other words, as Vanek has already noted, under purely competitive markets and with free entry, Horvat's profit maximization rule will converge towards the same optimum resource allocation solution as does the income per capita maximization rule and as does the ideal capitalist model with zero excess profits. In the short run, however, with different technologies,
different capital charges, different market conditions and different wage determination criteria, firms may operate with widely different labor productivities and widely different nominal wages.

A second similarity between the pure Horvat and Ward-Vanek co-op models is their assumption that an enterprise can always freely adjust the size of its work force to reach the profit-maximizing or net-income-per-laborer-maximizing level of labor employment.11 Such an assumption seems highly unreasonable for the majority of Yugoslav firms. As Meade has pointed out in a recent article on the theory of labor-management and profit-sharing, two rules are likely to guide the termination of membership within a labor-managed enterprise—first, the individual worker must wish to terminate his employment; and second, he must obtain permission from the remaining members to do so.12 Although the latter rule is apparently not observed in Yugoslavia, the former frequently is, both because of the influence of workers on hiring and firing practices and because of a set of legal regulations which limit worker layoffs to clearly specified circumstances.13 Such legal and institutional impediments to firing apply only to permanent workers who are hired by an enterprise for an "indefinite" time period. In contrast, temporary workers are hired on a
contractual basis for a clearly specified amount of time and they may be discharged once their contract expires. Because of the temporary and specific nature of their association with an enterprise, temporary workers probably carry little if any weight in the organs of self-management. Thus, in most respects, the relationship between a self-managed enterprise and its temporary labor force is analogous to the relationship between a capitalist enterprise and its work force. In both cases the enterprise hires labor to perform a specific task for a fixed wage without any guarantee of employment security. As table 3.3 indicates, in most industrial branches the share of temporary workers is low, amounting to at most 7.2% of total labor employment; therefore, the majority of employed laborers fall under the traditions and legal requirements which guarantee continued employment—at least over relatively short periods of time.14

**TABLE 3.4**

PERMANENT AND TEMPORARY WORKERS IN THE TOTAL WORK FORCE (PERCENTAGES) (1970)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Temporary</th>
<th>Permanent</th>
<th>Sector</th>
<th>Temporary</th>
<th>Permanent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>2.7</td>
<td>97.3</td>
<td>Trade</td>
<td>1.9</td>
<td>98.1</td>
</tr>
<tr>
<td>Agriculture</td>
<td>6.7</td>
<td>93.3</td>
<td>Transport</td>
<td>3.3</td>
<td>96.7</td>
</tr>
<tr>
<td>Forestry</td>
<td>6.6</td>
<td>93.4</td>
<td>Crafts</td>
<td>3.6</td>
<td>96.4</td>
</tr>
<tr>
<td>Construction</td>
<td>6.2</td>
<td>93.8</td>
<td>Utilities</td>
<td>7.2</td>
<td>92.8</td>
</tr>
</tbody>
</table>

**SOURCE:** SŽS, SG, 1971, table 104-3, p. 87.
As a result of institutional and legal factors, the main reasons for terminations of employment among the permanent work force in Yugoslavia are voluntary worker requests for dismissal and retirement, sickness or old age. As table 3.5 reveals, aside from lay-offs of temporary workers which account for up to 36% of total layoffs, most terminations of employment are requested by or agreed to by workers or are the result of natural causes. In every year only a small fraction of total worker terminations are the consequence of work slowdowns, production stoppages or bankruptcy.

### TABLE 3.5

**THE CAUSES OF WORKER LAYOFFS**

<table>
<thead>
<tr>
<th>Cause</th>
<th>1969</th>
<th>1970</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of layoffs</td>
<td>239,796</td>
<td>238,018</td>
</tr>
<tr>
<td>% of which based on</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worker request</td>
<td>18.1</td>
<td>20.3</td>
</tr>
<tr>
<td>Worker desertion of job</td>
<td>20.4</td>
<td>28.0</td>
</tr>
<tr>
<td>Worker councils' decision with worker consent</td>
<td>9.0</td>
<td>10.4</td>
</tr>
<tr>
<td>Reduction in the volume of work</td>
<td>2.4</td>
<td>1.6</td>
</tr>
<tr>
<td>Inability of worker to continue work</td>
<td>1.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Retirement and death</td>
<td>4.3</td>
<td>4.7</td>
</tr>
<tr>
<td>Expulsion of worker or termination of contract</td>
<td>2.6</td>
<td>2.0</td>
</tr>
<tr>
<td>Termination of temporary contract</td>
<td>35.7</td>
<td>27.4</td>
</tr>
<tr>
<td>By force of law, independently of worker and workers' council</td>
<td>4.6</td>
<td>3.8</td>
</tr>
<tr>
<td>Unspecified</td>
<td>1.2</td>
<td>.7</td>
</tr>
</tbody>
</table>

The fact that enterprises cannot easily reduce the size of their permanent labor force without the voluntary request or consent of their workers suggests that labor turnover in Yugoslavia is likely to be smaller than labor turnover in other economies where capitalist modes of hiring and firing prevail. This supposition is borne out by the data contained in table 3.6 which indicates that labor turnover in Yugoslavia, as measured by the monthly rate at which workers leave enterprise employment per 100 employed, is only about 1/2 to 3/4's the size of labor turnover in the U.S. Low rates of labor turnover in Yugoslavia mean that the enterprise sector cannot easily reduce the size of its labor force in the short run in response to deteriorating demand conditions on product markets. In fact, because such conditions are likely to adversely affect worker expectations about alternative job possibilities in the rest of the economy and hence worker willingness to consent to dismissal requests, the maximum possible reduction in the labor force under such conditions is likely to be smaller than the maximum reduction possible under conditions of expanding economic activity. This hypothesis is also supported by the data presented in table 3.6 which clearly show the sharp decline in labor turnover and hence the sharp decline in the ability of the enterprise sector to reduce its
### TABLE 3.6

LABOR TURNOVER IN THE U.S. AND YUGOSLAVIA, 1965-70
(MONTHLY AVERAGES)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>2.7</td>
<td>2.1</td>
<td>1.8</td>
<td>1.6</td>
<td>1.6</td>
<td>1.7</td>
</tr>
<tr>
<td>Social sector</td>
<td></td>
<td>3.0</td>
<td>2.3</td>
<td>1.9</td>
<td>1.7</td>
<td>1.8</td>
<td>1.9</td>
</tr>
<tr>
<td>enterprises</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>4.1</td>
<td>4.6</td>
<td>4.6</td>
<td>4.6</td>
<td>4.9</td>
<td>4.8</td>
</tr>
</tbody>
</table>


\(^a\) Workers who left employment during a month as a percentage of total employed workers during that month. The "total" figures include both the so-called economic sectors, consisting of social sector enterprises engaged in industrial activities and related activities, such as transportation and construction, and the so-called non-economic sectors including health, government, education and welfare.

\(^b\) Total separations of workers from their employment due to quits, layoffs, military obligations and the like, per 100 employed. Monthly average.

Employment during the years of economic slowdown and uncertainty which began in mid-1965 and extended through the end of 1967. The data on terminations of employment and vacancies presented in table 3.7 provide additional evidence supporting this conclusion. The data reveal that during the 1965-67 economic slowdown the average number of terminations of employment dropped significantly, from an average of 31,104 during the 1962-65 period
to an average of 24,171 during 1966 and 1967. Moreover, the number of terminations of employment did not begin to recover until 1971, indicating that adverse worker expectations about job availability caused by the prolonged economic slowdown continued to influence worker willingness to accept dismissal. As a result of the combination of a reduction in the number of terminations of employment and a reduction in output levels and aggregate demand in the 1966-67 period the average number of

TABLE 3.7
TERMINATIONS OF EMPLOYMENT AND VACANCIES, 1961-71
(MONTHLY AVERAGES)

<table>
<thead>
<tr>
<th>Year</th>
<th>Terminations of Employment</th>
<th>Vacancies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>28,940</td>
<td>57,136</td>
</tr>
<tr>
<td>1962</td>
<td>31,576</td>
<td>57,804</td>
</tr>
<tr>
<td>1963</td>
<td>30,588</td>
<td>78,605</td>
</tr>
<tr>
<td>1964</td>
<td>30,985</td>
<td>83,068</td>
</tr>
<tr>
<td>1965</td>
<td>31,277</td>
<td>53,304</td>
</tr>
<tr>
<td>1966</td>
<td>24,842</td>
<td>43,677</td>
</tr>
<tr>
<td>1967</td>
<td>23,499</td>
<td>33,531</td>
</tr>
<tr>
<td>1968</td>
<td>19,104</td>
<td>33,505</td>
</tr>
<tr>
<td>1969</td>
<td>19,983</td>
<td>43,202</td>
</tr>
<tr>
<td>1970</td>
<td>19,835</td>
<td>46,293</td>
</tr>
<tr>
<td>1971</td>
<td>21,087</td>
<td>45,093</td>
</tr>
</tbody>
</table>


vacancies dropped sharply by 43.4%, from an average of 68,195 during the 1962-65 period to an average of 38,604 during 1966 and 1967.
Although the ability of the Yugoslav enterprise to reduce the number of workers it employs is severely restricted in the short run there remains the possibility of larger reductions in the total volume of labor inputs via reductions in the number of hours worked. In practice, this possibility is seldomly exploited because most enterprises establish fixed nominal, basic, *monthly* wages for both permanent and temporary workers, and once these wages are set, it becomes unprofitable to reduce the number of hours per worker below that which is considered normal for an average month's work. Partly as a result of this custom of setting basic *monthly* wages in many enterprises and partly as a result of worker pressure for a minimum number of hours for which payment is guaranteed, the use of cyclical reductions in the number of hours per worker to cope with cyclical reductions in aggregate demand has probably been quite limited.\(^{15}\) Unfortunately, data limitations make it difficult to judge the validity of this hypothesis. As the figures presented in table 3.8 suggest, the number of hours worked per worker per month declined by 2.5%, from a high of 202 hours in 1964 to a low of 197 for the 1965-67 period. However, this reduction represented the continuation of a trend to reduce the total number of possible hours of work by reducing the average length of the work week and by increasing the number of vacation days per worker.
Therefore, it is difficult to interpret the observed reduction in the number of hours worked in the 1966-67 period as evidence of a cyclical reduction in hours caused by the economic slowdown. This is especially the case in light of the fact that the total number of possible hours continued to drop throughout the 1968-70 period. One possible way out of this dilemma is to examine the number of "unworked" hours caused by work stoppages and slowdowns, and the number of overtime hours for possible cyclical variations, under the hypothesis that if enterprises can freely vary hours, then depressed periods of economic growth such as 1967, should be characterized by an increase in the former and a decrease in the latter. In fact, as table 3.8 reveals, the number of overtime hours did decline somewhat from a monthly high of 6 in 1964 to a monthly low of 4 in 1966-67, but the number of hours lost due to work slowdowns remained constant, as it had done throughout the postwar period. These facts alone suggest that while enterprises may vary the number of overtime hours in response to a drop in product demand, they may not be able to reduce the number of regular hours below some normal minimum. However, this last supposition must be accepted cautiously since the very large drop in hours worked in 1967 caused by the trend reduction in possible hours may have made additional
TABLE 3.8
AVERAGE MONTHLY NUMBER OF HOURS PER WORKER IN ECONOMIC ACTIVITIES

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Possible hours&lt;sup&gt;a&lt;/sup&gt;</td>
<td>202</td>
<td>200</td>
<td>200</td>
<td>192</td>
<td>187</td>
</tr>
<tr>
<td>Worked hours&lt;sup&gt;b&lt;/sup&gt;</td>
<td>174</td>
<td>170</td>
<td>169</td>
<td>163</td>
<td>157</td>
</tr>
<tr>
<td>Unworked hours&lt;sup&gt;c&lt;/sup&gt;</td>
<td>28</td>
<td>30</td>
<td>31</td>
<td>29</td>
<td>30</td>
</tr>
<tr>
<td>Annual and sick leave</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>Work stoppages</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Absenteeism</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other (state holiday, etc.)</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Overtime hours</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>


<sup>a</sup>"Possible hours" equals the daily number of hours available during regular work time times the number of working days in the month.

<sup>b</sup>"Worked hours" equals possible hours minus the hours during which workers did not work, regardless of whether they received payment or not.

<sup>c</sup>"Unworked hours" is the sum of all hours during regular time not worked, regardless of cause.

use of cyclical reductions in hours unnecessary. In other words, without more information, it is impossible to determine whether a greater increase in unworked hours due to work stoppages would have occurred in 1967, in the absence of the observed reduction in possible hours due to the operation of long-term factors.

Summarizing the above discussion, it seems
reasonable to conclude that the scope for cyclical reductions in labor inputs—traditionally considered the variable input in analyses of capitalist economies—in response to cyclical reductions in aggregate demand is severely restricted in Yugoslavia by limitations on both the size of reductions in the number of workers employed and the size of reductions in the number of hours per worker. Although it is impossible to judge the exact extent of these limitations, particularly in the case of manhours, it does appear reasonable to conclude that their combined impact works to narrow the scope for demand-induced variations in the employment of labor inputs in Yugoslavia below what is usually considered to be the possible range for such variations in capitalist economies. Therefore, it seems safe to hypothesize that employment levels in Yugoslavia—whether measured in terms of the number of workers or the number of manhours—exhibit greater downward rigidity than they do in other economies where capitalist practices of hiring and firing prevail.

Downward rigidity in the size of the permanent labor force means that pure profit or net income per worker maximization of the type suggested by the labor co-op and Horvat models may be impossible. Consider a production period ranging over three to twelve months.
During this period, the enterprise may be viewed as employing two homogeneous, non-competing types of labor, permanent labor and temporary labor. The number of temporary workers can be varied, if the contracts specifying their employment terms expire. The number of permanent workers cannot decline below a minimum consistent with the normal attrition of membership due to worker withdrawal and retirement. Following the tradition in most Yugoslav firms, the enterprise has established fixed, nominal, monthly wages for its permanent laborers. The wage for temporary laborers is set in accordance with prevailing conditions in the enterprise and in the rest of the economy. In this case, the relevant income per worker and profit function are:

\[
\frac{TV_i}{(L_p)_i} = \frac{p_i x_i - OC_i - T_i - (\tilde{w}_t L_t)_i - (\tilde{w}_p L_p)_i}{(L_p)_i} \tag{3.6}
\]

where \((L_p)_i > (C_p)_i\);

and

\[
\pi_i = (p_i x_i - OC_i - T_i - (\tilde{w}_t)_i(L_t)_i - (\tilde{w}_p)_i(L_p)_i)
\]

\[
\tag{3.7}
\]

where \((L_p)_i > (C_p)_i\)
and \( \bar{w}_t \) = the fixed monthly wage for temporary labor set by the firm and incorporated in the contracts of temporary workers;

\( L_t \) = the number of temporary laborers employed;

\( L_p \) = the number of permanent workers or enterprise members;

\( \bar{w}_p \) = the fixed monthly advance wage for permanent workers and

\( C_p \) = the lower limit for permanent labor employment during the production period.

As these functions indicate, if the profit maximizing or net-income-per-laborer maximizing positions call for permanent labor employment in excess of the specified minimum, then quantity and employment are determined by the labor demand equilibrium conditions contained in expressions (3.2) and (3.5) above. If the labor employment constraints are binding, however, the wage bill becomes a fixed cost, and like all fixed costs, it has no effect on the optimizing decisions of the enterprise, as long as total revenue continues to exceed total variable cost.

**Wage Determination in the Horvat and Co-op Models**

A final similarity between the labor co-op and Horvat theories of firm behavior is their failure to
examine the nature of the wage setting and adjustment process in an individual firm. Both theories implicitly assume that some such process occurs within each enterprise. In the labor co-op case, the enterprise is assumed to choose the fixed advance payments schedule and the parameters B and (1-B) allocating net income per worker between savings and payment shares,\(^{21}\) while in the Horvat case, the enterprise is assumed to choose a fixed nominal wage and its rate of growth from period to period. In either case, there is no guarantee that each firm will choose a nominal income level which just yields the real wage necessary to clear the aggregate labor market at the prevailing set of prices. Because worker income payments depend on enterprise profits, collective savings decisions and specialized wage determination procedures, realized nominal wage behavior can be quite nearly independent of aggregate labor market and unemployment conditions. In this sense, each firm can be viewed as operating its own labor market—first choosing a nominal wage and then adjusting its labor supply if possible to the volume required for maximization of its objective function, regardless of the implications of its actions for aggregate labor utilization.\(^{22}\) In the short run, therefore, there is no automatic mechanism insuring the equalization of labor's marginal product and the real wage at
the level just needed for full employment. In the long run, as was already noted, full employment can be attained as the unemployed are absorbed into new enterprises which compete down the profits of existing enterprises until they are consistent with optimal resource utilization and allocation.

Proposition A of the wage-push theory, which identifies excessive aggregate, nominal wage increases as the source of inflation, is difficult to interpret in an economic system which permits the isolation of enterprise labor markets from the aggregate labor market. On the one hand, in such a system, each enterprise is free to decide upon a nominal wage which exceeds the marginal product of labor as measured by the shadow price of labor on the aggregate labor market and in this sense, the scope for excessive wage increases as defined in the wage-push theory is unlimited. On the other hand, since each enterprise does not measure its labor cost at this shadow price enterprise wage increases which are excessive by aggregate standards may be warranted by enterprise profits and may therefore have no effect on unit labor costs and desired employment. In this case, an alternative version of Proposition A which focuses on enterprise rather than on aggregate labor market conditions and which identifies excess nominal wage increases
within an enterprise as those which exceed realized increases in the marginal value product of its labor force, become more meaningful for an examination of inflationary pressures. The alternative proposition discussed here can be formally expressed as:

A'. In each self-managed enterprise nominal wage increases in excess of realized increases in labor's marginal value product occur autonomously as the result of efforts by workers within that enterprise to increase their real wages at constant product price.

The distinction between the original version of Proposition A and the modification described here is important because it suggests that one of the most telling marks of a wage-push inflation in a capitalist economy—namely, the coincidence of high and growing rates of unemployment and nominal wage increases—may be irrelevant in a labor-managed economy like Yugoslavia. As long as each enterprise makes its nominal wage decisions independently, with no reference to overall resource utilization, there is no reason to expect any relationship between aggregate unemployment and wage increases, nor will the observed lack of relationship provide any information about the extent of wage-push pressures operating at the enterprise level. In contrast, in a capitalist economy where aggregate labor market conditions are
assumed to directly affect the price at which each enter-
prise hires labor, the coincidence of high and growing
unemployment rates and rapid nominal wage growth carries
the presumption that wage-push pressures are operative.
This presumption is implied because in the absence of dis-
tortions in the labor market allowing workers to "push
up" nominal wages, the competitive model predicts that
wages will actually decline until full employment is
achieved. In other words, in the model of a purely
competitive economy, at constant product prices, nominal
wages and hence real wages increase only as a result of
excess demand for labor on the aggregate labor market.
If, contrary to the model's prediction, nominal wages
and real wages increase in the presence of excess labor
supply, as measured by the unemployment rate, the impli-
cation is that labor, as a result of its monopoly power,
is "pushing" the real wage above its equilibrium value.

Needless to say, the gap between enterprise wage
changes and aggregate labor market conditions in an
economy of self-managed enterprises has undesirable ef-
ficiency and equity effects. In the area of resource
allocation, the isolation of individual labor markets
fosters inter-enterprise inequalities in labor's margin-
al product and resulting output loss, while it permits
employed workers to share in surplus profits and rents
and to enjoy growing nominal incomes even as unemployed workers are prevented from bidding away jobs by accepting a lower wage. As Vanek has already emphasized, these equity and efficiency problems can be solved by the correct pricing of capital, by the control of natural monopoly and by the unrestricted entry of new enterprises into existing industries. These solutions are long-run in nature, however, and in the short-run, the isolation of the employed work force from the aggregate work force is likely to have its expected negative results. As should be obvious, this conclusion in no way bears on the issue of the sensitivity of a labor-managed economy to wage-push inflationary pressures. In other words, the fact that such an economy exhibits a high level of unemployment and growing nominal wages and prices in the short run does not imply that it is suffering from a wage-push inflation.

The Price-Wage Link in a Labor Co-op

The wages of the permanent members of a labor co-op depend not only on the level of average net income per laborer earned during a production period but also on the co-op's decision about the distribution of total net income between collective savings and individual income payments. To see this, consider a co-op which has a total net income per permanent worker of 100 thousand dinars per accounting period, and which allocates 25%
of this to internal accumulation while distributing 75% in the form of wage and bonus payments. Further assume that the firm acts to maximize income per permanent worker, defined to exclude all intermediate and final costs of production, including the cost of temporary labor, so that its optimum employment of permanent labor is given by

\[
\frac{p_i X_i - OC_i - T_i - \left(\bar{w}_t\right)_i (L_t)_i}{(L_p)_i} = p_i \frac{dX_i}{dL_p}_i = Y_i \frac{(L_p)_i}{(L_p)_i}
\]

(3.8)

If the firm now decides to increase total income payments to its permanent labor force by 10% then it can accomplish this goal by reallocating total net income so that 82.5% flows into personal income payments and 17.5% flows into savings. In this case, nominal wages of permanent labor can rise without any change in selling price. Moreover, because only the distribution and not the level of net income per worker is changed, optimum labor employment and output remain constant as well. In short, basic wage increases not offset by labor productivity changes need not have an effect on production and employment provided the firm can finance these increases by reductions in retained earnings or profits.

The above discussion can be broadened to include the case of a co-op in which permanent workers receive a
fixed wage per production period which is set by the collective decision of the enterprise. By choosing a fixed wage level, the enterprise is in fact choosing the share of each dinar of net income per permanent worker which is to be paid out to the members of the permanent labor force, so that at the end of its accounting period, the distribution of net income between savings and income payments is automatically determined by

\[
\frac{\bar{w}_p}{NY_i} \frac{L_p}{L_p} = B_i \quad \text{and} \quad \frac{NY_i - (\bar{w}_p)}{NY_i} \frac{L_p}{L_p} = 1 - B_i \quad (3.9)
\]

where \( \bar{w}_p \) = the fixed wage per permanent worker and

\[ NY_i = p_i X_i - OC_i - T_i - (\bar{w}_t) L_t \]

In other words, the choice of a fixed wage level for permanent workers is exactly analogous to the choice of an internal savings rate by the co-op firm at the end of the period. The analogy carries over into the area of price-wage behavior where nominal wage increases in excess of productivity increases need have no effect on output, employment, or prices as long as \( B_i \) remains less than one or alternatively as long as realized retained earnings at the end of the period remain positive.

The enterprise can also choose to pay out part of its net income, exclusive of the fixed wage bill for
permanent labor, in bonus payments so that total payments to permanent labor equal \( S_i + (\bar{w}_p L_p)_i \), where \( S_i \) stands for bonuses, and the realized distribution of net income becomes

\[
\frac{(\bar{w}_p L_p)_i + S_i}{NY_i} = \Theta_i; \quad \frac{NY_i - (\bar{w}_p L_p)_i - S_i}{NY_i} = 1 - \Theta_i
\]

In this case, the enterprise can be viewed as setting a fixed advance wage, calculating net income exclusive of this wage, and then determining the shares of savings and bonus payments to be applied to this net income figure. The setting of a fixed wage is then analogous to the setting of a planned share in net income inclusive of permanent labor wages, though the realized share may vary depending on further decisions about the share of bonuses in net income exclusive of the value of the advance wage bill. According to many studies of actual Yugoslav enterprises, the usual procedure is to plan the shares of the wage bill and savings in total net income inclusive of wages before the production period and then to pay out a fixed advance wage whose level is set by predictions about expected flows of net income. In this case, the realized shares at the end of the period are determined by the fixed advance wage and the actual flow of net income. If actual flows widely exceed planned levels,
additional bonuses are then added to worker incomes to bring the realized savings rate closer to its planned level. 24

In a perfectly competitive market system where all non-labor factors receive their equilibrium price and surplus profits are zero, a positive \((1-B_1)\) reflected in the savings decision of a co-op firm means that its permanent members are willing to take home less than the value of their marginal product. Although such willingness on the part of workers is possible—particularly if they are assured of continued employment and a continued share in the returns on collective investment—it is unlikely to result in large divergences between received nominal wages and labor's marginal value product. Therefore, the scope for financing nominal wage increases in excess of labor productivity increases out of retained earnings is probably quite small in a system which guarantees market equilibrium at zero profits. In a real economy, like Yugoslavia, where numerous market imperfections and rigidities lead to surplus profits, the scope for such wage increases becomes larger, and workers can increase their wages more rapidly than labor productivity increases by directing either a growing share of constant profits or a constant share of growing profits into their pay checks without reducing output or
increasing prices.\textsuperscript{25}

A Permanent Income Hypothesis for Co-op Firm Behavior

The co-op's decision about the allocation of net income between payments to workers and internal savings or about the size of $B_i$ can be compared to the savings-consumption decision of a household. Assume the firm makes its plans on the basis of an expected or permanent income flow, defined according to the Friedman permanent income hypothesis as

\[
\left( \frac{NY_i}{LP_i} \right) = \phi \int_{-\infty}^{t} e^{(\alpha - \phi)(t-T)} \left( \frac{NY_i}{LP_i} \right) dt
\]

(3.10)

where $\text{NY}_i$ = definition as in expression (3.9)

$t$ = the current time period

$\phi$ = the trend rate of growth of $(NY/LP)$

and $\alpha$ = the actual rate of growth of $(NY/LP)$.

Now suppose the firm expects net income to grow at 6% a year and that it decides to keep the share of savings constant at 25% of the total. In this case, the workers' council will approve a 6% increase in advance nominal wage payments. If expectations are exactly realized, than at the end of the production period, net income, wages and savings will have all risen by 6%. If actual flows fall short of expected levels, however, then the
realized savings of the firm defined as

\[(S_i/(L_p)_i) = ((1-B_i)(NY_i/(L_p)_i)) = (NY_i - (\bar{w}_p L_p)_i)/(L_p)_i\]  

(3.11)

where \( S_i \) = the realized amount of savings and

\( \bar{w}_p \) = the planned advance nominal wage for permanent workers.

will be lower than planned savings and realized consumption will equal planned consumption. Of course, if realized net income is larger than expected—that is, if the transitory component of net income is positive—then the reverse adjustments will occur. In either case, variations in actual savings allow the firm to realize its planned consumption expenditures, despite shortfalls or windfalls in net income. Of course, if an income shortfall is so great as to result in losses at the planned wage level so that \((\bar{w}_p)_i(L_p)_i > (NY_i)\) and \(1-B_i\) is negative, then these losses will have to be financed either by asset reduction or by external credit.26

The above discussion yields several hypotheses about firm behavior which can be tested against Yugoslav reality. First, the permanent income hypothesis suggests that at any point in time firms or sectors with below average realized net income per worker will exhibit lower savings rates than firms with above average per worker
net income. This hypothesis is also implied by the theory of competitive wage formation in Yugoslav firms suggested by Horvat and Bajt. Just as Duesenberry's relative income hypothesis for households explains the apparent increase in the average propensity to save as one moves from low to high household income levels as the consequence of the expenditure of a larger fraction of income by lower income households in order to maintain their relative position in the income hierarchy, so the competitive wage theory or the relative income hypothesis for co-op firm behavior explains the increase in savings rates as one moves from low to high per worker net income firms as the consequence of efforts by poorer firms to maintain the wages of their permanent labor force, thereby maintaining their relative position in the wage hierarchy.

If either the relative income hypothesis or the permanent income hypothesis of cooperative firm behavior is correct, then firms with above average per capita net incomes should consistently exhibit higher savings rates than firms below the average. This supposition is clearly borne out by the data presented in Table 3.9 for production sectors in all Yugoslavia. The rank correlation coefficient between net income per capita and the savings rate, defined as the share of total discretionary retained earnings and total discretionary depreciation in
enterprise per capita net income, is .61 for 1969 and .75 for 1967. Both figures are significant at the .01 level of significance and together they indicate the clear relationship between levels of firm income and rates of firm accumulation in the Yugoslav industrial sector. This relationship is shown in graph 1, which plots the saving rate in each sector of production against per capita net income in that sector. Ordinary least squares estimation of the relationship between these two variables yields the following results:

\[(1-B_i) = 1.1175 + 0.239(Y_i/L_i)^{29} \]  
\[(2.37)\]

where \((1-B_i)\) = the share of total discretionary savings and depreciation in firm net income in sector \(i\);

and \((Y_i)\) = disposable income + discretionary depreciation - all legal and contractual obligations. The measure is approximately equal to \(NY_i = p_iX_i - OC_i - T_i - (w_t)_i(L_t)\)

the measure of net income discussed in the text. The main difference between the text definition and the numbers used to measure net income arises from the inclusion of depreciation (discretionary) and the
TABLE 3.9
PER CAPITA NET INCOME AND THE SAVINGS RATE, BY SECTIONS OF ECONOMY, 1967 and 1969

<table>
<thead>
<tr>
<th>Sectors</th>
<th>1967a</th>
<th>1969b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per capita net income</td>
<td>(index)</td>
<td>(index)</td>
</tr>
<tr>
<td>Share of savings in total net income</td>
<td>(percentage)</td>
<td></td>
</tr>
<tr>
<td>Per capita wage or personal income payments</td>
<td>(index)</td>
<td></td>
</tr>
<tr>
<td>Per capita net income</td>
<td>(index)</td>
<td></td>
</tr>
</tbody>
</table>

Index: avg. across sections = 100.

Electrical energy | 203 | 42.2 | 165 | 192 |
Oil | 249 | 57.8 | 148 | 173 |
Nonferrous metals | 122 | 32.2 | 116 | 131 |
Chemicals | 131 | 42.1 | 106 | 141 |
Food processing | 110 | 34.8 | 101 | 109 |
Printing | 151 | 28.8 | 151 | 125 |
Retail trade | 114 | 33.0 | 107 | 96 |
Wholesale trade | 131 | 36.7 | 116 | 112 |
Shipbuilding | 128 | 24.1 | 136 | 127 |
Construction materials | 104 | 32.6 | 99 | 116 |
Rubber | 116 | 40.7 | 96 | 109 |
Coal | 72 | 14.5 | 87 | 86 |
Non-metals | 85 | 26.9 | 87 | 92 |
Metals | 86 | 27.1 | 88 | 100 |
Wood | 62 | 18.8 | 71 | 85 |
Paper | 56 | 10.8 | 71 | 109 |
Textiles | 69 | 28.3 | 70 | 79 |
Leather | 75 | 26.4 | 78 | 86 |
Ferrous Metals | 90 | 33.1 | 84 | 115 |
Electrical equipment | 94 | 30.5 | 92 | 104 |
Tobacco | 71 | 29.7 | 70 | 95 |


NOTE: Per capita net income = disposable income (total revenues minus total taxes minus depreciation required by law minus all legal and contractual obligations) plus personal income = per capita net personal incomes (fixed and supplementary wages) plus fund for collective consumption; enterprise savings = total discretionary payments minus discretionary depreciation.

a Nineteen sixty-seven: coefficient of variation: per capita net income: .748; rank correlation coefficient between per capita net income and savings rate: .748.

b Nineteen sixty-nine: coefficient of variation: per capita net income: .615; correlation coefficient between per capita net income and savings rate: .615, significant at .005 level.
TABLE 3.9

SOME AND THE SAVINGS RATE, BY SECTIONS OF PRODUCTION

<table>
<thead>
<tr>
<th>1969b</th>
<th>Per capita wage or personal income payments</th>
<th>Per capita net income</th>
<th>Share of savings in total net income</th>
<th>Per capita wage or personal income payments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(percentage)</td>
<td>(index)</td>
<td>(percentage)</td>
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<tr>
<td>42.2</td>
<td>165</td>
<td>192</td>
<td>46.7</td>
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<td>116</td>
<td>131</td>
<td>31.3</td>
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<td>42.1</td>
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<td>41.3</td>
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<td>36.7</td>
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<tr>
<td>29.7</td>
<td>70</td>
<td>95</td>
<td>30.9</td>
<td>94</td>
</tr>
</tbody>
</table>

Note: Per capita net income = disposable income (total revenues minus total material costs) plus total depreciation and legal and contractual obligations (taxes, interest payments, etc.); per capita incomes (fixed and supplementary wages) plus per capita allocations to enterprise savings = total discretionary payments into enterprise savings funds plus total

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izable income (total revenues minus total material costs) plus total depreciation and legal and contractual obligations (taxes, interest payments, etc.); per capita incomes (fixed and supplementary wages) plus per capita allocations to enterprise savings = total discretionary payments into enterprise savings funds plus total

of variation: per capita net income: .422; per capita personal income: .275; per capita net income and savings rate: .748, significant at .01 level.

of variation: per capita net income: .248; per capita personal income: .173; per capita net income and savings rate: .615, significant at .01 level.
inclusion of the wage bill for temporary labor in the latter measure.

These results reveal that the average propensity to save within each sector of production increases as its net per capita income increases, in exactly the manner suggested by short-run studies of household savings and consumption decisions. As noted earlier, a rising average propensity to save is consistent with either the permanent income hypothesis or the relative income hypothesis of firm behavior.

The data in table 3.9 also indicate that per capita net income levels are considerably more disperse than per capita personal income or wage payments. Thus, in 1967, the coefficient of variation of sectoral per capita income levels was .422 while the coefficient of variation in sectoral personal income payments was only .275. The figures in 1969 were .248 and .173 respectively. A comparison of these two sets of figures suggests the following conclusions.

1. In 1967, a year of substantial economic difficulty and declining growth rates, there were greater inequalities in both the level of per capita net income and the level of wage or personal income payments than in 1969, a year of rapid economic growth.

2. In both years the fact that per capita personal
Graph 3.1. Sectoral net per capita income and savings rates, 1970. (Data Source: see footnote 29.)
Graph 2. Per capita personal incomes and per capita savings by sector of production, 1970. (Data Source: same as graph 1)
income payments were considerably less disperse than per capita net income levels implies that per capita savings levels were considerably more disperse than per capita net income levels. In other words, greater equality among wages was achieved at the expense of greater inequality in per capita retained earnings and savings. This observation is supported by the evidence contained in graph 2 which shows both per capita personal income payments and per capita savings across sectors of production in 1970. The graph reveals that savings per worker tends to be considerably more disperse than per capita personal income payments. The greater dispersion of per capita savings is explainable in terms of the permanent income or relative income hypothesis of firm behavior, both of which imply that firms will maintain planned wage payments despite shortfalls or windfalls in net income by permitting offsetting shortfalls or windfalls in planned savings.

Wages and Inflationary Pressure in the Co-op Firm: A Modified Profits-Push Theory of Inflation

The findings of the above paragraphs suggest that in a co-op firm there is no direct relationship between changes in worker income payments, changes in labor's marginal value product and changes in product prices of the type described by proposition B of the wage-push theory of inflation. This conclusion is a natural
consequence of the fact that in a pure co-op, labor income is defined to be the residual earned after payment of all non-labor costs of production. As condition (3.2) indicates, even if workers are paid a fixed advance wage the resulting wage bill has no impact on equilibrium output, employment or prices. Once payments to labor take the form of profits shares, the link between wages and prices via unit labor costs is broken, since such costs become meaningless for production and employment decisions. This is not to say that increases in labor incomes in a co-op may not cause or encourage increases in prices. However, if such a sequence of causality occurs then it must take a very different form from the one implied in propositions A and B of the pure wage push theory.

Suppose the permanent workers of a co-op try to win a wage increase which cannot be financed by variations in enterprise savings out of surplus profits. For simplicity, consider an enterprise which is currently distributing all residual income in excess of production costs to its permanent workers in the form of wage payments. The initial equilibrium of the firm is characterized by the following conditions

\[
\left( \bar{w}_p \right)_i = p_i \left( \frac{dX_i}{dL_i} \right) = p_i X_i - OC_i - T_i - \frac{(\bar{w}_t L_t)_i}{(L_p)_i}
\]

and \( B_i = 1 \) \hspace{1cm} (3.12)
Under these conditions, as long as all cost and demand factors remain unchanged, workers within the enterprise cannot finance increases in their personal incomes by reductions in collective savings since the volume of such savings is already zero. Now suppose the enterprise decides to try to increase the nominal value of wage payments by increasing its selling price. As expression (3.12) reveals, such a decision is equivalent to a decision to try to increase the nominal value of net income per worker by raising selling prices. Provided the firm is in an initial position of equilibrium, however, attempts to increase net income per worker and wages by increasing prices are doomed to failure. Given constant cost and demand conditions, any increase in price from its initial equilibrium position can only reduce profits per worker to some suboptimal position. Therefore, initial efforts to gain larger incomes by increasing selling prices will be reversed as the enterprise responds to the resulting deterioration in its profitability.

The above discussion yields the following three propositions about the possibility of a wage-induced price inflation in an economy of pure co-op firms.

D. A desired increase in the wage rate or personal income payment for permanent workers may lead a co-op enterprise to autonomously increase its selling price in
an effort to increase its per capita net income.

E. Such a policy is feasible only when the co-op enterprise has some degree of monopoly power in its product markets; otherwise, a price increase will reduce enterprise sales to zero as demand shifts to competitor firms selling at the market-determined price.

F. Even if the enterprise has the necessary monopoly power to enforce a price increase, such an increase will necessarily reduce per capita net income provided the enterprise is initially in a position of equilibrium and provided all relevant cost and demand factors remain unchanged. Therefore, under these conditions, a wage-induced price increase will be reversed as the enterprise responds to the resulting deterioration in its profitability caused by a movement away from its initial optimum equilibrium configuration of price and output.

These propositions reveal the significant difference between pure-wage-push inflation as described in propositions A-C and the type of price inflation caused by excessive wage growth which is likely to develop in an economy of pure co-op firms. According to the pure wage-push theory, starting from an initial position of equilibrium, an autonomous increase in nominal wages can cause a permanent increase in prices and a permanent reduction in output, so that the economy reaches a new
equilibrium characterized by higher nominal wages and prices, a higher real wage, and smaller volumes of output and employment. In contrast, starting from an initial position of equilibrium, an autonomous price increase of the type discussed in propositions D-F will necessarily be reversed as each enterprise reacts to the reduction in per capita revenues following upon that price increase. Therefore, we can conclude that while a wage-push inflation may be self-sustaining, an inflation motivated by enterprise efforts to increase its net income will be self-correcting or self-reversing provided each enterprise begins from an initial optimum position. This conclusion is consistent with the traditionally-held belief that profit-push pressures lead to temporary, one-shot price increases rather than to the type of permanent continuous price increases associated with wage-push pressures. 32 Since the theory of inflation described in propositions D-F is clearly a hybrid of the profit-push theory, modified to fit an economy where enterprises maximize profits per worker in lieu of total profits, it is not surprising that both theories lead to the same conclusion about the temporary nature of price increases.
The Price-Wage Link in the Horvat Model of Firm Behavior

The last three sections of this chapter consider possible relationships between increases in personal incomes or wages paid to the permanent work force and increases in selling prices in an economy composed of pure co-op firms. The discussion is relevant to the issue of wage-push inflation in Yugoslavia only to the extent that the majority of Yugoslav firms act in accordance with the rules of behavior posited by the theory of the co-op enterprise. Since opinion appears divided on this point and since a growing number of students of the Yugoslav economy find the Horvat model of modified profit-maximization preferable to the pure co-op theory as a reasonable approximation to reality, it is necessary to examine the relationship between prices and wages in the context of this model before we can draw any general conclusions about the probable importance of wage-push pressures in the Yugoslav economy.

Consider a Yugoslav enterprise which maximizes an objective function of the type suggested by the Horvat theory of firm behavior. Such an objective function is defined in expression (3.7). Assume also that because of legal and traditional limitations on hiring and firing practices of the type observed in Yugoslavia, the firm is constrained to maintain a permanent labor force
(defined in terms of either the number of workers or the number of manhours) of size $C_p$ during a given production period. Now assume that the enterprise starts out at an initial point of equilibrium characterized by equality between the real wage and the marginal product of labor and that the workers' council passes a nominal wage increase for permanent workers which pushes the real wage above its equilibrium value. The profit maximizing response to such a wage increase is a reduction in permanent labor employment and output, and, provided the firm operates in imperfectly competitive product markets, an increase in selling price. In the following discussion it is assumed that this condition is satisfied and that each enterprise faces a downward sloping demand curve. This assumption is made because if all firms operated in perfectly competitive markets, excessive nominal wage increases within an individual firm would eventually force it to close down. Only if the same wage increase were simultaneously secured by all other enterprises in the same industry would each firm be able to finance excessive nominal wage growth. Yet exactly because in an economy of Horvat-type firms enterprise labor markets are shielded from one another, and because the extent and frequency of wage decisions within each depend on the unique composition of its work force, the probability that
such simultaneous wage increases will occur is infinitely small. Therefore, if all markets except the labor market were competitive, the pressure of externally generated competition would keep internally generated wage decisions in line with realized changes in labor productivity and the potential for the development of wage push pressures in an economy of Horvat-type enterprises would be eliminated.  

Although the profit maximizing response to an autonomous nominal wage increase under the conditions discussed here is a reduction in output and employment and an increase in selling price, this response may be impossible because of the permanent labor employment constraint which imposes a lower limit on the value of current period labor utilization. To see the effect of this constraint, consider the case of a nominal wage increase which calls for optimum labor employment short of the minimum. With the nominal wage set and employment fixed at its minimum value, the nominal wage bill for permanent labor becomes a fixed cost and the firm is forced to maximize a constrained profit function of the type

\[ \pi_i^R = p_i x_i - (\tilde{w}_p)_i (\bar{c}_p)_i - (\tilde{w}_t L_t)_i - OC_i - T_i \]  

The maximum of this function occurs where the marginal value products of non-permanent-labor factors just equal
their prices and these conditions are fulfilled at the level of output consistent with minimum employment of the permanent labor force. The profit maximizing price associated with that output is in turn determined by the demand curve facing the enterprise in the product market.

In the limiting case where the enterprise cannot reduce its optimum labor employment at all in the short run, an excessive nominal wage increase will change neither output nor price, which will be set at their initial levels by the constrained equilibrium condition in (3.13). Therefore, over short periods of time when the permanent labor force is guaranteed employment security, the output and price consequences of excessive nominal wage growth depend crucially on the size of the minimum labor employment constraint. This constraint is likely to be large especially in situations where the proximate cause of employment reductions are higher nominal wages for the workers who are lucky enough to keep their positions. In short, the potential tradeoff between employment and excessive wage growth and the conflict which it implies between those workers who are forced to leave their jobs and those workers who receive the higher wage are likely to act as deterrents to excessive wage demands unless they are accompanied by safeguards on employment levels. As a result,
employment adjustments in response to nominal wage changes are likely to be severely restricted and prices and output are likely to be largely unaffected by excessive wage increases at least in the short run.

The tradeoff between employment security and nominal wage increases discussed here faces every union bargaining for higher wages. Two factors distinguish the union situation from the workers' council situation, however. First, because of their more democratic structure, workers' councils are less likely than unions to accept a nominal wage increase which necessitates unemployment. Because each worker has an equal voice in the wage and employment decisions adopted by the workers' council, the elected leadership of the council is unable to autonomously set enterprise policy under the expectation that such policy will automatically be accepted by the rank and file workers. Particularly when the issue concerns such crucial worker interests as job security and wage levels, all members of the workers' council are likely to become directly involved, thereby preventing the leadership from dominating crucial policy decisions. In contrast, union leaders, once elected, frequently appear able to determine wage policy in accordance with their own value system, even if the resulting policy leads to the eventual unemployment of some of the union
members, because the rank and file workers generally accept the policy packages proposed by the leadership. The willingness of the individual worker to vote approval to union programs probably stems from his lack of knowledge of the relevant tradeoffs involved in such programs. In contrast, because of his continual involvement in certain aspects of enterprise policy formation, particularly the determination of wages and hiring and firing practices, each member of the workers' council has a clear understanding of these tradeoffs and can therefore express his own preferences regarding them.

A second difference distinguishing unions and workers' councils is the potential ability of the latter to maintain both nominal wage increases and employment security within each enterprise. Thus, an individual council may vote a 5% increase in wages and at the same time may prohibit any layoffs of permanent labor. Naturally, this policy package increases the fixed wage bill of the enterprise, and under constant cost and demand conditions, this increase will necessarily result in a reduction of enterprise profits. However, the workers' council is free to choose between its wage and employment package and a reduction in enterprise profits. In contrast, the union is forced to choose between higher wages and steady employment levels, since the option of a reduction
in enterprise profits to finance a higher nominal wage bill is unavailable under conditions of capitalist hiring and layoff policies.

Consider now the case of a workers' council which adopts a nominal wage increase and which prevents the enterprise from making the employment and output reductions necessary for profit maximization at the new higher wage level. The enterprise is therefore forced to operate at the constrained equilibrium position implied by maximization of the constrained profit function defined in expression (3.13). At this position the fixed wage bill may result in either a reduction of surplus profits or an increase in financial losses. For example, if the firm was earning a surplus or pure profit of 100,000 dinars per period before the nominal wage increase and if the resulting fixed nominal wage bill for the permanent labor force increases by less than 100,000 dinars the firm can continue to operate at its constrained equilibrium where surplus profits fall to zero. In contrast, if the wage bill increases by more than 100,000 dinars as a result of the wage increase, then fixed costs will exceed surplus profits and losses will develop. Over time, the workers in the firm will be faced with a choice between bankruptcy, wage reduction or employment reduction. This choice can be postponed only as long as the
firm can draw down its past savings or can borrow from the banking system to finance its short run losses. In short, the self-managed enterprise, acting as an independent labor market and wage setter, is nevertheless restricted in its wage decisions because of the inherent conflict between excessive nominal wage increases, employment security and financial solvency.

Of course, if the enterprise has sufficient resources to finance its wage bill at the constrained equilibrium position for as long as necessary, then the labor employment limit may only postpone and not eliminate the nominal price rise which is the natural consequence of the excessive nominal wage growth. In the absence of technological progress or changes in non-labor costs of production, this price increase will occur in one of two ways: first, if product demand increases output will remain constant until excess demand forces prices up restoring equality between the marginal product of labor and the real wage; or second, if product demand is constant, the firm will not replace retiring or departing workers until the natural rate of attrition brings the labor force and output down to the reduced levels consistent with the existing real wage. In either case, prices may gradually increase in response to the initial wage pressure and, in this sense, a wage-push
inflation may occur. However, the scope for such an inflation is naturally limited by the ability of the enterprise to finance its fixed bill until such time as product demand increases or the labor force naturally declines, just enough to restore equality between labor's marginal value product and the nominal wage level chosen by the workers' council. Therefore, employment security and rigidity in the Horvat-type enterprise impose a natural boundary on the size of the nominal wage increases which can be sustained and therefore on the likely size of a wage-push inflation.

**Surplus Profits and Workers' Incomes in a Horvat-Type Firm**

According to Horvat, the typical Yugoslav firm pays its workers a fixed nominal wage per production period and retains all residual profits earned after paying this wage and other current production costs. In a system of purely competitive markets these residual profits equal zero and each factor, including labor, receives its marginal value product as payment. In reality a variety of market imperfections exist so that at the end of a production or accounting period, the Yugoslav enterprise is likely to find itself with substantial residual profits. There is evidence that not all of these profits are retained by the firm in its internal
savings funds. As a growing body of studies indicate, most firms continue to distribute a part of their residual profits in the form of bonuses to workers\textsuperscript{36} thereby following the pre-1961 procedure of distinguishing between fixed and supplementary (bonus) wage payments. Firms acting in this manner can be viewed as setting a fixed wage during the production period to guide their factor employment decisions. At the end of the period, the firm also pays the worker a profit share so that the total income per employed is the sum of the wage and the bonus payment. In this way, the firm continues to make optimal factor employment decisions on the basis of the fixed accounting wage while employees receive a share of the profits to which their activity as risk takers and decision-makers of the firm have contributed.\textsuperscript{37} Such a dichotomy between the accounting wage and the actual income of the worker reduces the kind of wage-push pressures which may develop in a capitalist firm when workers try to win a share of surplus profits. If the workers are successful, then the managers of the capitalist firm can be expected to try to mark up prices to restore their target share in surplus profits. In this case, the struggle over these profits can incite a wage-price spiral of the type associated with the wage-push theory of inflation. In Yugoslavia, where
laborers are viewed as equal partners with managers in the residual profits of the firm, the method of allocating such profits can be divorced from the method of making optimal factor employment and output decisions.

The importance of profit shares in total worker incomes in Yugoslavia cannot be directly measured, because official data do not distinguish between fixed wages and bonuses. However, based on trends observed in the pre-1961 period, when data for both fixed and supplementary wages were available, and on recent estimates by Wachtel, it appears that bonus payments account for approximately 2-10% of total worker incomes. The inclusion of bonuses in official income statistics makes it difficult to measure the level of the fixed accounting wage which influences labor employment decisions. Moreover, it confounds changes in the fixed nominal wage with changes in bonuses, so that it is impossible to determine the rate at which the current wage is changing over time. These complications must be kept in mind in any statistical examination of the relationship between wages, prices and output which purports to support the wage-push theory of inflation. For example, an "excessive" nominal wage increase may reflect changes in residual profits and in bonus payments, rather than changes in the accounting wage and may therefore have no effect on
employment, output or prices. In this respect, bonus payments in the Horvat firm play an analogous role to income payments in the co-op firm, and in either case, variations in firm savings rates may account for variations in worker income payments.

Wage-Push Pressures at the Enterprise Level: Some Conclusions

Although the wage-push theory of inflation attempts to explain the phenomenon of rising aggregate prices on the macroeconomic level, its assumptions are firmly based on a definite model of price and wage formation at the enterprise level. Therefore, the applicability of the wage-push theory to a given inflationary experience depends on whether this model of enterprise behavior is appropriate to the microeconomic institutions of the economy in which the inflation occurred. In particular, before the wage-push theory can be adopted to explain cycles of inflation in Yugoslavia it is necessary to determine whether this model conforms to the unique patterns of enterprise decision-making likely to develop under a system of workers' self-management. In the above sections I have attempted to present some major arguments relating to this issue by examining the possible interrelationships between nominal wage increases and enterprise price and output decisions under two
alternative models of enterprise behavior which appear to have some relevance for the actual practice of Yugoslav firms. In either case the analysis supports the general conclusion that the model of enterprise behavior on which the traditional wage-push theory is based must be significantly modified to take account of the unique features of price, wage, and employment determination in an economy of self-managed enterprises. Moreover, the modifications themselves suggest that wage-push inflationary pressures may be less likely to arise in such an economy than in an economy composed of profit-maximizing capitalist enterprises.

The major assumption about microeconomic institutions on which the wage-push theory rests is the assumption that enterprises act as profit maximizers, determining output and price in keeping with the dictates of cost minimization. Under this assumption, given constant costs and labor productivity, an autonomous nominal wage increase will necessarily lead to an increase in product price as the marginal cost of output increases due to the increase in labor's real wage. Provided there is no change in conditions of product demand, the increase in price will be accompanied by a reduction in equilibrium output and employment as well.

Now consider the same autonomous nominal wage
increase occurring in an economy composed of either labor co-op firms or Horvat-type profit maximizers. In either case assume that each firm operates with a minimum labor employment constraint which sets limits on the amount of labor which can be unemployed within a given production period. Under such circumstances, the range of possible price and output responses to the nominal wage increase can be summarized as follows:

1. The Co-op Firm

   A. The nominal wage increase may be financed by a reduction in the enterprise savings rate. If before the wage increase, the equilibrium distribution of net income per worker took the following form:

   \[ B^0 \left( \frac{Y}{L_p} \right)_i = w^0_p \text{ and } (1-B^0) \left( \frac{Y}{L_p} \right)_i = S^0_i/(L_p)_i \]

   then after the increase the new distribution of net income will become

   \[ B^1 \left( \frac{Y}{L_p} \right)_i = w^1_p \text{ and } (1-B^1) \left( \frac{Y}{L_p} \right)_i = S^1_i/(L_p)_i \]

   where \( w^1_p > w^0_p \) and \( B^1 > B^0 \).

   At the new wage rate, price, output and labor employment will remain unchanged at the original equilibrium position where the marginal value product of labor just equals net income per worker.
B. If the firm has some degree of monopoly power in its product market then it may attempt to finance the wage increase by increasing its selling price. Such a reaction is likely to occur when the firm does not wish to alter its distribution of net income between savings and the wage bill. Say the firm starts in an initial position of equilibrium defined by the following conditions

\[
(Y/L_p)_i = \frac{p_i^0X_i - OC_i - T_i - (w_tL_t)_i}{(L_p)_i} = p_i^0(dX_i/dL_p)
\]

and

\[
w_p^0 = B^0(Y/L_p)_i
\]

Now, if the wage increases to \(w_p^1\), then the firm may try to keep \(B^0\) constant and increase \((Y/L_p)_i\) by increasing its selling price from \(p_i^0\) to \(p_i^1\). In this case, the firm's attempt to increase the value of net income per worker by increasing its price is exactly analogous to the attempt of a profit maximizing firm to use its monopoly position to increase total profits by increasing price. In both cases, provided the firm starts out from an equilibrium position and provided all cost and demand conditions remain unchanged, the price increase will fail to increase either net income per capita or total profits, and the firm will be induced to return to its original price-output
configuration. In this sense, while a wage-induced price increase may occur in a pure labor co-op firm, it is likely to be temporary and self-reversing. In contrast, the wage-push theory predicts permanent, self-sustaining price growth caused by a nominal wage increase.

II. The Horvat-Type Firm

Because the Horvat-type firm maximizes profits given a wage rate collectively determined by the decision of its workers' council, the profit maximizing response of such a firm to an increase in the wage rate is likely to be some reduction in output and employment, and, provided the firm has some degree of monopoly power in its product market, some increase in selling price. In this sense, the sequence of events leading from a nominal wage increase to a price increase is exactly as predicted by the model of firm behavior on which the traditional wage push theory is based. Therefore, if the majority of Yugoslav firms act in accordance with the Horvat paradigm, then wage-induced price increases of the traditional wage-push variety are at least a theoretical possibility. In practice, however, the scope for such price increases may be quite limited because firms may be unable to reduce employment and output to the levels consistent with profit maximization at the new higher wage rate. In the limiting case where the
enterprise cannot reduce output and employment at all in
the short run, a nominal wage increase will change nei-
ther output nor price. In the less extreme case the wage
increase will lead to some increase in price and some
reduction in employment and output within the bounds set
by the minimum employment constraint. In either case,
downward rigidity in labor employment coupled with the
wage increase is likely to cause a reduction in enter-
prise profits or an increase in enterprise losses. Ul-
timately, the workers of the firm are likely to be faced
with a choice between employment, higher wages, and fi-
nancial solvency. Under these circumstances the tradeoff
between employment security and higher wages—which in-
volves a more significant tradeoff in well-being between
those workers who may be laid off because of a wage
increase and those workers who may receive higher incomes
following such an increase—is likely to act as a deter-
rent to excessive nominal wage increases and the price
increases which accompany them.

The above discussion about the interrelationships
between price and wages in co-op and Horvat-type firms
suggests the following general propositions:

1. An economy of Horvat-type firms is potentially
susceptible to the same type of wage-push pressure which
develops in an economy of profit-maximizing firms. In
contrast, an economy of co-op firms is not susceptible to such pressures, because in such an economy there is no direct relationship between changes in worker incomes, changes in labor's marginal value product and changes in output and prices.

2. The scope for the development of wage-push pressures in an economy of Horvat-type firms is likely to be limited because the workers' council in each enterprise is likely to formulate wage policy in keeping with the dictates of employment security and enterprise solvency. Therefore, wage increases requiring either large reductions in output and employment and large increases in price or large reductions in enterprise profits are likely to be passed over in favor of increases consistent with employment security and financial solvency.

Wage-Push Pressures at the Enterprise Level and Aggregate Price Inflation: A Capitalist Economy

The preceding sections of this chapter have focused on wage-push pressures as they may develop in individual Yugoslav enterprises. In order to integrate these sections into a general theory of inflation, it is necessary to explain how wage and price increases within an individual enterprise lead to increases in the aggregate price level. The existing literature on the wage-push theory of inflation provides an explanation of
the link between enterprise price increases and aggregate price increases in an economy where firms act as pure profit maximizers and where each firm or sector of production sells in an imperfectly competitive product market. Under these assumptions, an increase in the nominal wage paid to labor employed within one such enterprise or sector of production leads to a reduction in output and employment and an increase in price within that firm or sector. The resulting price increase in turn causes production costs to increase in those sectors of production which purchase their inputs from the original enterprise or production sector. In addition, the initial nominal wage increase in one firm or sector may lead to a chain reaction of similar increases in other enterprises or sectors as workers struggle to maintain their relative positions in the inter-enterprise or inter-sectoral wage hierarchy. As both labor and non-labor costs of production rise throughout the economy, profit maximizing output and employment reductions spread. In this way the initial wage and price increase leads to a downward shift in the aggregate supply curve, and, provided aggregate demand remains unchanged, to an increase in the aggregate price level and a reduction in aggregate output and employment levels.

The above comparative statics argument indicates
how a single nominal wage increase within an individual production sector (or enterprise) can lead to a once and for all increase in the aggregate price level. In order to explain continuing rounds of price inflation, some further assumptions about price and wage behavior must be added to the wage-push theory. The simplest and most popular assumption is that wages and prices interact with one another in a spiralling fashion so that an initial round of wage growth leads to a price increase which in turn fosters further wage increases as workers persist in trying to push the real wage above its equilibrium level. Under the spiral assumption, each successive wage increase causes a leftward shift in the aggregate supply schedule, and, in the absence of any increase in aggregate demand, ever-decreasing levels of output and employment and ever-increasing prices. In this case, it is difficult to believe that a wage-push inflation will be self-sustaining, because continuous reductions in employment must eventually encourage workers to reduce their wage demands, thereby bringing the inflationary cycle to an end. However, if the aggregate demand curve shifts upward, reflecting an increase in the level of real demand during the inflation, then output and employment reductions can be moderated or eliminated and the inflation may be sustained without any major loss in output.
The crucial question is thus the way in which aggregate demand responds to the upward shifts in aggregate supply. At one extreme aggregate demand may shift up proportionately with the upward shift in supply, indicating that at the new higher level of wages and prices, real demand is unchanged. In this case, equilibrium aggregate output and employment will remain constant. However, there are several reasons for expecting that the inflation will work to reduce real aggregate demand.

1. With a constant money supply, an increase in the price level will lead to an increase in interest rates as economic agents rid themselves of securities in an effort to obtain the amount of transactions balances required for the higher levels of aggregate money demand. The increase in interest rates in turn will have a contractionary effect on aggregate demand. Of course, this effect will be mitigated to the extent that inflationary expectations reduce the desired ratio between transactions and cash holdings, thereby permitting an increase in the velocity of money.

2. The increase in prices will reduce the value of fixed money assets, thereby reducing the real wealth of creditors and reducing the real liabilities of debtors. If the reduction in creditor consumption caused by the reduction in wealth is greater than the increase in
debtor consumption caused by the reduction in liabilities, then total aggregate demand will decline.

3. Inflation brings about some redistribution of income against fixed income groups. To the extent that the propensity to consume of these groups is higher than that of other groups, some decrease in aggregate demand is possible.

4. Inflation may reduce the net export balance or increase the net import balance. Both of these effects work to reduce total real aggregate demand. Because of these and other factors, it seems most likely that aggregate money demand will not increase in line with the increase in nominal wages and consequently, that a wage-push inflation will eventually lead to a reduction in output and employment levels. Once this point is reached, the upward thrust of prices will lose momentum and falter. If prices in some sectors continue to rise, the unemployed resources in these sectors will shift to other sectors, reducing prices and wages there. The average level of prices throughout the economy will then cease to rise. In this way every pure wage-push inflation is likely to subside, and if there are large non-unionized segments of the labor force in the economy, then the time needed for the termination of the inflation is likely to be short. This conclusion is not
warranted, however, if we make the further assumption that the monetary and fiscal authorities in the economy always stand ready to adopt the economic policies required to guarantee full employment, regardless of the price consequences of such policies. Under this assumption wage-induced leftward shifts of the aggregate supply curve are automatically and immediately followed by policy-induced rightward shifts of the aggregate demand curve, and prices rise rapidly at constant levels of output. Many of the cruder versions of the wage-push theory of inflation make an assumption of this type in order to support their conclusion that excessive wage demands cause sustained increases in the aggregate price level. Such assumptions are defended on the grounds that the monetary and fiscal authorities in modern industrial economies are forced to manipulate aggregate demand policies to avoid socially unacceptable unemployment at all costs.

Wage-Push Pressures at the Enterprise Level and Aggregate Price Inflation: An Economy of Self-Managed Enterprises

Intuitively, there is no reason why the simple theory relating enterprise or sectoral price increases and aggregate price increases cannot be applied to the Yugoslav economy. However, appropriate modifications must be made to reflect some of the unique characteristics
of the possible interactions between prices and wages caused by the institutions of self-management. First, it is clear that an excessive nominal wage increase—i.e., a wage increase in excess of the increase in labor's marginal value product—in an enterprise which acts like a pure co-op will have no direct effect on production costs and output decisions in other enterprises, provided the wage increase is financed by a change in the distribution of enterprise net income. In this case the impact of the wage increase is isolated within the enterprise in which it occurs and the link between such an increase and the aggregate price level disappears. Moreover, even if the initial wage increase induces a series of wage increases in other enterprises as a result of worker efforts to maintain their relative wage position, none of these increases need have any impact on prices either at the enterprise or at the aggregate level, provided each of them is financed by offsetting reductions in enterprise savings rates.

This conclusion is important because it bears directly on the frequently heard argument that wage-push pressures are likely to be more severe in an economy of self-managed firms because the absence of an aggregate labor market in such an economy will lead to large inter-enterprise and inter-sectoral wage inequalities. Such
inequalities are assumed to encourage enterprises to increase their wages in order to improve their relative position in the wage hierarchy. According to the proponents of this argument, an increase in wages in one enterprise is likely to set off a chain of wage increases throughout the rest of the economy as each workers' council struggles to prevent any increase in the already excessive wage differentials. Competitive wage increases are in turn assumed to lead to price markups particularly in slow growing sectors where these increases are not offset by increases in the marginal value product of labor. However, as the pure co-op theory of firm behavior suggests, wage increases need not have this effect if they are financed by a reduction in enterprise savings. This conclusion may have considerable relevance to Yugoslavia where evidence on enterprise savings rates and net income levels indicates that richer firms with higher wages exhibit higher savings rates than poorer enterprises with lower wages. Such evidence suggests that individual Yugoslav enterprises may attempt to maintain or improve their position in the relative wage hierarchy by varying their savings rates. If this is the case, then the existence of inter-enterprise or inter-sectoral wage inequalities may have fostered the development of inflationary pressures in the Yugoslav economy.
The link between enterprise price increases and aggregate price increases may also be influenced by the existence of labor employment constraints in the self-managed enterprise. Consider the case of a Horvat-type enterprise which is unable to react to an excessive nominal wage increase by profit-maximizing reductions in output and employment. Under these circumstances a given wage increase is likely to have a smaller initial impact on output and price than the same increase would have in an economy with less downward rigidity in employment levels. However, even if the Yugoslav enterprise cannot immediately reduce its output and employment levels, it may nonetheless decide to mark up prices to maintain some target ratio between profits and wages at the new higher wage rate. In this case enterprise price may increase by the amount predicted by the simple wage-push theory. The sequence of events leading from the enterprise price increase to an economy-wide price increase will then be the same as that described for an economy of capitalist firms, with one significant difference. For those enterprises which decide to mark up prices--either because their nominal wages increase or because their non-labor costs of production increase--but which cannot reduce output and employment to the levels consistent with market demand at the new prices, the
necessary result will be an increase in financial losses or a decrease in realized profits and an increase in unplanned inventory accumulation. In other words, profit reductions and inventory buildup are likely to be the immediate consequences of wage-induced or cost-induced price increases within the Yugoslav enterprise. In contrast, the usual concomitant of wage-induced price increases in a capitalist enterprise is unemployment. This is an important distinction for two reasons. First, in a capitalist firm, members of the work force who retain their jobs following an excessive wage increase are unaffected by the social and economic costs inflicted on those workers who are unemployed. Under these circumstances, the employed workers have no incentive to reverse their wage policy since they have successfully improved their economic position. In a self-managed firm, in contrast, the permanent workers who receive higher nominal wages are all equally threatened by the adverse effects of financial losses and unplanned inventory accumulation. Because these workers are interested in the long-term solvency of their enterprise and in the job security which it guarantees, they are likely to respond quickly and directly to the negative consequences of their wage decisions by reducing wage rates to more sustainable levels. As a result, excessive nominal wage
increases may be largely self-correcting as workers realize the implications of wage growth for present and future employment security.

Second, in a capitalist economy wage-push pressures lead directly to unemployment which is a social and political problem of national economic scope. In contrast, in an economy of self-managed enterprises, excessive wage increases may initially cause economic distortions, such as financial losses and inventory accumulation, which are internal to the enterprise and which have a limited impact on aggregate economic activity. Therefore, the monetary and fiscal authorities in such an economy may be under less immediate pressure to adopt expansionary economic policies to maintain real aggregate demand at the new higher price level. Without such policies, however, the enterprise which raises its price at constant levels of output and employment may ultimately be forced to choose between continued inventory accumulation, financial insolvency and price and wage reductions. In this way, the price increase caused by the initial excessive wage increase may be moderated and inflation may subside automatically.

The model of wage-push inflation in an economy of self-managed, Horvat-type profit maximizers operating with binding minimum labor employment constraints can be
summarized more formally in the following manner. Consider a nominal wage increase which calls for a profit-maximizing reduction in employment and output and an increase in price at the enterprise level. Assume that the enterprise cannot reduce its output because of downward rigidity in labor employment, so initially aggregate supply is unchanged. Caught between rigid employment and higher wages, the enterprise has two choices: it can increase selling prices and accumulate unsold production in inventories or it can dip into current and past period savings to finance the higher wage bills, maintaining output and prices at their original equilibrium levels. In the first case aggregate supply remains unchanged, and prices and inventories increase. In the second case, both aggregate supply and the aggregate price level remain constant. In either case, if the financing of inventories and payroll increases leads to an increase in real aggregate demand—either by an increase in the velocity of money due to the liquidation of enterprise cash balances and other assets or by an increase in the supply of money due to the mobilization of excess bank reserves to finance new loans to the enterprise sector—then enterprise inventory stocks or financial losses will be reduced somewhat. In the limiting case, if real demand increases by just enough to restore equilibrium at
the initial level of aggregate supply and at the new price level consistent with the higher wage rate, then no further adjustments are necessary. If demand increases fall short of this critical amount, however, then enterprises will continue to accumulate inventories, run financial losses, and run down realized profits and cash balances. Eventually, each enterprise will be forced to choose between employment reductions, wage reductions, and financial solvency. Given the importance of employment security to the work force it is not unreasonable to argue that many enterprises will choose to safeguard both current and future levels of employment by reducing wages to the level consistent with profitable operation at prevailing levels of real aggregate demand. Thus, we can conclude that in a self-managed enterprise a wage-push inflation is likely to moderate or subside over time, provided the monetary or fiscal authorities do not take any action to increase levels of real aggregate demand.

This conclusion is no longer warranted, however, if we make the further assumption that enterprises losses or inventory accumulation call forth expansionary policies which serve to increase the level of demand. For example, say the monetary authorities act to increase the lending potential of commercial banks so that increases in inventories can be financed at constant rates
of interest. As new bank loans feed through the system, the money supply will increase and demand will increase. If this process continues until at the new price level implied by the nominal wage increase, the new level of demand just equals or exceeds the level of supply implied by the minimum labor employment constraint, then there will be no impetus for each enterprise to reduce its prices and wages to their original levels. In this sense, then, the increase in aggregate demand called forth by the actions of the monetary authorities permits the inflationary pressures implied by excessive wage increases to be realized.

The assumption that enterprises losses and inventory accumulation call forth expansionary monetary and fiscal policies plays a crucial role in determining one's prediction about the likelihood of a self-sustaining wage-push inflation in an economy of self-managed enterprises. Therefore, it is necessary to judge the validity of this assumption before such predictions can be made for an individual economy. Moreover, even if the assumption is found to be valid, a further question of a more basic nature arises. Suppose we conclude, as seems reasonable, that the monetary authorities in Yugoslavia do respond to financial losses and inventory accumulation in the enterprise sector by introducing
policies to increase aggregate demand. Suppose also that losses and inventory growth are due to the combination of price and wage increases and employment rigidities at the enterprise level. Then a question arises as to why the Yugoslav policy-makers choose to eradicate the unfavorable consequences of excessive price increases instead of forcing each enterprise to reverse excessive wage and price increases in the first place. A second question of a similar nature comes to mind. Suppose, for whatever political, economic, or social reasons, the Yugoslav government does choose the former course of action during a given period of excessive wage increases. What effect does such action have on the probability of future wage and price increases? If each enterprise expects that an increase in wages and prices at current levels of output and employment will lead, after some delay, to government actions to increase aggregate real demand to the level required for profitable operations, then will such an expectation influence the likelihood that such wage and price increases will occur? And, if the answer to this question is affirmative, then what is the important factor determining the susceptibility of the Yugoslav economy to wage-induced price increases? Is it the propensity of one or more workers' councils to make inflationary wage decisions or is it the expectation of each enterprise
that the possible adverse effects of such decisions will be shortlived because of rapid government action to eliminate them? What if each enterprise did not act with such an expectation? Would self-management then lead to excessive wage increases or would each enterprise be forced in its own self-interest to choose that price and wage combination consistent with employment security, profitability and growth? Clearly, the reasonable answer seems to be that in the absence of a permissive monetary policy each enterprise would be forced to reckon with the inherent conflict between excessive wage increases and employment security on the one hand and financial solvency and profitability on the other. In other words, the institutional fact that each self-managed enterprise can choose its own wage rate and its own selling price does not mean that such an enterprise is absolved from the economic necessity of choosing between employment levels and wage rates. And this necessity, coupled with the natural interest of the workers in job security, should act as an effective deterrent to excessive wage increases and the development of wage push pressures.

All of the questions identified here are of critical importance to the issue of whether self-management at the enterprise level has made the Yugoslav economy particularly susceptible to wage-push inflationary
pressures. Therefore, in later chapters I will try to provide answers to these questions with the aim of showing first, why the Yugoslav monetary authorities may have acted to validate inflationary pressure introduced into the economy by excessive wage or price increases at the enterprise level, and second, how these actions and the expectations which they have fostered, may have led to the re-emergence of such pressures on a more widespread scale.
Footnotes

1. Unless and until prices rise in the same proportion as nominal wage rates, there will exist a tendency for the supply of goods to fall short of demand (assuming, of course, no downward shift in demand, or assuming that the demand for output falls by less than the supply following the price and wage increases), thus causing the price rise to continue until the previous ratio of wages to prices is restored.

2. I did not examine price changes in 1964-65 or 1965-66, because administratively-imposed price changes in those years seriously confounded the effects of pure cost and demand factors on sectoral price changes. Unit labor cost and price behavior in 1961-62 was not analyzed because of lack of data.

3. Moreover, in 1970, the year in which a significant positive correlation between unit labor costs and product prices was found, price controls were as pervasive as they were in 1968 and 1969; consequently, it does not appear that price controls successfully prevented cost-induced price increases from occurring.


5. Before 1961, official accounting procedures directed the firm to distinguish between fixed, periodic payments to labor and supplementary or bonus payments. After 1961, these procedures were discontinued but most firms continued to differentiate between fixed salaries and bonuses. In most enterprises fixed salaries are understood to be advances on the workers' share in total firm profits. Fixed salaries are usually set in nominal terms before each production period whereas bonus payments vary with realized profits at the end of the period. For a more detailed discussion of the distinction between fixed wages and
bonus payments, see H. Watchel, *Workers' Management in Yugoslavia*, chap. 5.

6. Horvat argues that the nominal wage set by the firm—which he calls the "aspiration income" level—consists of last year's or some standard personal income payment plus a change, usually an addition, to be achieved in the current year. The aspiration income is a function of (a) expected sales, (b) incomes in other firms, (c) personal incomes paid in the last year or earlier years, (d) labor productivity, (e) the cost of living, and (f) taxation policy. See B. Horvat, "Critical Notes on the Theory of the Labor-Managed Firm and Some Macroeconomic Implications," *Ekonombska Analiza* (1973), pp. 288-93, 290.

7. Vanek argues that the maximization of net income per worker is a natural operating principle in a labor-managed enterprise where decision-making is based on democratic majority rule and where each worker receives an equitable, though not necessarily equal, share in enterprise profits. J. Vanek, *The General Theory*, pp. 1-3. Of course, Horvat also assumes that the determination of the fixed wage or aspiration income for each production period is based on a democratic majority rule. However, once this wage is decided upon, each worker abdicates a further role in enterprise decision-making to the enterprise managers who are assigned the task of designing the best policies to maximize total profits given this wage. In this sense, then, a managerial group and a worker group can be clearly distinguished and the cooperative rule whereby all enterprise members share in all aspects of enterprise decision-making is replaced by rules delegating decision-making responsibilities between these two groups.


9. For a discussion of these conditions, see J. Vanek and P. Miović, "Explorations into the 'Realistic Behavior' of a Yugoslav Firm," Cornell University Economics Department, 1971.

10. Ibid., p. 32.
11. In a recent discussion of his theory of enterprise behavior, Horvat argues that the equality between the marginal value product of labor and the fixed wage predicted as an equilibrium position by his pure theory is rarely observed in practice. Instead, because of a general reluctance on the part of workers to dismiss fellow workers, firms frequently operate at disequilibrium positions where \( \frac{dX}{dL} < w \). Moreover, Horvat argues that if this disequilibrium persists, the Yugoslav firm is often likely to reduce \( w \) for the next period rather than reduce labor employment, thereby increasing \( \frac{dX}{dL} \). See Horvat, "Critical Notes," p. 292.


13. By law the firm can lay off its workers only if it eliminates the jobs which they perform. No replacements can be hired to perform the same or similar work nor can other workers remaining with the enterprise be shifted into the vacated position. Moreover, laid-off workers can appeal their case on both the enterprise and local government levels.

14. It is impossible to determine the exact period during which employment security for an individual permanent employee is guaranteed; nevertheless, a reasonable estimate probably ranges from six months to one year. Therefore, in my discussion of short-run employment rigidity, I limit my analysis to time spans which fall within this range.

15. Marshak notes that in interviews with many Yugoslav firms, the managers referred to the "normal size" of the labor force suitable for enterprise operations. Managers also claimed that output targets were set at levels consistent with this size and with the "basic" number of hours worked by each employee. See T. Marshak, "Centralized Versus Decentralized Resource Allocation: The Yugoslav Laboratory," QJE 82 (Nov. 1968): 561–87, 585. The pressure of the work force for a minimum number of hours is enhanced by the system of enterprise income calculations, according to which the accounting income for each subdivision of the enterprise (each economic unit) is determined by the amount of production (not sales) it achieves at planned costs. Since the
total revenues of the enterprise are distributed among the units in proportion to their realized accounting income, and since these revenues provide the basis for bonuses and supplementary income payments to workers, it follows that workers within each unit stand to lose income if they do not produce the maximum possible, and if they do not work the maximum possible hours. See, I. Adizes, Industrial Democracy: Yugoslav-style: The Effect of Decentralization on Organizational Behavior (New York: Free Press, 1971), pp. 56-58.


17. Actually, the drop in overtime hours in 1966-67 may have been the result of continued efforts by the Confederation of Trade Unions to reduce overtime hours, thereby creating new jobs. Ibid., p. 63.

18. This possibility was first considered in the context of the pure labor co-op theory by Domar who noted that once a cooperative enterprise is organized, it is highly unlikely that it can admit or expel members at will. Moreover, Domar argues that although hours of work can be varied, it is equally unlikely that members will be indifferent to the number of hours which they work and for which they are paid. Therefore, the typical co-op is probably frequently unable to vary its labor input in keeping with either the dictates of pure net income maximization or pure net income per worker maximization. Consequently, Domar concludes that at any given time a co-op may be compelled to operate at a disequilibrium position where net income per worker exceeds the marginal value product of labor if there is excess labor demand and where net income per worker falls short of the marginal value product of labor if there is excess labor supply. See Domar, "The Soviet Collective Farm," pp. 742, 745-47. Recently, Horvat, noting the rigidity of employment in most Yugoslav firms, drew a similar conclusion in the context of his profit maximizing model; viz, that because of labor employment rigidity, the firm may be forced to operate at a constrained equilibrium position where the fixed wage either exceeds or falls short of the marginal value of labor. See Horvat, "Critical Notes on the Theory of the Labor-Managed Firm," pp. 291-92.
19. By law, Yugoslav enterprises form preliminary financial accounts at the end of each of the first three quarters of the year and a final account at the end of the year. According to studies of enterprise behavior (see Adizes and Wachtel) firms make production plans for one year, but they may be reversed or modified during that year, depending on the financial results observed during the preliminary accounting periods. Therefore, a reasonable span for an accounting or production period is from three to twelve months.

20. If instead, the enterprise establishes fixed nominal hourly wages for its permanent and temporary labor force, the entire analysis developed here carries through, with the crucial difference that \( L_p \) and \( L_t \) represent the number of hours worked by the available labor force and \( C_p \) is a constraint on the number of hours worked by the permanent labor force. Under the assumption of a set monthly wage, no limitations on hours of work need be specified, since once the monthly wage is determined, variations in hours become unprofitable.

21. Actually, the choice of an advance wage schedule and the parameters \( B \) and \( (1-B) \) need not be independent. For a discussion of their possible interrelationships, see pp. 138-45 of this chapter.

22. Naturally, the enterprise may not be able to adjust its labor supply to the maximizing position. Thus, if limitations on reductions of employment of the type discussed above are operative, the firm may be forced to operate where \( \hat{w}_p \) or \( Y_i/(L_p)_i > MVP_{L_p} \).

Similarly, in a situation of labor shortage, the firm may be unable to hire new labor so that \( \hat{w}_p \) or \( Y_i/(L_p)_i < MVP_{L_p} \). The latter case is probably not too relevant to Yugoslavia as yet, because of continued high levels of unemployment.

23. In contrast according to models of perfectly competitive economies, the activity of profit maximizing capitalists, bidding for the cheapest available labor supply, guarantees the equalization of labor's MVP and the real wage at the level required for the full employment of labor even in the short run. In practice, because of numerous distortions and rigidities, this equalization rarely, if ever, occurs.
24. For a broader discussion of the type of wage and bonus setting discussed here, see pp. 164-67 of this chapter.

25. One of the main sources of surplus profits and worker incomes in Yugoslavia is the artificially low cost of capital, as measured by both interest rates on loans and capital charges on equipment owned by the state and used by the enterprise. Because of low capital charges, enterprises which are relatively capital intensive or can obtain access to rationed bank loans and investment funds earn excess profits which can be distributed to workers in the form of higher incomes. The actual amount of such profits retained by each enterprise to finance further investment and the actual amount paid out to workers depends on the decisions of the workers' councils. For empirical evidence on the role of surplus profits in wage determination, see J. Vanek and M. Jovićić, "Tržiste Kapitala i Raspodela Dohodka u Jugoslaviji: Teoretska i Empirijska Analiza," (Belgrade: Institut Ekonomskih Nauka, 1972).

26. In Yugoslavia, both compulsory and voluntary reserve funds held by the enterprise are readily available sources of finance in such situations. In fact, these funds have been designed specifically to insure planned basic income payments against unforeseen changes in the economic environment over which workers have no control. The underlying principle behind the establishment of these funds is that workers should receive only that portion of net income which they actually help to create and not that portion of net income which is due to random factors operating in the economy at large. In the context of the discussion here this proposition means that transitory changes in net income are only allowed to influence savings, or in other words, that transitory income and consumption are unrelated, as the permanent income hypothesis suggests. See I. Adizes, Industrial Democracy: Yugoslav-style, p. 58.

27. Horvat's relative income hypothesis is described in S. Popov and M. Jovićić, Uticaj Licnih Dohodaka na Kretanje Cene (Belgrade: Institut Ekonomskih Nauka, 1971). Bajt's theory is described in Inflacija Osebnih Dohodkov (Ljubljana, Ekonomski Institut, 1970).

28. Data limitations prevented testing the permanent income hypothesis with enterprise data.
29. These results were obtained by D. Marsenić using data on sectoral savings rates and per capita net income levels defined as in table 3.8 for 1970. Marsenić's results and the data he used are presented in his paper, "Tendencije u namenskoj raspodeli dohotka u periodu 1967-1970 i politika dohotka no ovom području," in M. Korač, et al., Politika Dohotka u Samoupravnoj Robnoj Privređe (Belgrade: Institut za Ekonomiku Investicija, 1972), pp. 163-200, 188.

30. Per capita wages or personal income payments include both total fixed wages and supplementary or bonus payments per worker plus per worker total allocations of enterprise net income into the so-called collective consumption fund. This fund is used by the enterprise to finance worker fringe benefits in the form of education grants, housing facilities and the like.

31. For data on growth rates in 1967 and 1969, see chap. 5, table 5.4.


33. It is important to note just how restrictive the assumption that each individual firm faces a downward sloping demand curve really is. Without such an assumption the proponents of wage-push pressures in Yugoslavia are forced to argue that individual enterprises within the same branch of production are faced with the same excessive nominal wage increases at the same point in time. However, this is unlikely since the extent and frequency of wage increases in Horvat-type enterprises depend solely on the decision of workers within that enterprise and although aggregate labor market conditions may be considered in this decision, there is no reason to expect that they will exert a dominant influence. Equally unlikely, however, is the assumption that each firm in Yugoslavia is a limited monopolist. Yet either one or the other assumption is needed to complete the argument that wage-push pressures at the enterprise level are the source of price increases on the aggregate level.

34. Horvat argues that since the Yugoslav firm is collectively managed, there is a great reluctance to

35. The degree of interest expressed by members of workers' councils in the issues of wages and hiring and firing practices is suggested by the following figures.

Percentage of Workers Desiring to Participate in Decision-making, By Content of Decision

<table>
<thead>
<tr>
<th>Decision</th>
<th>% Wishing to participate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discipline and Labor Relations</td>
<td>59</td>
</tr>
<tr>
<td>Work Conditions</td>
<td>50</td>
</tr>
<tr>
<td>Distribution of Personal Incomes</td>
<td>48</td>
</tr>
<tr>
<td>Hiring and Firing</td>
<td>40</td>
</tr>
<tr>
<td>Investment Decisions</td>
<td>28</td>
</tr>
<tr>
<td>Public Relations</td>
<td>21</td>
</tr>
<tr>
<td>Marketing</td>
<td>17</td>
</tr>
</tbody>
</table>


36. See Wachtel, Workers' Management in Yugoslavia, chap. 5, and I. Adizes, Industrial Democracy: Yugoslav-style, chaps. 3 and 4, for more on the details of profit distribution in Yugoslav enterprises.

37. Over time one might expect the fixed accounting wage on which labor employment decisions are based to be adjusted to include the average value of residual profits paid out to labor. In this case employment decisions might ultimately depend on the average over time total compensation of labor and output and employment levels might then become dependent on enterprise decisions about the distribution of residual profits.


39. For more on the influence of inter-enterprise wage differentials on inflationary trends in Yugoslavia, see S. Popov and M. Jovičić, Uticaj Licnih Dohodaka, and A. Bajt, Inflacija Osebnih Dohodov.
CHAPTER 4

THE TRADEOFF BETWEEN INFLATION AND UNEMPLOYMENT IN YUGOSLAVIA

Introduction

The discussion in chapter 3 indicates that the Yugoslav economy, despite its unique set of microeconomic institutions, may be susceptible to a modified form of wage-push inflation. Moreover, its susceptibility appears to be greater to the extent that the majority of Yugoslav firms behave like Horvat-type profit maximizers. Accepting the proposition that some form of wage-push inflation is a theoretical possibility in Yugoslavia suggests that the next step in a study of the Yugoslav inflation is the design of tests to determine whether actual inflationary trends are explainable in terms of the wage-push paradigm. Unfortunately, this question, like all questions about the causes of inflation, is untestable, given current macroeconomic data limitations and current statistical techniques. Because of such limitations, most recent studies of inflation have focused on the empirical estimation of the time paths of wage and price inflations in a given economy without identifying
how these inflations have originated. This approach has led to the investigation and estimation of Phillips curves and simultaneous price and wage equations which describe the short-run tradeoff between output and employment levels on the one hand and price and wage increases on the other. Following current methodology, in this chapter I will describe and estimate a simultaneous price and wage system for the Yugoslav economy during the 1962-72 period.

The estimation of simultaneous price and wage equations can be used to answer two questions of significance to a study of the Yugoslav inflationary experience: (1) what has been the shape of the tradeoff between unemployment and inflation in the Yugoslav economy during the last ten years; and (2) how has this tradeoff compared to the tradeoffs assumed or observed to exist in other economies where workers' self-management has not influenced price and wage formation. Answers to these questions can be used to determine whether the institution of self-management at the enterprise level has resulted in a relative deterioration of the tradeoff between price stability and full employment facing the Yugoslav policy makers at the macroeconomic level. More significantly, the juxtaposition of empirically estimated price and wage equations for the Yugoslav economy with those estimated for other economies can reveal how self-management may
have affected certain aspects of wage and price formation, such as the sensitivity of wages to unemployment and expected price changes and the sensitivity of price changes to changes in labor costs or wages. All of these issues are relevant to an evaluation of the often-heard hypothesis that wage-push pressures are likely to be more severe, and hence, that the tradeoff between employment and inflation is likely to be significantly worse, in an economy of self-managed enterprises than in an economy of capitalist firms.¹

Because the major goal of the empirical analysis contained in this paper is the comparison of the Yugoslav inflationary experience with the inflationary experiences of other economies, the price and wage equations are restricted to functional forms which have been derived in empirical studies of inflation in the U.S. and Western Europe. To allow for the possible effects of development level and inflationary expectations on the shape of the price and wage relationships the functional forms from a recent study of the Chilean inflation are also employed. A comparison of the empirical results of each equation estimated for the Yugoslav economy with the results obtained for either the U.S. or Chile provide some conclusions about the influence of workers' self-management on the wage and price process and on the terms of the
tradeoff between price stability and unemployment.

*Simultaneous Wage and Price Equations: Theory and Practice*

In a purely competitive economy where all enterprises act as price takers, where the labor market clears at a real wage determined by aggregate supply and demand conditions, and where price expectations are completely elastic, an inflationary shock, such as an increase in the equilibrium rate of growth of the money supply, always causes prices and wages to increase at the same rate, thereby leaving labor employment and real output unchanged at their initial equilibrium levels. The resulting dichotomy between changes in nominal variables and changes in real economic activity is a basic proposition of both classical and neoclassical economic theory. The validity of this proposition rests upon the assumption that prices and nominal wages always *completely adjust by equal percentage amounts* to an exogenous inflationary impulse. Under this assumption, an instantaneous wage-price spiral is always the expected consequence of inflationary pressure. This instantaneous relation between prices and wages, however, is not to be confused with the wage-price spiral theories of inflation which underlie the Phillips curve and simultaneous price and wage equation systems. The essence of these theories is their assumption that
prices and nominal wages do not always increase at the same rate; consequently, a given inflationary impulse causes a change in the real wage. Such a change may be due to a variety of factors including inelastic price expectations, infrequent nominal wage bargains or price controls, any of which interfere with either the timing or the extent of wage and price adjustments following an inflationary shock. The resulting real wage change in turn induces variations in output and employment as profit maximizing producers alter their production schedules until the marginal product of labor just equals the new wage. Under these circumstances, the link between complete adjustment in prices and wages is broken, and the classical dichotomy between changes in the absolute price level and changes in real output disappears.

The modern version of the price-wage spiral theory of inflation is usually formalized in equations of the following form:

\[
\Pi_t = a_1 + \sum_{i=0}^{\infty} a_{2i} \ (w)_{t-i} + a_3 \ E_1
\]

\[
w_t = b_1 + \sum_{i=0}^{\infty} b_{2i} \ (\Pi)_{t-i} + b_3 \ U_t^{-1} + b_4 E_2
\]

where
\( \Pi_t \) is the percentage rate of growth of prices in period \( t \);

\( w_t \) is the percentage rate of growth of wages in period \( t \);

\( E_1 \) is a vector of exogenous factors influencing the rate of inflation;

\( E_2 \) is a vector of exogenous factors influencing the rate of growth of nominal wages;

and \( u_t \) is a measure of excess demand on the aggregate labor market.

\( E_1 \) generally includes some measure of market demand conditions, such as capacity utilization levels, inventories or sales, and some measure of changes in non-labor production costs, such as the rate of growth of prices of raw materials or farm products. \( E_2 \) frequently includes the rate of growth of labor productivity, the rate of growth of unemployment, and the level of enterprise profits.

The form of equation (4.1) and the variables most often included in it reflect the popular belief that enterprises in modern industrial economies follow a type of cost-markup pricing, modified to take account of the prevailing market situation. This model of pricing behavior relates changes in selling prices to changes in labor and non-labor production costs, as measured by the rate of change of nominal wages (frequently corrected for changes in
labor productivity) and the rate of change of material input costs, and to changes in the level of aggregate demand.

Equation (4.2) is based on a theory of wage determination which explains changes in the nominal wage level in terms of labor market supply and demand conditions. According to this theory, the rate of growth of nominal wages is proportional to the level of excess demand on the labor market, as measured by the unemployment rate. Frequently, this theory is modified to allow for possible nonlinearities in the response of wages to labor market conditions. The most usual modification takes the form of allowing the absolute size of a percentage change in nominal wages to increase as the unemployment rate declines. Empirically, this relationship is estimated by relating percentage changes in the aggregate wage level to the inverse of the aggregate unemployment rate. Theoretically, nonlinear responses in the reaction of wages to labor market conditions are explained in terms of labor market distortions, such as unions, infrequent wage negotiations and the like, all of which are assumed to act to limit the extent of possible reductions in the nominal wage as the excess supply of labor, measured by the unemployment rate, increases. Whether such a theoretical justification is reasonable—and there are some who
contend that it is not—the actual relationship between percentage changes in nominal wages and the unemployment rate appears to be nonlinear in many economies.³

The relationship between percentage changes in wages and the unemployment rate suggested by the pure theory of competitive markets is also frequently modified to allow for other effects of labor market imperfections on the movement of wages over time. First, percentage changes in the aggregate price level in equation (4.2) are often replaced by percentage changes in the cost of living index or percentage changes in those prices which refer to commodities bought by the majority of the labor force. This replacement in turn implies a re-interpretation of the theoretical rationale for the inclusion of current and lagged price terms in the wage equation. Classical theory suggests that nominal wage changes are affected by price changes via the necessary equalization of the nominal wage and the marginal value product of labor in an economy of profit-maximizing enterprises. In contrast, the modern theory of wage determination suggests that nominal wages are affected by price changes because such changes are important in determining the size of wage demands in the unionized sector. According to proponents of this theory, increases in the cost of living strengthen union demands for wages and place unions under increasing
pressure from their members to get such wage increases. In such an environment nominal wage changes can be expected to depend on changes in the cost of living. Although the differences between the classical and modern theories of nominal wage changes are clear-cut, for purposes of estimation these differences become significant only when aggregate price changes, as measured by changes in the cost-of-living index, diverge from aggregate price changes, as measured by some other more-inclusive price index relating to the selling prices of that sector of the economy to which the simultaneous wage and price equations refer. Because aggregate price indices tend to move together, such divergencies are rare; consequently, the distinction between the classical and modern versions of wage determination has been overlooked in the majority of empirical studies of inflation.\(^4\)

A second modification of the classical relation between nominal wages and the excess demand for labor is the inclusion of the level of profits among the exogenous variables appearing in equation (4.2). According to the modern theory of the wage-price spiral, profit levels are frequently a key determinant of wage changes because the higher are profits, the greater the demands of workers for a wage increase, and the greater the ability of employers to yield to such demands. The inclusion of profit
levels in the wage equation is explainable within the framework of the classical theory of wage determination only if profits are taken as a proxy for the marginal value product of labor.⁵

Workers' Self-Management and the Wage-Price Spiral

Before actually estimating simultaneous price and wage equations of the types contained in expressions (4.1)-(4.2) for the Yugoslav economy it is instructive to consider whether the theories of price and wage formation on which such equations are based are compatible with the patterns of behavior of self-managed firms. Suppose we have a simultaneous price and wage system estimated for some economy where wages and prices are formed by the independent interactions of profit-maximizing capitalists and labor organizations. Before we re-estimate this system for the Yugoslav economy it is necessary to re-examine the rationale for the inclusion of some of the explanatory variables in light of the behavioral rules for the self-managed enterprise presented in chapter 3.⁶

Only after such a re-examination can we interpret the meaning of the coefficients estimated for these variables. Moreover, such a re-examination suggests some hypotheses about how the unique patterns of wage and price formation characterizing self-managed enterprises may be expected to influence the size of some of these
coefficients.

**The Wage Equation**

In both the pure co-op and Horvat theories, workers' incomes depend on enterprise profits, collective savings decisions and special wage determination procedures all of which are internal to the individual enterprise. In the labor co-op model workers' incomes are determined by the level of enterprise net income and by the collective's decision about the distribution of net income between collective savings and worker payments. In the Horvat model, workers' incomes are determined by the collective's decision about the level of the fixed nominal wage and its rate of growth from period to period. In either case there is no guarantee that each firm will choose a nominal wage level which just yields the real wage needed to clear the aggregate labor market at prevailing prices. Enterprise wage behavior can be quite independent of aggregate labor market and unemployment conditions. However, it is important to distinguish here between conditions of excess labor demand and excess labor supply. If the aggregate supply of labor falls short of the aggregate demand by all enterprises then the isolation of each enterprise will be broken down by the need for all enterprises to compete with one another to obtain additional labor. In this situation, the aggregate excess
demand for labor will clearly influence the rate of growth of wages in each enterprise competing for labor and therefore the rate of growth of wages in the economy as a whole. Now consider the opposite situation where the aggregate demand for labor falls short of the aggregate supply. Under these circumstances each enterprise can determine its own internal wage policy, unaffected by conditions on the aggregate labor market. The differential response pattern outlined here whereby enterprise wage policy is sensitive to aggregate excess demand but insensitive to aggregate excess supply is exactly the differential response pattern which the association between wage growth and the inverse of the unemployment rate tries to model. Therefore, we can expect that such an association does exist in the Yugoslav economy.

The independent wage determination policies described by the Horvat and co-op theories of enterprise behavior suggest that self-management is also likely to influence the empirical results of the wage equation by influencing both the size and speed of adjustment of nominal wages to actual and anticipated changes in the rate of inflation. In a capitalist economy where wage bargains are infrequently negotiated and where real wage demands are partially held in check by the pressures of unemployment, nominal wages frequently do not immediately and fully
adjust to changes in the aggregate rate of inflation. Consequently, in many capitalist economies, such as the United States, Great Britain, and Canada, the elasticity of current wage changes with respect to current or lagged price changes, used as a proxy for the expected rate of inflation, has been found to be significantly less than one.\(^7\) Moreover, recent attempts to replace current or lagged price change by a weighted sum of an extended series of past prices changes as an appropriate measure of the expected rate of inflation have consistently supported this conclusion.\(^8\) On the basis of available statistical evidence, it appears that workers in major capitalist economies have suffered a real wage decline during periods of inflation, either because they have failed to adjust their nominal wage demands for expected inflation rates or because management has successfully prohibited such adjustments from occurring. In contrast, in a self-managed economy, like Yugoslavia, where workers' councils are free to re-negotiate wage schedules whenever they wish, unanticipated price increases can lead directly to offsetting increases in nominal wages and to a restoration of the real wage to its initial level. Additionally, the time lag between price increases and the full adjustment of wages to these increases is likely to be shorter in Yugoslavia than elsewhere. Of course, the
more rapid and complete adjustment of wages to price in-
flation in Yugoslavia may stem not from its unique form
of enterprise organization but from its previous history
of rapid inflation which may have acted to increase worker
sensitivity to real income reductions caused by unexpected
price growth. In order to determine whether it is the
process of expectations formation in an inflationary
environment or the institution of self-management which
accounts for possible variations in the size and speed of
wage adjustments, the elasticity of wage changes with
respect to price changes in Yugoslavia must be compared
with the elasticity observed in another inflationary econ-
omy. In the empirical analysis which follows, Chile is
chosen as the basis for a comparison of this kind.

The Price Equation

The price equation contained in (4.1) is based on a
model of modified cost-markup pricing at the enterprise
level. According to this model each enterprise sets its
selling price by applying some absolute or percentage
markup to total labor costs and material costs of produc-
tion. The extent of the markup at any point in time is
assumed to depend on prevailing demand and supply condi-
tions in commodity markets. The markup model of enter-
prise pricing behavior is inappropriate for an economy
composed of pure co-op enterprises, because, according
to the hypothesized rules of behavior for such enterprises, worker incomes are defined as a residual after the payment of all non-labor production costs. Consequently, even if workers are paid some fixed wage as an advance against their share in firm net income, labor costs are not included among production costs as they are in the modified cost-markup model of pricing. Therefore, this model is incompatible with the pure co-op theory of the behavior of self-managed enterprises. Compatibility is only achieved if the cost-markup model is modified so that prices are based on markups applied to all non-labor costs of production. In this case, the rationale for the inclusion of the wage term in the price equation disappears, and if such an equation is estimated for an economy of pure co-op enterprises, the results may suffer from mis-specification errors. In contrast, if the self-managed enterprise acts like a Horvat-type profit maximizer, then wage costs are included among total production costs and the markup model of pricing may be applicable. Evidence of an anecdotal nature suggests that many enterprises in Yugoslavia do act in accordance with the profit-maximizing paradigm, setting some fixed wage before the production period and including the resulting wage bill as an element of total production costs. Moreover, selling prices in such firms are frequently set by
applying some markup to the sum of intra-enterprise transfer prices which are based on the costs of material inputs and fixed wages in each production subdivision of the enterprise. Such patterns of behavior are consistent with the markup model of pricing; therefore, to the extent that they dominate price determination in the Yugoslav economy, a price equation like that in expression (4.1) is properly specified and the estimation of such equations may yield results which are similar to those observed in economies where capitalist forms of pricing prevail.

A self-managed enterprise--be it of the Horvat or pure co-op type--can finance short-term changes in worker incomes by varying the distribution of firm net income. In other words, although both employment and output may be based on the equalization of net income per worker and the marginal value product of labor in the pure co-op base, or on the equalization of the wage rate and the marginal value product of labor in the Horvat case, in either case, actual worker incomes may diverge from the realized marginal value product of labor. Consequently, the rate of growth of prices need not always equal the rate of growth of nominal labor incomes adjusted by the rate of growth of labor productivity. To the extent that the rate of growth of prices exceeds the rate
of growth of adjusted labor costs, profits or retained earnings may increase, while to the extent that the rate of growth of prices falls short of the rate of growth of adjusted labor costs, profits may decline. In a capitalist economy the distribution of income between profits and wages is usually assumed to be quite stable over time. Stability in this distribution in turn implies that percentage changes in labor costs, as measured by percentage changes in nominal wages adjusted for percentage changes in labor productivity, always give rise to equal percentage changes in prices. Consequently, the coefficient of the wage term or the labor costs term in the price equation has usually been found to be close to or equal to one in capitalist economies. This result may not be observed in the Yugoslav economy because labor incomes may move independently of labor's marginal value product and because the distribution of enterprise income between profits and wages may vary over time within each self-managed enterprise.

Price and Wage Equations: The Statistical Results

In this section I select some simple aggregate price and wage equations which have previously been estimated for the U.S. and Chile and I re-estimate them using comparable Yugoslav data. The basic U.S. model which I adopt is taken from G. Perry's study of money wage rates and
inflation in the U.S. economy during the 1950's. The basic Chilean model is adopted from a recent unpublished econometric study of the Chilean inflation by Vittorio Lioi Corbo. A variant of the Chilean model recently estimated by R. Flanagan for the U.S. economy during the 1951-68 period is also presented to facilitate important cross-country comparisons. ¹² Both the U.S. and Chilean equation systems are presented in table 4.1 along with a definition of the explanatory and dependent variables. The table also contains the structural equations to be estimated for the Yugoslav economy and a summary of the variables employed in the estimation. The data used in the estimation of the Yugoslav versions of the equations, together with a description of how individual time series were constructed and the original sources from which they are taken, are discussed in appendix A.4.1.

Since the major purpose of this section is to use the price and wage equation systems presented in table 4.1 to document cross-country differences in the relationship between unemployment and inflation, it is wise to be aware of the extent to which differences in the estimated relationships may arise for technical or statistical reasons. Such differences—which are spurious as far as differences in the true relationships are concerned—may arise for two reasons. First, there
TABLE 4.1
COMPARATIVE PRICE AND WAGE EQUATIONS

I. The Perry Model

\[ w_t = a_0 + a_1 U_t^{-1} + a_2 c_t + a_3 R_t + a_4 \Delta R_t + e \]

\[ p_t^m = b_0 + b_1 w_t + b_2 p_t^r + b_3 \Delta C_t + b_4 C_t + e \]

Variables: \( w_t \) is the annual percentage change in straight
time average hourly earnings in all manufacturing indus-
tries; \( U_t^{-1} \) is the inverse of the unemployment rate, meas-
ured as a percentage of the civilian labor force; \( R_t \) is the
profit rate in the manufacturing sector, defined as earn-
ings after taxes divided by shareholders' equity; \( \Delta R_t \) is
the change in the profit rate series; \( c_t \) is the annual per-
centage change in the consumer price index; \( p_t^m \) is the
annual percentage change in the wholesale price index of
the manufacturing sector; \( p_t^r \) is the annual percentage
change in the price index of raw materials; \( C_t \) is an
index of capacity utilization in the manufacturing sector;
and \( \Delta C_t \) is the quarterly change in the \( C_t \) index. All
level variables, such as \( U_t^{-1} \) and \( C_t \), are measured as four
quarter moving averages to adjust for seasonality in the
quarterly series.
TABLE 4.1--Continued

II. The Corbo Model

\[
    w_t = a_0 + a_1 U_t^{-1} + a_2 c_t + e
\]

\[
    p_t^m = b_0 + b_1 w_t + b_2 p_t^r + b_3 \text{NLCU}(t-1) + e
\]

Variables: \( w_t \) is the annual percentage change in monthly wages in industrial employment; \( U_t^{-1} \) is the inverse of the unemployment rate in the industrial sector; \( p_t^m \) is the annual percentage change in the industrial price index; \( c_t \) is the annual percentage change in the retail price index; \( p_t^r \) is the annual percentage change in the imported raw materials component of the wholesale price index; and \( \text{NLCU}(t-1) \) is a nonlinear capacity utilization variable, defined as \( 1/(8.4 - \text{CU}(t-1)) \) where \( \text{CU} \) is the ratio between a quarterly industrial production index and a quarterly maximum production index. All level variables are measured as four quarter moving averages to adjust for seasonality in the quarterly series.

III. The Flanagan Model

\[
    w_t = a_0 + a_1 U_t^{-1} + a_2 c_t + e
\]

\[
    c_t = b_0 + b_1 w_t + b_2 p_t^r + e
\]

Variables: \( w_t \) is the annual percentage change in gross
TABLE 4.1-Continued

(straight time plus overtime) hourly earnings in the manufacturing sector; \( U_{t}^{-1} \) is the inverse of the unemployment rate expressed as a percentage of the civilian labor force; \( c_{t} \) is the annual percentage change in the consumer price index; and \( p_{t}^{R} \) is the annual percentage change in the overall import price index. \( U_{t}^{-1} \) is measured as a four quarter moving average to adjust for seasonality in the quarterly series.

IV. The Yugoslav Equations

\[
\begin{align*}
w_{t} &= a_{0} + a_{1}U_{t-1}^{-1} + a_{2}c_{t-1} + a_{3}R_{t-1} + a_{4}\Delta R_{t} + e \\
w_{t} &= a_{0} + a_{1}U_{t-1}^{-1} + a_{2}c_{t-1} + e \\
p_{t}^{m} &= b_{0} + b_{1}w_{t} + b_{2}\Delta CU_{t} + b_{3}CU_{t} + e \\
p_{t}^{m} &= b_{0} + b_{1}w_{t} + b_{2}NLCU(t-1) + e
\end{align*}
\]

Variables: \( w_{t} \) is the annual percentage change in monthly personal incomes per worker in the social (industrial) sector; \( U_{t-1}^{-1} \) is the inverse of Mencinger's excess labor supply variable, discussed in the text; \( c_{t} \) is the annual percentage change in the retail price index; \( R_{t} \) is the profit rate per worker, defined as the difference between
TABLE 4.1--Continued

total receipts and total material expenses in the social sector divided by the number employed in that sector; \( \Delta R_t \) is the change in \( R_t \); \( CU_t \) is the ratio between a quarterly industrial production index and a quarterly maximum production index; \( \Delta CU_t \) is the change in \( CU_t \); and \( NLCU(t-1) \) is defined as \( 1/(r-CU(t-1)) \) where \( r \) is some measure of the limit on capacity utilization levels observed during the 1962-72 period. All level variables are seasonally adjusted; for the methods of seasonal adjustment see appendix A.4.1.

may be differences in the definitions and methods adopted in compiling the data from which the estimated relationships are computed. Second, there may be differences in the procedures used to estimate the relationships. Both factors are operative in the analysis presented in the following pages. At least two distinct problems of the second type may be identified. One source of incomparability arises from the inclusion of different explanatory variables in the estimated relationships. Thus, a variable measuring the rate of growth of import prices or raw materials prices is included in both the U.S. and Chilean price equations. However, data limitations necessitated
the exclusion of such a variable from the Yugoslav price equation. Provided there is some correlation between the rate of growth of wages and the rate of growth of import prices over time, the exclusion of the latter variable from the Yugoslav equation may bias the estimated effect of wage changes on price changes. Another source of incomparability arises because different statistical techniques are employed to compute the parameters of the estimated relationships. Perry's results for the U.S. are estimated using ordinary least squares while Corbo's results for Chile, Flanagan's results for the U.S., and my results for Yugoslavia are estimated using either two stage least squares or instrumental variables. These differences in estimation techniques, while having some effect on the estimated relationships, seem unlikely to alter the broad conclusions which can be drawn from the empirical results. A more serious problem seems likely to arise because of differences in the underlying data. Of critical importance in this regard are differences in the definition and measurement of unemployment and wages. Concerning the wage variable, the relevant problem concerns not differences in the measurement of wage levels per se but only those differences which lead to corresponding differences in the four-quarter overlapping rates of growth of such levels, since rates of growth appear
as the dependent variable in the wage equation. For example, "wage levels" in Yugoslavia are measured as total worker incomes including regular wage earnings, overtime wage earnings, and bonus payments, while wage levels in Chile are measured by an index of wages and salaries and wage levels in the U.S. are measured by straight time average hourly earnings of production workers. Now it seems plausible to argue that total earnings or the Yugoslav measure of wage levels will advance more rapidly than base or straight time wage rates when the level of economic activity is high since there will be more overtime and larger profit shares. Therefore, the sensitivity of variations in wage rates to variations in near-full-employment levels of unemployment is likely to be overstated in Yugoslavia. A more serious problem of data incomparability which has potentially more devastating effects on international comparisons is posed by the different measures of unemployment used in each equation. This problem is discussed later in the chapter when the tradeoffs between unemployment and inflation characterizing each economy are compared.

Summarizing the above discussion we may conclude that there are a number of factors limiting the comparability of the estimated price and wage relationships. However, the view on which this chapter is premised is
that such differences do not vitiate cross-country comparisons altogether. Rather, these differences lead one to accept broad conclusions based on the estimated relationships somewhat tentatively and to take these conclusions as only rough indicators about the extent and direction of differences in price and wage dynamics in the three economies considered.

With the above caveats firmly in mind the statistical results can now be examined. However, some brief preliminary comments are required so that these results can be correctly interpreted. First, all of the Yugoslav price equations include a reform dummy variable, taking the value of one during the four quarters ranging from 1965III to 1966II and zero otherwise. This dummy is added to catch the impact of administratively-induced price and wage changes which occurred during the 1965 economic reform. In all equations, the dummy turns out to be highly significant, indicating that the reform had an important short-run impact on the pattern of price growth. Second, the unemployment variable included in the Yugoslav wage equation is a measure of the seasonally adjusted excess supply of labor, calculated by J. Mencinger of the Ekonomski Institut of Ljubljana, as the difference between the supply of labor and the demand for labor, expressed as a percentage of the supply of labor. In these
calculations the supply of labor is measured as the number employed in the social sector and the number of workers registered as job-seekers at the Federal Employment Office, while the demand for labor is measured by the number employed in the social sector and the number of free working places.\textsuperscript{13} This series is probably a somewhat better measure of cyclical variations in the excess supply of labor than the official unemployment rate—measured as the ratio between the number of job-seekers registered at the Federal Employment Service and the total number of employed workers and unemployed workers in the social sector—because the latter series exhibits a pronounced upward trend due, at least in part, to the growing use of the Employment Service by unemployed workers who had previously sought jobs on their own behalf and who had therefore not been included in official estimates of the unemployed.\textsuperscript{14} In Mencinger's excess supply measure, this upward trend is somewhat offset by cyclical variations in the number of job vacancies. Nonetheless, an upward trend is still observable in Mencinger's series as can be seen from graph 1. To the extent that this trend reflects changes in the practice and tradition of using the Employment Service rather than real changes in the conditions of labor availability, the coefficients estimated for the unemployment term in the wage equation will be inconsistent due to
underlying errors of measurement.

However, there are at least two reasons for arguing that the observed growth in the unemployment rate series reflects real changes in the availability of labor to the industrial or social sector whose wage behavior is examined here. First, during the 1966-70 period the population increase was unusually large as a result of the postwar baby boom. The population increase in turn caused a large increase in the number of new entrants into the labor force. During the 1961-65 period the average annual rate of growth of workers seeking jobs at the Federal Employment Office for the first time was 7.76% while in the 1965-70 period the rate climbed to 11.9%.15 Second, a large but unmeasurable fraction of the rate of growth of unemployed persons during the 1961-72 period reflected a growing tendency for underemployed workers in private activities to try to shift into the modern social sector. As wage rates and employment opportunities expanded in this sector relative to wages and opportunities in the private sector, more and more rural, agricultural workers decided to try to find a job in the social sector. Seen in this light the upward trend in the unemployment rate series represents a real change in the conditions of labor availability to the social sector brought on by the efforts of agricultural workers to find jobs in
industry. Such workers registered at the Federal Employment Service to aid in their search for alternative employment opportunities. As a result over 80% of all registered unemployment was localized in rural, predominantly agricultural areas during the sixties.16

The argument that the upward trend in measures of excess labor supply reflects real changes in the conditions of labor availability is further strengthened by the fact that this trend did not really manifest itself until the 1967-68 period. Certainly, the increase in unemployment rates in 1966-67 is best interpreted as the natural result of a marked three year recession in industrial growth rates caused partly by the 1965-66 economic reform and partly by restrictive monetary and fiscal policies. As such the increase in unemployment in these years undoubtedly reflects the changing conditions of excess labor supply assumed to influence nominal wage determination. During the 1968-70 period, however, the economy recovered, but the unemployment rate failed to fall to its pre-1965 level. The persistence of high unemployment rates during the economic recovery is probably due to an increase in the number of new applicants for social sector jobs called forth by improved employment prospects in that sector.

The unemployment rate variable appears in all the Yugoslav wage equations with a one period lag. This is
in contrast to the U.S. and Chilean equations in which the current unemployment variable appears as the independent variable. Tests performed by Perry and Corbo with both current and lagged values of the unemployment rate inverse suggested that the current value had greater explanatory power as measured by traditional statistical measures of goodness of fit, such as standard errors and R²'s. Initial experiments with the Yugoslav equation indicated that the current unemployment variable was frequently not a quantitatively important or significant determinant of current wage change. In contrast, as the results in table 4.2 indicate, the lagged unemployment variable consistently appears as a major influence on current wage growth, in the manner predicted by the wage determination model.

The existence of a lag between changes in aggregate labor market conditions and changes in the rate of growth of wages in Yugoslavia probably reflects traditional patterns of wage determination in self-managed enterprises. Surveys and studies of individual firm behavior in Yugoslavia indicate that advance nominal wages are set prior to the annual production or accounting period. These wages are understood to be advances on worker shares in enterprise net income. However, changes in wage levels can be made during the year, usually at the end of
each quarterly accounting period when realized conditions within the enterprise and in the economy are contrasted with the predicted conditions on which the original wage decisions were based. Clearly, such a pattern of revisions is consistent with an observed lag between the onset of a change in labor availability and changes in the rate of growth of nominal wages. On a more general level the existence of such a lag attests to the ability of employed workers in self-managed enterprises to temporarily protect planned wage increases from the competitive pressures exerted by unemployed workers.

Table 4.2 presents the results of the price and wage equations estimated by Perry and Corbo along with the results obtained by fitting the same equations to the Yugoslav data for the 1962II-1972II period using two-stage least squares. The two-stage least squares procedure is based on the assumption that the set of independent variables appearing in the equation system are predetermined, in the sense that they are uncorrelated in the probability limit with the error terms. This assumption is justifiable on one of two grounds: either the independent variables are exogenous variables in a larger equation system from which the price and wage equations are taken or the independent variables are lagged endogenous variables in a larger equation system.
Unemployment, 1961-72

U - Mencinger's excess labor supply series defined in the text. (See Appendix A.4.1)
TABLE 4.2

TWO-STAGE AND ORDINARY LEAST SQUARES ESTIMATES OF PRICE AND WAGE EQUATIONS FOR THE U.S., CHILE AND YUGOSLAVIA

<table>
<thead>
<tr>
<th>Country and period</th>
<th>Regression number</th>
<th>Dependent variable</th>
<th>Independent variables</th>
</tr>
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<td>The Perry model</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S. 1947IV-1960III</td>
<td>1</td>
<td>( w_t ) (OLSQ)</td>
<td>( c ) ( c_{t-1} ) ( U_{t-1} ) ( R_{t-1} ) ( \Delta R_t )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-4.3 ) (.37 ) (14.7 ) (.42 ) (.79 ) (.05 ) (2.2 ) (.11 ) (.18 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( \bar{R}^2 = .87 ); D.W. = 1.2</td>
</tr>
<tr>
<td>U.S. 1947IV-1960III</td>
<td>2</td>
<td>( w_t ) (OLSQ)</td>
<td>( c ) ( c_{t-1} ) ( U_{t-1} ) ( R_{t-1} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-3.8 ) (.31 ) (13.5 ) (.40 ) (.06 ) (2.6 ) (.08 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( \bar{R}^2 = .81 )</td>
</tr>
<tr>
<td>Yugoslavia 1962II-1972II</td>
<td>3</td>
<td>( w_t ) (OLSQ)</td>
<td>( c ) ( c_{t-1} ) ( U_{t-1} ) ( R_{t-1} ) ( \Delta R_t )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-4.5 ) (.71 ) (103.0 ) (-.42 ) (.25 ) (.09 ) (30.7 ) (1.4 ) (.15 ) (.15 )</td>
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<tr>
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<td></td>
<td></td>
<td>( \bar{R}^2 = .93 ); D.W. = 1.99; ( \rho = .6 )</td>
</tr>
<tr>
<td>Yugoslavia 1962II-1972II</td>
<td>4</td>
<td>( w_t ) (TSLS)</td>
<td>( c ) ( c_{t-1} ) ( U_{t-1} ) ( R_{t-1} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-7.7 ) (.76 ) (111.2 ) (.09 ) (.09 ) (29.1 ) (.07 )</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>( \bar{R}^2 = .92 ); D.W. = 2.0; ( \rho = .6 )</td>
</tr>
<tr>
<td>Instruments: ( w_{t-1}, c, c_{t-2}, U_{t-1}, U_{t-2}, R_{t-1}, R_{t-1}, CU_t, CU_{t-1}, Ref_t ), ( p_{t-1} )</td>
<td></td>
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<tr>
<td>U.S. 1947IV-1960III</td>
<td>5</td>
<td>( p_t ) (OLSQ)</td>
<td>( c ) ( w_t ) ( p_{t-1} ) ( CU_t ) ( \Delta CU_t )</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(-15.0 ) (.47 ) (.34 ) (.15 ) (-.61 ) (.12 ) (.02 ) (.05 ) (.12 )</td>
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<td></td>
<td>( \bar{R}^2 = .87 )</td>
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<td>Country and period</td>
<td>Regression number</td>
<td>Dependent variable</td>
<td>Independent variables</td>
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</tr>
<tr>
<td>Yugoslavia 1962II-1972II</td>
<td>6</td>
<td>( p_t , \text{(OLSQ)} )</td>
<td>( c ), ( w_t ), ( \text{Ref}_t ), ( \text{CU}_t ), ( \Delta \text{CU}_t )</td>
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<tr>
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<td></td>
<td>(-17.4), ( .31 ), ( 5.2 ), ( .20 ), ( -5.3 )</td>
<td>( (39) ), ( (1.5) ), ( (32) ), ( (38) )</td>
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<tr>
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<td>( R^2 = .93 ); ( \text{D.W.} = 1.7 ); ( \rho = .9 )</td>
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</tr>
<tr>
<td>Yugoslavia 1962II-1972II</td>
<td>7</td>
<td>( p_t , \text{(TSLS)} )</td>
<td>( c ), ( w_t ), ( \text{Ref}_t ), ( \text{CU}_t )</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.0), ( .33 ), ( 5.6 ), ( .04 )</td>
<td>( (1.0) ), ( (1.5) ), ( (0.3) )</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>Instruments:</td>
<td>( p_{t-1} ), ( c ), ( w_{t-1} ), ( \text{CU}<em>{t-1} ), ( \text{CU}</em>{t-1} ), ( U_{t-1} ), ( U_{t-2} ), ( R_{t-1} ), ( R_{t-2} ), ( \text{Ref}<em>{t-1} ), ( \text{Ref}</em>{t-1} )</td>
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<td></td>
<td>( f ), ( f )</td>
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The Corbo model
(Two-stage estimates)

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<tr>
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<td>( w_t , \text{(TSLS)} )</td>
<td>( c ), ( c_{t-1} ), ( U_{t-1} )</td>
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<tr>
<td></td>
<td></td>
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<td>( (0.9) ), ( (24.6) )</td>
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<tr>
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<td></td>
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</tr>
<tr>
<td>Instruments:</td>
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<td>VNLCU(t-2), ( p_t ), ( p_{t-1} )</td>
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<td>Country and period</td>
<td>Regression number</td>
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<td>-18.9 .77 110.3</td>
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<td>(.09) (24.6)</td>
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Instruments: same as equation (9) except ANLCU in place of VNLCU.

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<td>-19.1 .78 110.3</td>
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<td>(.09) (24.6)</td>
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Instruments: same as equation (9) except BNLCU in place of VNLCU.

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<td>-18.9 .77 110.3</td>
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<td>(.09) (24.6)</td>
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Instruments: same as equation (9) except NLCU in place of VNLCU.

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<td>(.14) (.01) (.05)</td>
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Instruments: $p_{t-1}, \; c, \; w_{t-1}, \; VNLCU(t-1), \; VNLCU(t-2), \; Ref_{t}, \; Ref_{t-1}, \; U_{t-1}, \; p_{t-2}^f, \; p_t^f, \; p_{t-1}^f$. |
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The Corbo model
(instrumental variables)

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<th>Regression number</th>
<th>Dependent variable</th>
<th>Independent variables</th>
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<tbody>
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<td>Chile 1959I-1968IV</td>
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<td>Instruments:</td>
<td>$M(t-1), M(t-2), p_t, p_{t-1}, p_t, c.$</td>
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Table 4.2—Continued

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<th>Independent variables</th>
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<tbody>
<tr>
<td>Yugoslavia</td>
<td>1962II-1972II</td>
<td>$w_t$  (INST)</td>
<td>$U_{t-1}$</td>
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<td></td>
<td></td>
<td>$c$</td>
<td>$c_{t-1}$</td>
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<tr>
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<td>$R^2 = .92$; D.W. = 2.1; $\rho = .6$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-22.0$</td>
<td>116.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.09)</td>
<td>(26.3)</td>
</tr>
<tr>
<td>Instruments:</td>
<td>M(t), M(t-1), M(t-2), Ref, $f_t$, $f_{t-1}$, $p_t$, $p_{t-1}$, $c$, and all lagged endogenous variables.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>1959I-1968IV</td>
<td>$p_t$  (INST)</td>
<td>$w_t$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$c$</td>
<td>$NLCU(t-1)$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$p_t$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.17</td>
<td>.69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.13)</td>
<td>(.05)</td>
</tr>
<tr>
<td>Instruments:</td>
<td>M(t-1), M(t-2), $p_r^t$, $p_r^{t-1}$, $p_f^t$, $p_f^{t-1}$, $c$, and NM(t-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>1962II-1972II</td>
<td>$p_t$  (INST)</td>
<td>$w_t$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$c$</td>
<td>$VNLCU(t-1)$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$Ref_t$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.8</td>
<td>1.151</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.09)</td>
<td>(1.00)</td>
</tr>
<tr>
<td>$R^2 = .94$; D.W. = 1.8; $\rho = .9$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruments:</td>
<td>M(t), M(t-1), M(t-2), Ref, $f_t$, $f_{t-1}$, $p_t$, $p_{t-1}$, $c$, and all lagged endogenous variables.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>1962II-1972II</td>
<td>$p_t$  (INST)</td>
<td>$w_t$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$c$</td>
<td>$BNLCU(t-1)$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$Ref_t$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13.5</td>
<td>.32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.09)</td>
<td>(.26)</td>
</tr>
<tr>
<td>$R^2 = .94$; D.W. = 1.8; $\rho = .9$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruments:</td>
<td>same as equation (21).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Flanagan model

<table>
<thead>
<tr>
<th>U.S.</th>
<th>1951II-1968IV</th>
<th>$w_t$  (OLSQ)</th>
<th>$U_{t-1}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$c$</td>
<td>$c_t$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$R^2 = .72$; D.W. = .8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$-59$</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.07)</td>
<td>(2.0)</td>
</tr>
</tbody>
</table>

(Note: The table contains data for various regression models used in econometric analysis, detailing the coefficients and their significance levels for different countries and periods.)
<table>
<thead>
<tr>
<th>Country and period</th>
<th>Regression number</th>
<th>Dependent variable</th>
<th>Independent variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. 1951II-1968IV</td>
<td>24</td>
<td>$p_t$ (OLSQ)</td>
<td>$c$, $w_t$, $p_t^r$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$-.33$, $.58$, $.12$</td>
</tr>
</tbody>
</table>

(standard errors are not reported)

NOTES: D.W. is the Durbin-Watson statistic; $\rho$ is the estimated autocorrelation coefficient; $R^2$ is the multiple correlation coefficient adjusted for degrees of freedom; the figures in parenthesis are standard errors. Variables: $c$ is a constant term; U.S.: variables are defined as in table 4.1; Chile: variables are defined as in table 4.1. Additional variables are as follows: $M$ is the annual percentage rate of growth of the nominal money supply; $p_t^f$ is the annual percentage rate of growth of the agricultural component of the wholesale price index; and $NM$ is the square of the deviation from the mean of $M$, keeping the sign of the original deviation; Yugoslavia: variables are defined as in table 4.1. Additional variables are as follows: $Ref_t$ is the reform dummy; $VNLCU(t-1) = 1/(9.85-CU(t-1))$; $ANLCU = 1/(9.90-CU(t-1))$; $NLCU = 1/(10.0-CU(t-1))$; $BNLCU = 1/(9.7-CU(t-1))$; and $p_t^f$ is the percentage rate of growth of agricultural producer prices.

in which the error terms are free from autocorrelation.

Because of the questionable nature of these assumptions, the Corbo price and wage equations are also estimated using an instrumental variables approach in which current and lagged percentage rates of growth of the money supply, current and lagged percentage rates of growth of agricultural prices, and the reform dummy are taken as the predetermined variables driving both the dependent and the explanatory variables appearing in the price and wage subsystems.
Initial estimates of the Corbo and Perry equations using the Yugoslav data revealed significant autocorrelation in the residuals, so a correction was made using the Hildreth-Lu search technique to test for the value of the autocorrelation coefficient between zero and one which yielded the minimum standard error for each equation. 19 The high degree of autocorrelation characterizing the results reported in table 4.2 suggests that the equations may contain fundamental misspecification errors, so that the residuals catch the influence of some additional non-random factors which should be included among the explanatory variables. 20 While this is perhaps the case, an alternative explanation focuses on the distorting influence of price controls and structural economic reforms which resulted in long periods of artificial price stability followed by long periods of price growth, once pent-up pressures destroyed control efforts. Such factors are difficult to measure in a simple time series analysis and instead of trying to measure them here, I deal with the problem of autocorrelation by applying the autoregressive transformation necessary to obtain efficient, unbiased, two-stage least squares estimates. 21

A final note on the results presented in table 4.2 concerns the appropriate definition for the nonlinear capacity utilization variable employed in the Yugoslav
equations. The motivation behind the use of such a variable is a theory of pricing which predicts that as capacity utilization approaches some critical maximum level, the reaction of price to excess demand becomes larger and larger, ultimately exploding should that level ever be attained. The problem with the construction of such an index is that there is no way to determine \textit{a priori} the "true" critical maximum value of capacity utilization at which price pressures become explosive. Suppose we choose some maximum level of capacity utilization which has been approached but not reached during the period of observation as a measure of the true critical value. Because our choice enters the equation in an essential way, the results will be sensitive to the choice we make. The proper thing to do in a situation of this type is to estimate the critical value as a parameter, by iterating on possible values and choosing that one which maximizes the likelihood function for the dependent variable. Time and financial constraints made this procedure infeasible; instead, the price and wage equations were estimated using four different values for the critical maximum in order to determine whether the results were sensitive to the value chosen. Table 4.2 indicates that most of the statistical results—such as the size and significance of the coefficients of the explanatory variables other than
the capacity variable itself, and the standard measures of
goodness of fit—were not sensitive to the critical value
chosen.

However, it is still worthwhile to try to deter-
mine which of the four capacity utilization measures per-
forms best because each of these measures yields different
conclusions about the impact of excess demand conditions
in product markets on the rate of inflation. A relatively
simple way of handling this determination is available if
we utilize the fact that if the correct value of \( r \), the
capacity utilization limit were known, then the maximum
likelihood estimators of the coefficients in the price
equation would be the two-stage least squares estimators
and the maximum likelihood estimator for \( \delta^2_u \) would be

\[
\hat{\delta}^2_u = \frac{1}{T-k} \sum_{t=1}^{n} (p_t^m - \hat{\alpha}_0 - \hat{\alpha}_1 w_t - \hat{\alpha}_2 \text{NLCU}(t-1) - a_3 \text{Ref}_t)^2
\]

Maximum likelihood estimation of \( r \) thus requires that we
find the value of \( r \) that minimizes \( \hat{\delta}^2_u \) and therefore
maximizes the likelihood function for the dependent vari-
able \( p_t^m \). Since \((t-k)\) is the same for each choice of \( r \),
maximum likelihood estimation requires that the value of
\( r \) minimize the sum of squared residuals from the price
equation. Examining each of the price equations per-
formed with two-stage least squares, we see that \( r = 9.7 \)
and \( r = 9.85 \) lead to the lowest such sums. Therefore, these
two values of \( r \) perform best among the four values considered and together they yield an approximate range for the effect of excess demand on price inflation.

The results presented in table 4.2 give rise to some important conclusions about the comparative nature of wage and price dynamics in Yugoslavia, Chile, and the U.S. over the range of observations covered by the data. These conclusions in turn suggest some working hypotheses about the possible impact of institutions of workers' self-management on wage and price formation.

1. The estimated coefficients and the standard errors of the price term in the wage equation indicate that the elasticity of nominal wage growth with respect to price inflation is higher in Yugoslavia and Chile than it is in the U.S. This conclusion is supported by the confidence intervals for the elasticity measures presented in table 4.3. Thus, over the period of observation, worker efforts and ability to protect real wages against the eroding influence of price increases appear to have been stronger in Yugoslavia and in Chile than they have been in the U.S. As noted earlier, the fact that self-management allows workers to freely adjust their wage decisions to compensate for unexpected price increases may explain why wage growth has been more sensitive to price growth in Yugoslavia than in the U.S. On the other
hand, the absence of self-management institutions in Chile has apparently not prevented the Chilean work force from responding to the potential price erosion of real wage levels just as successfully as the Yugoslav work force has done. In light of the severe inflationary history of the Chilean economy it seems reasonable to conclude that inflationary expectations, built up over a long period of rapid price growth, may be just as important as labor market institutions in determining the extent to which workers are able to compensate for inflation by offsetting increases in nominal wages.

Another conclusion supported by the wage elasticity estimates is that despite a long history of inflation in Chile and the existence of labor management institutions in Yugoslavia, in neither economy do nominal wage increases appear to adjust completely to increases in the cost of living index. This result supports Harberger's contention that "real wages have historically tended to fall in periods of growing inflation, forcing workers to bear a disproportionate share of the burden." However, a reliable test of this proposition requires a complete formulation of the expectations hypothesis and the inclusion of an expected rate of inflation variable in the wage equation. The use of current or lagged price changes as a proxy for such a variable may lead to erroneous
conclusions about the extent to which wages adjust to prices once allowance is made for lags in adjustment caused by certain patterns of expectations formation.

TABLE 4.3

THE ELASTICITY OF WAGE GROWTH WITH RESPECT TO PRICE GROWTH

<table>
<thead>
<tr>
<th>Country</th>
<th>Regression number in table 4.2</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Perry model</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.</td>
<td>1</td>
<td>(.259, .475)</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>4</td>
<td>(.568, .944)</td>
</tr>
<tr>
<td>The Corbo model</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>8</td>
<td>(.479, .925)</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>9</td>
<td>(.590, .960)</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>10</td>
<td>(.589, .959)</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>11</td>
<td>(.595, .967)</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>12</td>
<td>(.591, .963)</td>
</tr>
<tr>
<td>U.S.</td>
<td>23</td>
<td>(.270, .555)</td>
</tr>
</tbody>
</table>

2. The coefficient of the unemployment term in all of the Yugoslav equations is significantly larger than the coefficient of the unemployment term in both the Chilean and the U.S. equations, even after allowance is made for differing standard errors. In fact, the size of the coefficient of the unemployment term in the Yugoslav equation appears to be outside the range of estimates observed in a variety of other economies where wage equations of a similar form have been reported.23 Two important
conclusions follow from this observation: first, a given level of excess demand appears to call forth a larger wage increase in Yugoslavia than it does in other economies and second, wages appear to exhibit considerably more inflexibility to excess supply in Yugoslavia than they do in other economies. These conclusions are consistent with our earlier hypothesis that conditions of excess supply on the aggregate labor market are likely to exercise little effect on wage decisions within each self-managed enterprise, because the members of such enterprises need take little or no account of the availability of potential replacements. On the other hand, once the excess supply of labor disappears and enterprises are forced to compete with one another for additional workers, wages within each enterprise will be sharply influenced by conditions of aggregate labor availability. It is this type of differential response pattern, indicating marked sensitivity to excess labor demand and little, if any, sensitivity to excess labor supply which the very large coefficients on the unemployment term suggest.

Another interpretation of this result is also possible and may be of considerable importance in explaining the apparent insensitivity of wage increases to excess labor supply conditions in Yugoslavia. Suppose that workers in each self-managed enterprise decide to protect
themselves against potential reductions in nominal wage levels, necessitated by deteriorating market conditions and reductions in the marginal value product of labor within the enterprise, by varying the distribution of firm net income between profits and retained earnings on the one hand and wages on the other. Such behavior in effect may mean that wage change is never negative; it is either zero or what conditions on the aggregate labor market and within the firm imply, whichever is algebraically larger. Under these conditions there is a floor on wage change in excess supply markets, independent of the amount of excess supply and of the past history of wages and prices. The existence of such a floor will be reflected in a very large coefficient on the unemployment inverse term in the wage equation. The coefficient size implies a Phillips curve which is very flat for high unemployment rates, when many enterprises hit the floor of zero wage growth, and which becomes nearly vertical at critically low rates of unemployment when all enterprises are competing for scarce new members.

3. Confidence intervals for the estimated coefficients of the wage term in the Corbo variant of the price equation indicate that the elasticity of price inflation with respect to nominal wage growth is higher in Chile than it is in Yugoslavia. In contrast, the data
indicate that the range of possible values for this elasticity overlap in the U.S. and Yugoslav variants of the Perry equation. Because more recent econometric evidence suggests that the elasticity of prices with respect to wages was approximately equal to one in the U.S. during the 1960's it is difficult to draw any definite conclusions from this observation. In lieu of such a conclusion we may merely state that for the time periods considered and with the equations specified, the observed elasticities of price growth with respect to wage growth in Yugoslavia appear to be in the range of elasticities estimated for the U.S. economy during the 1950's and somewhat below the range of elasticities observed in Chile during the 1959-68 period. As noted earlier, observed differences in the sensitivity of prices to wages in Yugoslavia may reflect the fact that within each self-managed enterprise changes in nominal wages may be divorced from changes in labor's marginal value product or changes in selling prices, by variations in the distribution of enterprise net income between personal income payments to workers and retained earnings or profits.

4. In the Perry version of the price equation the excess demand variables--$CU_t$ and $\Delta U_t$--yield insignificant results with the Yugoslav data. In contrast, the nonlinear capacity utilization variable of the Corbo equation is
significant in the Yugoslav equation for each of the four values of maximum capacity utilization tested. In every case, confidence intervals suggest that the size of the coefficient is larger in the Yugoslav equations than it is in the Chilean equations. Comparing the results obtained with the Perry and Corbo excess demand indicators suggests: (a) that if excess demand pressures have influenced the rate of inflation in Yugoslavia they have done so with a lag of up to one quarter; (b) that prices appear to respond to excess demand pressures in Yugoslavia in a nonlinear fashion with the absolute size of the price increase growing as the level of excess demand pushes capacity utilization toward some critical sustainable value; and (c) that prices in the commodity market are considerably more responsive to excess demand pressures in Yugoslavia than they are in Chile. Unfortunately, all of these conclusions are called into question by the instrumental variables estimates of the price equation which suggests that the nonlinear capacity utilization variables are insignificant at the .05 level of significance. Therefore, no definite conclusions can be drawn about the importance of excess demand pressures on price formation in the Yugoslav economy during the period considered.

5. In every version of the Yugoslav equations the reform dummy is highly significant. The coefficient of
the variable suggests that the rate of growth of prices
during the reform was approximately 6 to 7% higher than it
would have been if the reform had not occurred.

6. An examination of the results estimated for
the Perry model of wage determination in Yugoslavia reveal
that neither of the profit indicator variables have statisti-
cally significant coefficients. Thus, despite the impor-
tant link between wages and profits which is assumed to
exist in the self-managed enterprise, current period wage
changes do not appear to be explained by either current
period profits per worker or changes in profits per worker.
These results, however, do not contradict the theories of
enterprise wage determination discussed earlier, because
the apparent willingness of firms to vary the share of
retained earnings in current profits may cause the coef-
ficient linking wage growth and profits to vary cyclically.
If this is the case, efforts to estimate a stable coeffici-
ent for the profits variable by least squares regression
analysis will be unsuccessful.27,28

7. In all of the Yugoslav equations the esti-
mated constant term is insignificant. This result is not
surprising in light of the high degree of serial correla-
tion in the error terms of the original equations. With
a correctly specified autocorrelation coefficient, a
correctly specified equation will have a constant term
which cannot be estimated because it nearly disappears upon first differencing.

Because one of the main purposes of the empirical estimates performed here is to determine whether the institutions of self-management have produced any significant differences in price and wage dynamics observed in the Yugoslav economy, it seems useful to examine this issue in light of the conclusions discussed here. On balance, these conclusions seem to indicate that self-management has had little impact on the course of price and wage dynamics. The estimated coefficients for all the independent variables except the unemployment term in the wage equations are always within the range of values observed in either the U.S. or Chile using comparable equation forms. Only in the case of the unemployment term is the estimated coefficient for the Yugoslav equation consistently and significantly larger, thereby suggesting that self-management institutions may have modified the responsiveness of wage changes to conditions on the aggregate labor market. This conclusion is not surprising since an inherent feature of the self-management system is the ability of each group of employed workers to manage their wage policy without regard to unemployed workers who are powerless to compete for their jobs. Under such circumstances members of each firm need take little heed
of increases in unemployment except as these increases are accompanied by reductions in enterprise profits and revenues which necessarily reduce enterprise ability to finance wage increases for their own members.

The fact that the responsiveness of wages to excess labor demand is so sharply nonlinear in Yugoslavia might be interpreted to mean that the inflationary bias normally associated with such nonlinearity is more severe in Yugoslavia than elsewhere. In other words, since periods of aggregate excess labor supply appear to reduce wage growth significantly less than periods of aggregate excess labor demand appear to increase it, one might expect the average rate of growth of wages and prices across the cycle to tend to be larger in Yugoslavia than elsewhere. This conclusion is only warranted, however, if price growth is at least as sensitive to wage growth in Yugoslavia as it is in other economies. The estimates in table 4.2 suggest that this condition may not be satisfied. If the elasticity of prices with respect to wages is smaller in Yugoslavia than elsewhere, then although the rate of growth of wages over the cycle may be higher in Yugoslavia, the same conclusion need not apply to the average rate of growth or prices. In short, the relationship between excess labor demand and inflation depends on both the coefficient of the unemployment term in the wage
equation and the coefficient of the wage term in the price equation. Before we can make any comparative statements about the inflationary bias of the Yugoslav economy, it is necessary to examine the effect of both of these coefficients, and we can do so by combining the price and wage equations into a single tradeoff equation which directly expresses price growth as a function of the unemployment rate.

**Comparative Tradeoff Equations**

Table 4.4 contains the tradeoff equations for Yugoslavia, Chile and the U.S. calculated from the Corbo and Perry price and wage models presented in table 4.1. In order to calculate these equations it was necessary to estimate a relationship between $p_t^m$, the dependent price variable in the price equation, and $c_t$, the independent price variable in the wage equation. Different relationships were specified for the U.S., Chile and Yugoslavia to reflect differences in the definition of the price indices used.\(^{29}\) These relationships are presented and explained in table 4.4.

Tradeoff equations of the type examined here are usually used to answer questions about the price effects of an aggregate demand policy designed to hold the unemployment rate at some desired level or questions about the level of unemployment necessitated by an aggregate...
demand policy designed to keep the rate of inflation at some desired level. In either case, the basic question concerns levels: namely, what level of price inflation is associated with a given level of excess supply in the labor market? As the tradeoff equations reveal, in the short run as long as initial conditions and lag structures influence price growth, the answer to this question depends on previous wage and price performance. Thus, as Friedman has pointed out

Stated in terms of the rate of change of nominal wages, the Phillips Curve can be expected to be reasonably stable and well-defined for any period for which the average rate of change of prices and hence the anticipated rate has been relatively stable ... Curves computed for different periods or different countries for each of which this condition has been satisfied will differ in level, the level of the curve depending on what the average rate of price change was. The higher the average rate of price change the higher will tend to be the level of the curve.30

Therefore, in the short run answers to questions about the tradeoff between unemployment levels and rates of inflation depend on recent price and wage history, and such answers are not pertinent to questions about the relationships between unemployment levels and inflation rates in the long run when temporary distortions caused by exogenous shocks have dissipated.

In order to examine possible long-run relationships between levels of unemployment and rates of inflation, economists have developed the idea of the "long-run"
### TABLE 4.4

**COMPARATIVE TRADEOFF EQUATIONS**

<table>
<thead>
<tr>
<th>Country and Model</th>
<th>Tradeoff Equations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>U.S., The Perry model</strong></td>
<td>$p_t = -13.17 + .06 p_{t-1} + .10 p^s_t + .01 p^f_t + 6.86 U^{-1}_t + .20 R_t + .37 \Delta R_t + .34 p^r_t + .15 C U_t - .61 \Delta C U_t$</td>
</tr>
<tr>
<td>(Equations 1 and 5 in table 4)(^a)</td>
<td>Steady-state solution: $p_t = p_{t-1}$</td>
</tr>
<tr>
<td></td>
<td>$p_t = -14.04 + .11 p^s_t + .01 p^f_t + 7.30 U^{-1}_t + .21 R_t + .39 \Delta R_t + .37 p^r_t + .16 C U_t + .65 \Delta C U_t$</td>
</tr>
<tr>
<td><strong>Chile, The Corbo model</strong></td>
<td></td>
</tr>
<tr>
<td>(Equations 18 and 20 in table 4)(^c)</td>
<td>$p_t = -.54 + 27.23 U^{-1}<em>t + .05 p</em>{t-1} + .03 p_{t-2} + .01 p^f_{t-3} + .06 p^f_t + .04 p^f_{t-1} + .03 p^f_{t-2} + .02 p^r_{t-3} + .48 p^r_{t-1} + .03 p^r_{t-2} + .02 p^r_{t-3} + .05 N L C U(t-1)$</td>
</tr>
<tr>
<td>Steady-state solution: $p_t = p_{t-1} = p_{t-2} = p_{t-3}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$p_t = -.60 + 30.18 U^{-1}<em>t + .07 p^f_t + .05 p^f</em>{t-1} + .03 p^f_{t-2} + .01 p^f_{t-3} + .53 p^r_t + .03 p^r_{t-1} + .02 p^r_{t-2} + .01 p^r_{t-3} + .06 N L C U(t-1)$</td>
</tr>
<tr>
<td><strong>U.S., The Corbo-Planagan model</strong></td>
<td></td>
</tr>
<tr>
<td>(Equations 23 and 24 in table 4)</td>
<td>$p_t = .02 + 13.10 U^{-1}_t + .16 p^r_t$</td>
</tr>
<tr>
<td><strong>Yugoslavia, The Corbo model</strong></td>
<td></td>
</tr>
<tr>
<td>(Equations 9 and 14 in table 4)(^d)</td>
<td>$p_t = -.55 + 18 p_{t-1} + .03 p^f_{t-1} + 25.59 U^{-1}_{t-1} + 1.59 N L C U(t-1)$</td>
</tr>
</tbody>
</table>

\(^a\) See Table 4.4 for tradeoff equations.
\(^c\) Equation numbers refer to Table 4.
\(^d\) Corresponding equation numbers refer to Table 4.
\(^e\) NLCU = Net Long-Run Consumption Units.
<table>
<thead>
<tr>
<th>Country and model</th>
<th>Tradeoff equations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Steady-state solution:</strong> $p_t = p_{t-1}$</td>
<td></td>
</tr>
<tr>
<td>$p_t = -.66 + 31.13U_{t-1}^{l} + .03p_{t-1}^{f}$</td>
<td></td>
</tr>
<tr>
<td>$+1.9402VNLCU(t-1)$</td>
<td></td>
</tr>
<tr>
<td><strong>Yugoslavia, The Corbo model</strong></td>
<td></td>
</tr>
<tr>
<td>(Equations 12 and 16 in table 4)$^f$</td>
<td></td>
</tr>
<tr>
<td>$p_t = 9.94 + 18p_{t-1}^{l} + .03p_{t-1}^{f}$</td>
<td></td>
</tr>
<tr>
<td>$+25.90U_{t-1}^{l} + .41BNLCU(t-1)$</td>
<td></td>
</tr>
<tr>
<td><strong>Steady-state solution:</strong> $p_t = p_{t-1}$</td>
<td></td>
</tr>
<tr>
<td>$p_t = 12.04 + .04p_{t-1}^{f} + 31.40U_{t-1}^{l}$</td>
<td></td>
</tr>
<tr>
<td>$+.50BNLCU(t-1)$</td>
<td></td>
</tr>
<tr>
<td><strong>Yugoslavia, The Corbo model</strong></td>
<td></td>
</tr>
<tr>
<td>(Equations 19 and 21 in table 4)$^g$</td>
<td></td>
</tr>
<tr>
<td>$p_t = -2.56 + .22p_{t-1}^{l} + .03p_{t-1}^{f}$</td>
<td></td>
</tr>
<tr>
<td>$+27.78U_{t-1}^{l} + 1.1514VNLCU(t-1)$</td>
<td></td>
</tr>
<tr>
<td><strong>Steady-state solution:</strong> $p_t = p_{t-1}$</td>
<td></td>
</tr>
<tr>
<td>$p_t = -3.27 + .03p_{t-1}^{f} + 35.47U_{t-1}^{l}$</td>
<td></td>
</tr>
<tr>
<td>$+1.47VNLCU(t-1)$</td>
<td></td>
</tr>
<tr>
<td><strong>Yugoslavia, The Corbo model</strong></td>
<td></td>
</tr>
<tr>
<td>(Equations 19 and 22 in table 4)$^h$</td>
<td></td>
</tr>
<tr>
<td>$p_t = 9.99 + .22p_{t-1}^{l} + .03p_{t-1}^{f}$</td>
<td></td>
</tr>
<tr>
<td>$+28.7869U_{t-1}^{l} + .37BNLCU(t-1)$</td>
<td></td>
</tr>
<tr>
<td><strong>Steady-state solution:</strong> $p_t = p_{t-1}$</td>
<td></td>
</tr>
<tr>
<td>$p_t = 10.30 + .03p_{t-1}^{f} + 37.13U_{t-1}^{l}$</td>
<td></td>
</tr>
<tr>
<td>$+.41BNLCU(t-1)$</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.4--Continued

a All of the tradeoff equations are stable and have steady-state solutions. The steady-state properties of the Perry model for the U.S. economy and of the Corbo model for the Chilean economy are discussed by Perry (chap. 5, Unemployment, Money Wage Rates and Inflation) and Corbo (chap. 3, An Econometric Model of the Chilean Inflation) respectively. The stability of the Yugoslav tradeoff equations is immediately apparent, since all equations are first order difference equations in which the lagged term appears with a positive coefficient which is less than one.

b The equation relating $c_t$ and $p_t$ is

$$c_t = -.86 + .36p_{t-1} + .60p_t^S + .05p_t^F \quad R^2 = .86$$

where $p_t^F$, $p_{t-1}^m$, and $c_t$ are defined as in tables 4.1 and 4.2 and $p_t^S$ is the annual percentage change in the price of services to consumers. The equation was estimated by Perry using ordinary least squares.

c The equations relating $c_t$ and $p_t$ are:

$$p_t^w = .408p_t + .34p_t^f + .24p_t^r \quad \text{and} \quad c_t = .04 + .35p_t^w + .25p_{t-1}^w$$

$$+ .15p_{t-2}^w + .07p_{t-3}^w$$

The first of these equations which relates the wholesale price index to its major components is assumed by Corbo to be a definitional identity and is therefore estimated using ordinary least squares. The second equation relates the current cost of living index to current and past changes in the wholesale price index. The equation was estimated using instrumental variables and a polynomial distributed lag technique in which the polynomial was constrained to a second degree form. The instrumental variables used in the estimation were: $M(t-1), M(t-2), p_t^r, p_{t-1}^r, p_t^f$, and $c$ where these variables are defined in table 4.2.

d The equation relating $c_t$ and $p_t$ is

$$c_t = 4.78 + .9899p_t + .16p_t^f + 9.84Ref \quad R^2 = .98$$

$$(.1868) (1.9) \quad D.W. = 1.655 \quad \rho = .9$$
where the variables are as defined in tables 4.1 and 4.2. The equation was estimated using two-stage least squares and a Hildreth-Lu correction for autocorrelation. The instruments in the two-stage estimation were: \( c_{t-1}, c, p^f_{t-1}, p^f_t, p^f_{t-1,}, \text{Ref}_t, \text{Ref}_{t-1}, \text{VNLCU}(t-1), \text{VNLCU}(t-2), U_{t-1}, U^t_{t-1}, U^t_{t-2} \).

The reform dummy variable was dropped in the calculation of all tradeoff equations because the variable does not influence the crucial relationship between unemployment and inflation except during the 1965III-1966II period.

The equation relating \( c_t \) and \( p_t \) is

\[
c_t = 6.14 + .97p_t + .16p^f_t + 10.0\text{Ref}_t \quad R^2 = .98; \quad \text{D.W.} = 1.7;
\]

\[
(0.20) \quad (0.06) \quad (1.91) \quad \rho = .9
\]

The equation was estimated using two-stage least squares and a Hildreth-Lu correction for autocorrelation. The instruments are the same as those in footnote d except BNLCU is used instead of VNLCU.

The equation relating \( c_t \) and \( p_t \) is

\[
c_t = -.44 + 1.16p_t + .13p^f_t + 8.72\text{Ref}_t \quad R^2 = .97; \quad \text{D.W.} = 1.7
\]

\[
(0.21) \quad (0.06) \quad (2.1) \quad \rho = .9
\]

The equation was estimated using instrumental variables and a Hildreth-Lu correction for autocorrelation. The instruments used were: \( M(t), M(t-1), M(t-2), \ldots f^t, \text{Ref}_{t-1}, p^f_t, p^f_{t-1}, c \), and all the lagged endogenous variables.

Relationship between \( c_t \) and \( p_t \) same as in g.

Phillips curve which can be defined as follows: "assume that a given unemployment rate is maintained so long that the initial conditions and the lag structure of the underlying (price and wage) equations have no effect; what then
is the rate of inflation corresponding to this level of unemployment.\textsuperscript{31} The long-run Phillips curve is calculated by solving the short-run tradeoff equations, which are difference equations in prices. Provided the difference equation in question is stable, in the long run exogenous shocks and initial conditions will lose their effect and prices will depend on all of the constant terms and independent variables appearing in the underlying equations. Under these conditions, the long-run Phillips curve is assumed to reveal the structural characteristics of an economy with regard to unemployment and inflation.

The above discussion indicates that a comparison of the relative inflationary bias in Chile, Yugoslavia, and the U.S. is perhaps most appropriately based on the characteristics of the long-run Phillips curves estimated for each of these economies. This seems particularly wise because in the short run both the high average rate of inflation and the high elasticity of wage changes with respect to price changes in Yugoslavia and Chile will necessarily lead to the conclusion that the tradeoffs between levels of excess supply and levels of inflation are relatively worse in these economies than elsewhere, although this conclusion may not be warranted in the long run. On the other hand, because the long-run Phillips curve is a somewhat synthetic construct referring to a
steady state position which is unlikely to be attained and because economic policy is largely oriented toward short-run goals, a comparison of the short-run Phillips curves seems relevant as well, provided conclusions drawn on the basis of such a comparison are correctly interpreted.

Whether one compares long-run or short-run Phillips curves, however, the question usually asked is phrased in terms of levels of unemployment and rates of inflation, with the presumption that the higher the level of price inflation associated with a given level of unemployment, the worse the tradeoff between price stability and full employment. Samuelson and Solow have argued further that the worse the tradeoff according to this criterion, the greater the role of cost-push pressures or wage-push pressures in the generation of inflation.32 According to this argument if we can establish that a given level of excess labor supply called forth a larger price increase in Yugoslavia than it did in either Chile or the U.S. during the periods considered, then we would have some evidence to support the popular contention that the existence of self-management institutions has worsened the tradeoff between full employment and price stability and has exacerbated wage-push pressures in Yugoslavia. Unfortunately, a number of factors make it impossible to draw any such conclusions.
First, comparative statements about the relationship between a given level of unemployment and the rate of inflation are elusive because of differences in measuring excess labor supply in the economies considered. In the Yugoslav equations the unemployment rate in the social sector is corrected for changes in the number of job vacancies. In contrast, excess labor supply in the Chilean equations is measured as the simple unemployment rate in the industrial sector while in the U.S. equations, the official unemployment rate series for the whole economy is used. Moreover, even if the official unadjusted unemployment rate series had been used in the Yugoslav equations, a comparison of levels among the three economies would still be difficult because the official unemployment measures in both Chile and Yugoslavia are byproducts of unemployment insurance or unemployment service programs which tend to understate the unemployment rate relevant to the sample survey methods used in the U.S.

Second, the insignificance of the constant term in all of the Yugoslav equations and the insignificance of some of the capacity utilization and profits variables in the Yugoslav variants of the Perry model make it unwise to incorporate these terms into conclusions about comparative price and unemployment performance. Nonetheless, these terms will necessarily influence any ceteris paribus
statements about the relationship between the level of price inflation and the level of unemployment. Third, even if the unemployment rate series in Yugoslavia were somehow adjusted according to the concepts and measurements of the U.S. series one might still expect to observe higher average levels of unemployment in Yugoslavia than in the U.S. or in other "capitalist" economies because the rules of constrained profit maximization or the rules of per capita net income maximization assumed to govern the wage and employment policies of the self-managed enterprise need not lead to the absorption of all those who wish to be employed in the short run. There is nothing inherent in the functioning of existing labor-managed enterprises to guarantee full employment. Moreover, government policies aimed at reducing the level of unemployment by increasing aggregate demand may be unsuccessful in an economy composed of such enterprises, if these policies lead to an increase in the wages or net incomes of employed workers which exceeds or equals the increase in labor's marginal value product. In short, the existence of unemployment rates in a self-managed economy, such as Yugoslavia, which are "high" relative to those observed elsewhere may reflect a long-run structural problem rather than a problem of deficient aggregate demand and the policies required to reduce unemployment may be of a long-run
nature requiring considerable time for their fruition.

Vanek has identified at least two conditions which must be satisfied to guarantee full employment in a labor-managed economy: first, the effective price of capital must equal the marginal rate of return on capital; and second, those workers who are not currently employed must be able to compete equitably for available capital. If these two conditions are fulfilled, the unemployed will gradually be absorbed into the labor force either through increases in labor employment by existing firms or through the establishment of new firms by the unemployed. In either case, the process of absorbing unemployed workers will be a gradual one. In contrast, in a capitalist economy—at least in theory—profit maximization and perfect markets will lead to full employment automatically as workers and capitalists bid down wages to their market clearing levels. Once real world market distortions are introduced, arising from problems of insufficient aggregate demand, incomplete information, lags in adjustment and the like, unemployment can and does persist over long periods of time in capitalist economies such as the U.S. However, the unemployment problem in such circumstances is frequently amenable to aggregate demand policies designed to maintain employment at some desired level. Such policies can have a potentially greater
impact on the unemployment situation in the short run than the types of policies needed to guarantee full employment in a labor-managed economy.

On balance, therefore, one might expect to find a higher unemployment rate in a self-managed economy such as Yugoslavia—where the effective price of capital has been kept artificially low by interest rate controls and where the effective price of labor has been inflated by surplus profits and rents earned by existing enterprises—than in a capitalist economy, such as the U.S., where aggregate demand policy has been formulated to keep unemployment rates within some politically acceptable range. Because of the presumption of a higher structural unemployment level in Yugoslavia the coincidence of unemployment rates, which are "high" by the standards used in other economies, and rapid rates of inflation cannot be taken as reliable evidence of the strength of cost-push pressures in the Yugoslav economy relative to these pressures in other economies.

Because of the many difficulties associated with cross-country comparisons of unemployment levels and rates of inflation, it is impossible to document meaningful differences in the position of the Phillips curves for the three economies considered. However, comparative statements about the shape or slope of the Phillips curves
can be made, and such comparisons do yield some tentative conclusions about the policy choices facing decision-makers in each of these economies. The slope of the Phillips curve is defined as the derivative of the rate of inflation with respect to changes in the unemployment variable. Because the inverse of the unemployment rate is used in all of the estimated equations, the slope of the Phillips curve can be defined as

$$\partial p_t^m / \partial (U_t^{-1}) = (-\hat{b}/U_t^2)$$

(4.3)

where $\hat{b}$ is the estimated coefficient of the unemployment term appearing in the tradeoff equation. The slope of the short-run Phillips curve is understood to measure the responsiveness of the rate of inflation to variations in the unemployment rate in the short run when initial conditions and recent price and wage history still exert an influence on the policy options facing the government. In contrast, the slope of the long-run Phillips curve, depending as it does on the estimated coefficient of the unemployment term in the steady state solution of the tradeoff equation, is understood to measure this responsiveness once the effects of initial conditions and exogenous shocks have disappeared. Therefore, while the slope of the short-run Phillips curve is probably more relevant for short-run policy formation, the slope of the
long-run Phillips curve yields information about the underlying structure of the economy.

Table 4.5 contains the slopes of the short-run and long-run Phillips curves derived from the equation systems presented in table 4.4. The long-run Phillips curves are themselves calculated by finding steady state solutions for the tradeoff equations. In all cases, such solutions are stable, and support the existence of a long-run tradeoff between price inflation and unemployment in the economies considered. A comparison of the slopes of the short-run and long-run Phillips curves suggests the following two conclusions.

1. Starting from a given level of unemployment, a reduction in the unemployment rate increases the rate of inflation by approximately the same amount in Chile and Yugoslavia in both the short run and the long run. Given the standard errors underlying the calculations presented in table 4.5, and the basic similarity of the Chilean and Yugoslav figures presented there, it is impossible to draw any further distinction between the slope of the Phillips curve in Chile and Yugoslavia. On the other hand, for all of the equation systems the slope of the Phillips curve in Yugoslavia is two to three times the slope of the Phillips curve observed in the U.S. economy during the period of observation. Thus, a reduction in
TABLE 4.5

THE SLOPES OF THE SHORT-RUN AND LONG-RUN PHILLIPS CURVES

<table>
<thead>
<tr>
<th>Country</th>
<th>Equation number in table 4.4</th>
<th>Short-run</th>
<th>Long-run</th>
</tr>
</thead>
<tbody>
<tr>
<td>For a given unemployment rate:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.</td>
<td>(1)-(2)</td>
<td>$-6.9/U_t^2$</td>
<td>$-7.3/U_t^2$</td>
</tr>
<tr>
<td>Chile</td>
<td>(3)-(4)</td>
<td>$-27.23/U_t^2$</td>
<td>$-30.18/U_t^2$</td>
</tr>
<tr>
<td>U.S.</td>
<td>(5)</td>
<td>$-13.10/U_t^2$</td>
<td></td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>(6)-(7)</td>
<td>$-25.59/U_{t-1}^2$</td>
<td>$-31.13/U_{t-1}^2$</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>(8)-(9)</td>
<td>$-25.90/U_{t-1}^2$</td>
<td>$-31.40/U_{t-1}^2$</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>(10)-(11)</td>
<td>$-27.78/U_{t-1}^2$</td>
<td>$-35.47/U_{t-1}^2$</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>(12)-(13)</td>
<td>$-28.79/U_{t-1}^2$</td>
<td>$-37.13/U_{t-1}^2$</td>
</tr>
</tbody>
</table>

For the average unemployment rate during the period of observation:

<table>
<thead>
<tr>
<th>Country</th>
<th>Equation number</th>
<th>Slope (short-run)</th>
<th>Slope (long-run)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td></td>
<td>$-6.9/(4.63)^2$ = -.32</td>
<td>$-7.3/(4.63)^2$ = -.34</td>
</tr>
<tr>
<td>Chile</td>
<td></td>
<td>$-27.23/(5.08)^2$ = -1.06</td>
<td>$-30.18/(5.08)^2$ = -1.17</td>
</tr>
<tr>
<td>U.S.</td>
<td></td>
<td>$-13.10/(5.09)^2$ = -.51</td>
<td></td>
</tr>
<tr>
<td>Yugoslavia</td>
<td></td>
<td>$-25.59/(5.69)^2$ = -.79</td>
<td>$-31.13/(5.69)^2$ = -.96</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td></td>
<td>$-25.90/(5.69)^2$ = -.80</td>
<td>$-31.40/(5.69)^2$ = -.97</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td></td>
<td>$-27.78/(5.69)^2$ = -.86</td>
<td>$-35.47/(5.69)^2$ = -1.10</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td></td>
<td>$-28.79/(5.69)^2$ = -.89</td>
<td>$-37.13/(5.69)^2$ = -1.15</td>
</tr>
</tbody>
</table>

unemployment starting from a given unemployment rate appears to call forth a larger increase in price inflation in Yugoslavia than it does in the U.S. In this sense one may argue that the tradeoff between price stability and
full employment has been relatively worse in both Chile and Yugoslavia than in the U.S., during the time periods considered.

2. The fact that the slopes of the short-run and long-run Phillips curves are relatively steeper in Chile and Yugoslavia suggest that inflationary bias has been more severe in these economies than in the U.S. As traditionally defined and as defined here, inflationary bias is said to exist whenever the decline in price inflation called forth by an increase in the unemployment rate is less than the increase in inflation called forth by a reduction in the unemployment rate. Defined in this way the degree of inflationary bias depends on the estimated coefficient of the unemployment term in the tradeoff equation. The larger this coefficient, the greater in absolute terms will be the difference between the increase in inflation accompanying reductions in the unemployment rate and the decline in inflation accompanying increases in the unemployment rate. On this criterion, both Chile and Yugoslavia have been subject to considerably more inflationary bias than the U.S.

The conclusions reached here are stated under the assumption that the same unemployment rate prevails in each economy. However, if the actual values of the unemployment rate have differed significantly across the
economies, then such conclusions are not relevant for those positions on the short-run or long-run Phillips curves which are likely to characterize these economies at given points in time. Therefore, the slopes of the long-run and short-run Phillips curves are also calculated for each economy at the average value of the unemployment rate during the period of estimation. Fortunately, these average values--5.08% in Chile (1961III-1968IV), 4.63% in the U.S. (1947-60), 5.09% in the U.S. (1951-60) and 5.69% in Yugoslavia (1962II-1972II)--are quite similar and support the same conclusions--namely that variations in the level of excess labor demand have called forth nearly equal increases in the inflation rate in Chile and Yugoslavia and that both of these economies have been subject to considerably more inflationary bias than the U.S. in both the short run and the long run.

Conclusions
The empirical results presented in this chapter indicate that despite its unique institutions, the Yugoslav economy has been characterized by a tradeoff between inflation and unemployment which does not significantly differ from tradeoffs observed in economies of similar development levels. These results call into question the hypothesis that the Yugoslav inflation has been the product of workers' control over prices and wages. The
similarity of the inflation-unemployment tradeoff in Chile and Yugoslavia is simply not consistent with this hypothesis since workers' control did not exist in Chile during the period considered. Admittedly, this conclusion is based on results which are subject to severe problems of data measurement and data comparability across economies; nonetheless, these results do provide a rudimentary test for the crudest wage-push theories of the Yugoslav inflation. The theories fail the test.
Appendix A.4.1

Part 1. A description of the sources of data and construction of the variables used in the regressions.

Wages

The basic wage rate series used is average net receipts (prosecni neti licni dohoci) per worker employed in the economy (zaposlenih u privredi) during each quarter. The series is calculated by summing the monthly observations on nominal receipts to get quarterly receipts. This procedure is followed because certain components of worker quarterly income vary from month to month. For example, bonus payments are likely to be added to incomes at the end of the quarter rather than to be spread out evenly across the three months of the quarter. The monthly observations are taken from Indeks, the monthly statistical bulletin of the Yugoslav Federal Statistical Office (SZS), from the table entitled "Zaposlenost, Zaposljavanje i Primanja." The wage measure includes both basic wages and all other receipts of the worker during each quarter, including fringe benefits, profits shares, bonus payments, etc. The series covers only workers employed in the so-called "economic sector" which includes industry and mining, agriculture, forestry, trade, transportation and communications, construction and crafts. This sector covers about 83% of the total labor force and employed in the social (nationalized) sector which is subject to the rules and regulations of self-management legislation.

Unemployment

The unemployment rate variable is defined in the text. Mencinger calculates the series using data on employment in the social sector (zaposleno osoblje u privredi) and vacancies (slobodna radna mesta) and job seekers (lica koja traze zaposlenje) registered at the Federal Employment Office (Savezni Biro za Poslove Zaposljavanja). The data are taken from Indeks. Mencinger seasonally adjusts his series using the following formula

\[ U = U + .01239(QTR.1) - .00839(QTR.2) - .01327(QTR.3) \]

where QTR.1 is a seasonal dummy taking the value one during the second quarter and zero otherwise, QTR.2 is a seasonal dummy taking the value one during the third quarter
and zero otherwise, and QTR.3 is a seasonal dummy taking the value one during the fourth quarter and zero otherwise. The coefficients of the dummy variables are estimated using ordinary least squares.

Cost of Living

The cost of living is measured by the overall retail price index (opsti indeks cena na malo). The cost of living series is taken from Indeks. Rates of change in the index are measured by overlapping four quarter rates of growth.

Producer Prices

The producer price index is measured by the overall index for producer prices in the industrial sector (indeks cena proizvodaca, industrijski proizvodi ukupno). The producer price series is taken from Indeks. Rates of change in the index are measured by overlapping four quarter rates of growth.

Agricultural Prices

The agricultural price index is measured by the overall index for producer prices in agriculture (indeks cena proizvodaca, poljoprivredni proizvodi ukupno). Rates of change in the index are measured by overlapping four quarter rates of growth.

R_t (Profits per Worker)

Profits per worker are measured as the difference between total receipts in the social sector (naplacenarealizacija) and total material costs in the social sector (placanju po osnovu materijal i usluga) divided by the total number employed in the social sector of the economy (zaposleni u privredi). The series for both total receipts and total costs are taken from the Statisticki Bilten of the Social Accounting Service (Sluzbe Drustvenog Knjigovodstva), table 14, various issues. The R_t series is seasonally adjusted using the method of ratio of the series to a moving average. The four seasonal factors are .834, .969, 1.020, 1.2121 (The first factor is the seasonal ratio for the first quarter of data, the second factor corresponds to the second quarter and so on.) ΔR_t is the absolute quarter to quarter change in the adjusted R_t series.
CUₜ (Capacity Utilization Index)

The capacity utilization series was calculated by Mencinger as the ratio between an index of realized industrial production and an index of maximum or potential production in each quarter. Maximum industrial production is obtained by assuming monotonic growth in capacity during the period of observation. The CU index, like the index of industrial production, is a weighted average of indexes of production and maximum production for each of 29 industrial sectors, where the weight of each sector is its share in gross material product in 1969. Mencinger's series is taken from worksheets provided by him at the Ekonomski Institut. The series was seasonally adjusted using the method of ratio of the series to a moving average. The four seasonal factors are 1.0001, 1.0005, .9966, .9998. ΔCUₜ is the absolute quarter to quarter change in the adjusted CUₜ series.

Mt (Quarterly Rates of Change in the Money Supply)

The money supply is defined as the sum of currency and deposit money and corresponds to the U.S. definition of the M₁ series. The money supply figures were supplied by the National Bank of Yugoslavia and have since appeared in published form in G. Macesich and D. Dimitrijevic, Money and Finance in Contemporary Yugoslavia (New York: Praeger 1973), appendix C, "M₁, according to the 1966 definition." Rates of change in the money supply are measured by overlapping four quarter rates of growth.
Part 2. Variables for the period spanned by the regressions

<table>
<thead>
<tr>
<th>Year</th>
<th>$P_t$</th>
<th>$C_t$</th>
<th>$W_t$</th>
<th>$P^f_t$</th>
<th>$R_t^{(a)}$</th>
<th>$U_t^{(a)}$</th>
<th>$CU_t^{(a)}$</th>
<th>$M_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962I</td>
<td>.8</td>
<td>9.4</td>
<td>9.0</td>
<td>13.9</td>
<td>.43</td>
<td>4.79</td>
<td>8.39</td>
<td>23.1</td>
</tr>
<tr>
<td>II</td>
<td>-.2</td>
<td>9.8</td>
<td>9.1</td>
<td>14.3</td>
<td>.80</td>
<td>5.03</td>
<td>8.35</td>
<td>21.1</td>
</tr>
<tr>
<td>III</td>
<td>.1</td>
<td>6.3</td>
<td>10.8</td>
<td>20.8</td>
<td>.76</td>
<td>5.17</td>
<td>8.46</td>
<td>32.4</td>
</tr>
<tr>
<td>IV</td>
<td>1.0</td>
<td>4.7</td>
<td>13.3</td>
<td>13.4</td>
<td>.97</td>
<td>5.12</td>
<td>8.50</td>
<td>35.0</td>
</tr>
<tr>
<td>1963I</td>
<td>.8</td>
<td>3.9</td>
<td>14.8</td>
<td>14.1</td>
<td>.59</td>
<td>4.85</td>
<td>8.61</td>
<td>26.5</td>
</tr>
<tr>
<td>II</td>
<td>.7</td>
<td>1.9</td>
<td>18.0</td>
<td>9.3</td>
<td>.77</td>
<td>4.48</td>
<td>8.87</td>
<td>39.7</td>
</tr>
<tr>
<td>III</td>
<td>.1</td>
<td>4.9</td>
<td>16.2</td>
<td>10.8</td>
<td>.88</td>
<td>4.02</td>
<td>9.04</td>
<td>41.9</td>
</tr>
<tr>
<td>IV</td>
<td>.6</td>
<td>4.4</td>
<td>17.0</td>
<td>11.8</td>
<td>1.14</td>
<td>3.62</td>
<td>9.15</td>
<td>26.9</td>
</tr>
<tr>
<td>1964I</td>
<td>2.3</td>
<td>4.4</td>
<td>19.5</td>
<td>7.8</td>
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(a) not seasonally adjusted.
Footnotes

1. See J. Meade, "The Theory of Labor-Managed Firms and Profit Sharing," and the OECD Annual Reports on Yugoslavia for more on this hypothesis.


5. Ibid.

6. Of course, the unique institutions of the Yugoslav economy might also be expected to affect the proper choice of explanatory variables, but in order to maximize the comparability of my results with the results obtained for other economies I prefer to consider only those variables which have been found to be significant for these economies. Therefore, I will not attempt to find additional variables which might provide the best explanation of price and wage changes in Yugoslavia during the period considered.

7. See OECD, A Study of Inflation in Member Countries, 1971, Statistical Appendix and Results. Solow also cites evidence supporting the conclusion that in major industrial economies, including the U.S., Great Britain, Sweden, and Canada, the elasticity of wage change with respect to price change is significantly less than one. See Solow, "Recent Controversy on the Theory of Inflation," p. 8.

8. See Solow, ibid., p. 13 for a summary of attempts to measure the expected rate of inflation by a weighted average of past rates of inflation in the U.S. For more recent results of similar attempts see S. J. Turnowsky and M. L. Wachter, "A Test of the Expectations Hypothesis Using Directly Observed Wage and

9. Many workers' councils in Yugoslavia set a fixed nominal wage schedule prior to the production period, which is often taken to be one year. Therefore, unexpected price increases during that period may reduce the real wage below its anticipated level. However, if a threatened reduction in the real wage were excessive, it seems probable that the councils would re-negotiate their wage decision before the end of the production period.


13. See J. Mencinger, Simulacioni Model Inflacije, 1959-1970 (Ekonomski Institut, Ljubljana 1972), p. 7 for a discussion of the excess labor supply series used here. It is important to note that in both the Mencinger series and in the official unemployment rate series, excess labor supply is measured as a percentage of total employment in the social sector and total unemployment. Employment in the social sector includes only 54% of those employed in the Yugoslav economy.

14. Mencinger discusses various factors accounting for the upward trend in the unemployment rate series on pages 8-9 of Simulacioni Model Inflacije.


17. Perry's estimates for the U.S. were made using ordinary least squares. Corbo's results are obtained using two-stages least squares. In addition Corbo also tried an instrumental variables approach of the type discussed in the text. The results he obtained are in table 4.2.

18. The money supply is likely to affect prices through the real liquid wealth effect influencing the level of consumption and the interest rate effect influencing investment and consumption. Both effects will lead to price changes via changes in the unemployment and capacity utilization variables. The use of money supply growth rates as instruments rests on the assumption that these growth rates do not depend on other endogenous variables in the larger system to which the wage and price equations belong.

19. Because of time and financial constraints the search for the best value of the autocorrelation coefficient was carried out using intervals of .1 between zero and one.

20. A recent study of price and wage equations of the type examined here indicates that serial correlation may also be built into the residuals as a consequence of measuring the dependent variables as overlapping four quarter rates of growth. See J. C. R. Rowley, and P. A. Wilton, "Quarterly Models of Wage Determination: Some New Efficient Estimates," AER (June 1973), pp. 380-90.

21. I also tried to get at the autocorrelation problem by estimating the best fitting equation forms over two major subperiods ranging from 1962II to 1967IV and from 1968I to 1972II. Unfortunately, because of the limited number of observations in each of these subperiods and because of the high degree of multicollinearity in the independent variables reflecting the sharp cyclical changes in the economy between each of the subperiods considered, the standard errors of the estimators made any reliable statements about the size and significance of the important coefficients impossible.

23. See, for example, the results presented in OECD, A Study of Inflation in Member Countries and R. Bodkin, et al., Price Stability and High Employment, Ottawa 1967.

24. It is impossible to draw any conclusions about the size of the elasticity of prices with respect to wages from the Flanagan results because he fails to report the standard error on the wage term in the price equation.

25. For example, Eckstein and Brimmer report an estimated elasticity of one for prices with respect to wages adjusted for standard growth in average labor productivity. See The Inflation Process in the U.S., p. 4.

26. Mencinger and Bajt argue that the low observed elasticity of prices with respect to wages in Yugoslavia reflects the practice of variable markups whereby enterprises pass on wage increases in the form of price increases when the market permits but finance wage increases by reductions in the share of retained earnings when price increases are not sustainable. See Mencinger, Simulacioni Model Inflacije, p. 19.

27. The insignificance of the profits variable may stem from the inadequacies of the series used to measure this variable. Available Yugoslav statistics do not contain a series on net income, defined as total receipts minus total material expenditures and contractual and tax obligations. According to enterprise accounting practices this net income concept is the correct measure of overall profitability which guides the firm in its decisions about wage payments and retained earnings. However, a series measuring net income in this manner is not available and in its absence I was forced to use a profits measure, defined as gross receipts minus gross material expenditures. Because of frequent changes in taxation policy during the sixties this measure probably fails to capture some important changes in realized enterprise net income and this failure may explain the insignificance of the estimated coefficients.

28. Some recent statistical studies of the Yugoslav inflation carried out by J. Mencinger also fail to establish a significant link between profits and wage growth. Mencinger does not test the Perry model of wage determination discussed here but instead tries
to relate annual percentage growth in wages to annual percentage changes in enterprise profits, the expected rate of inflation, and the unemployment rate. He consistently fails to find a significant coefficient for his profits indicator (measured by the annual rate of change in profits, which in turn are measured as in footnote 27). Mencinger argues that the insignificance of the profits indicator is probably the result of cyclical variations in the share of personal incomes in total enterprise net income. This explanation is supported by Bajt's recent study of inflation in which he notes that the share of personal incomes in total net income oscillates over the cycle with increases in net income going into savings during the upswing and into worker incomes during the downswing. See A. Bajt, Gospodarska Gibanja (Ekonomski Institut, Ljubljana, June 1972).

29. Differences in the price indexes employed undoubtedly affect the cross-country comparability of the results in the manner discussed in the introduction to this chapter.


33. These conditions are discussed by Vanek in an unpublished paper written with P. Miovic entitled, "Explorations into the 'Realistic Behavior' of a Yugoslav Firm," (Cornell Economics Department 1971), p. 32.
CHAPTER 5

MONEY SUPPLY INCREASES AND THE
YUGOSLAV INFLATION

Introduction

Both theoretical and empirical studies of the inflation process in a number of economies suggest that a sustained inflation requires a sustained increase in the money supply. This observation appears to be borne out by the experience of the Yugoslav economy during the 1962-72 period when rapid rates of growth of the money supply accompanied rapid rates of growth of the aggregate price level. Therefore, any attempt to explain the recent cycles of inflation in Yugoslavia necessitates a consideration of two related questions: first, why have the Yugoslav monetary authorities adopted policies conducive to rapid increases in the money supply; and second, how have changes in aggregate monetary conditions influenced aggregate price and output performance. In this chapter I develop some preliminary answers to the second of these questions by examining the theoretical relationships between changes in monetary conditions and
changes in economic activity which can be expected to prevail in the Yugoslav economy and by testing some of the simple hypotheses derived from a study of these relationships.

**A Basic Static Macroeconomic Model of the Yugoslav Economy**

The standard textbook macroeconomic model for a capitalist economy is summarized by the well-known "IS-LM" formulation of Keynesian economics. According to this formulation the determination of equilibrium real income and interest rate levels depends on the interaction between supply and demand in real product markets, summarized by the IS relationship, and supply and demand in the money market, summarized by the LM relationship. The "IS-LM" model and the assumptions on which it is based can be shown to be sufficiently general to be applicable to many economies regardless of their unique institutions. In particular, it can be demonstrated that the existence of workers' councils at the enterprise level in the Yugoslav economy is consistent with a modified IS-LM formulation which leads to the usual conclusions about the role of the money supply in the generation of inflation.

**The Simple Keynesian Model**

The complete Keynesian model of income determination distinguishes three separate markets: a market for
money, a market for labor and a market for real output. The conditions of supply and demand on each of these mar-
kets are given by the following set of equations:\(^1\)

1. **Output Supply**

\[ y = f(L, K_0) \]

where \( f \) is the aggregate production function, \( K_0 \) is the available capital stock, fixed in the short run, \( L \) is labor employment and \( y \) is the level of real output.

2. **Output Demand**

\[ C(y) + I(r) = y \]

where \( C \) is real consumer demand for output, assumed to depend positively on the level of real income, \( I \) is real investment demand, assumed to depend inversely on the interest rate, and \( r \) is the interest rate.

3. **Money Supply**

\[ M^S = M_0 \]

where \( M_0 \) is the nominal money supply, assumed to be exogenously determined by the monetary authorities.

4. **Money Demand**

\[ M^D = l(y, r) \]

where \( M^D \) is the demand for money, assumed to depend
positively on the level of real income and negatively on the interest rate.

5. **Labor Demand**

\[ f_1(L, K_0) = \frac{w}{p} \]

where \( w/p \) is the real wage, \( w \) is the nominal wage, \( p \) is the aggregate price level, \( f_1 \) is the marginal product of labor, and labor demand is assumed to depend on the principle of profit maximization.

6. **Labor Supply**

\[ w = w_0 + w(L) \]

where \( w_0 \) is some rigid level of nominal wages; once this level is reached, wages will remain constant regardless of the level of unemployment.²

Combining equations (1) and (2) into an equilibrium condition for the product market yields the so-called IS schedule, summarizing combinations of interest rates and real income levels at which the demand for output just equals the supply. Similarly, combining equations (3) and (4) into an equilibrium condition for the money market yields the so-called LM schedule summarizing combinations of interest rates and real income levels at which the demand for money just equals the supply. The intersection of these two schedules thus yields that
interest rate and output configuration at which the money market and the product market are simultaneously in equilibrium. Associated with this equilibrium position are an equilibrium price level, an equilibrium real wage and an equilibrium employment level.

Equations (1)-(6) contain several behavioral assumptions about the activity of different economic agents. Therefore, to judge the validity of the Keynesian model for a given institutional setting it is first necessary to determine the validity of such assumptions for that setting. In particular, to evaluate the relevance of the Keynesian model for a market socialist economy, such as Yugoslavia, where enterprises are directed by workers' councils, it is first necessary to determine whether such an economy can be assumed to function according to Keynesian behavior rules. This issue has already been examined by B. Ward and J. Vanek in their theoretical studies of the microeconomic and macroeconomic properties of a self-managed economy. Both authors build models which suppose that while the Keynesian behavioral assumptions for the product and money markets remain valid in such an economy, the assumptions about the functioning of the labor market must be modified to reflect the special form of enterprise objective functions. If one assumes, as Vanek and Ward do, that each
self-managed enterprise maximizes net income per worker, as defined in chapter 3, then equations (5) and (6) of the Keynesian model must be replaced by the following condition for labor employment equilibrium:

7. Labor Market Equilibrium

\[ pf_1(L, K_0) = (py - p_k K_0) / L \]

where \( p_k \) is the money price of a unit of capital.

This condition implies a backward bending supply curve for aggregate output and the possibility of instability in the product market.⁴ Vanek, who has studied the comparative statics properties of a model incorporating equation (7), analyzes his conclusions on the assumption that the initial equilibrium position is a stable one. He defends his assumption by arguing that "in a realistic situation, an unstable equilibrium could never exist. Thus, for purposes of comparative statics and economic policy analysis, the only equilibrium to be considered is the stable one."⁵

If one accepts Vanek's assumption about the existence of an initial stable equilibrium in a self-managed economy defined by equations (1)-(4) and (7), the effects of an expansion of the money supply on the aggregate price level, aggregate real output and employment, and the level of the interest rate can be
calculated. The comparative statics results are presented in table 5.1, along with the results obtained for the simple Keynesian model defined by equations (1)-(6). The effects of a money supply increase in the pure co-op world are an increase in product price, a reduction in the interest rate, and a reduction in labor employment and output. Thus, under the assumptions of the co-op model, an expansionary monetary policy does not act to increase output and reduce unemployment but rather acts to increase price while reducing both output and employment.

**TABLE 5.1**

**EFFECTS OF AN INCREASE IN THE MONEY SUPPLY UNDER VARIOUS ASSUMPTIONS ABOUT ENTERPRISE BEHAVIOR**

<table>
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<th>Effects of an increase in the money supply on</th>
<th>Price</th>
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<td>Horvat profit-maximizer</td>
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The counter-intuitive nature of the results obtained with the pure co-op model indicates that some modification of equation (7) is needed to yield a more realistic macroeconomic model for a labor-managed economy. Two lines of attack on this issue have appeared in the literature. Domar has illustrated that the backward
bending supply curve on the enterprise and industry level—and hence, via aggregation, on the national level—disappears once conditions of labor availability are explicitly introduced into the model. Domar presents the following argument:

(the pure model) assumes that labor input can be varied by changing prices and rents in order to maximize the dividend rate (net income per worker), a highly unlikely situation once the co-op has been organized. Surely, the co-op by its very nature cannot admit or expel members at will. On the basis of this conclusion Domar analyzes two possible cases: the case in which both the number of workers and the number of hours of work contributed by them are fixed in the short run and the case in which the co-op faces an upward sloping labor supply schedule. In the first case, which is also examined by Vanek in an unpublished paper on the macroeconomic properties of a self-managed economy, the assumption of a fixed labor supply in each co-op, and hence in the economy as a whole, implies that real output is fixed in the short run. In this case an increase in the money supply causes prices to increase but has no effect on equilibrium output. In the second less restrictive case where there is some elasticity in labor input, the effects of an increase in the money supply on output and price are exactly the same as they are in a capitalist economy defined by equations (1)-(6). Similar conclusions are reached if one replaces the pure
co-op theory of firm behavior with the Horvat profit-maximization theory discussed in chapter 3. Horvat's theory implies that aggregate labor demand in the self-managed economy is guided by the principle of profit maximization which leads to an aggregate labor demand function of the type contained in equation (5). Labor supply conditions depend on the nominal wage level set by self-managed enterprises in advance of the production period. If the advance nominal wage plays the role of a minimum nominal wage, then the labor supply function is equivalent to equation (6). If, instead, the advance nominal wage prevails regardless of levels of employment, equation (6) is replaced by

\[ w = w_0 \]  

(6')

In either case the traditional Keynesian conclusions about the effects of an increase in the money supply on prices and output apply. These results and the results obtained under the pure co-op and Domar co-op models are summarized in table 5.1.

**Credit Rationing in the Simple Keynesian Model**

In static Keynesian models interest rates are assumed to adjust to equilibrate both the product and money markets. Under this assumption there exists a single short-run equilibrium rate of interest which
simultaneously measures the return to lenders (savers), the cost to borrowers (investors), and the internal marginal rate of return for all spending units. Such an assumption may be unwarranted in an economy like Yugoslavia where interest rate increases are limited by an official policy of interest rate ceilings.\(^8\) As long as the interest rate fixed by policy falls short of the equilibrium interest rate, the net flow demand for funds will exceed the net flow supply of funds and the two can be brought together only by a system of rationing the available supply among competing borrowers.

Although it is difficult to determine the exact relationship between the interest rates which have prevailed in the Yugoslav money market and the interest rates required to clear these markets without rationing, rudimentary evidence suggests that the prevailing rates have consistently fallen below the equilibrium ones. For example, the data presented in table 5.2 indicates that the real rate of interest, corrected for the rate of inflation, has frequently been negative. In an equilibrium setting the real rate of interest should just equal the marginal rate of return on capital which is always non-negative. In fact, Vanek has estimated the rate of return on real capital in Yugoslavia to be around 9\%, and this estimate has been re-affirmed by V. Franković who
TABLE 5.2
SELECTED INTEREST RATES IN YUGOSLAVIA

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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling rates for bank loans to enterprises(^a)</td>
<td>10.0</td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
<td>8.0</td>
<td>8.0</td>
<td>10.0</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>Sight savings deposits</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>Time savings deposits</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>7.0</td>
<td>7.0</td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Rate of inflation in the retail price index(^b)</td>
<td>10.0</td>
<td>6.8</td>
<td>4.3</td>
<td>8.2</td>
<td>28.3</td>
<td>23.5</td>
<td>6.0</td>
<td>4.5</td>
<td>7.5</td>
<td>10.0</td>
<td>18.0</td>
</tr>
</tbody>
</table>


\(^b\) Annual rates of inflation calculated using Retail Price Index from *SZS, SG* (1972), p. 262, table 121-4.

has calculated a 12% rate of return on capital in the Yugoslav industrial sector.\(^9\) Additional evidence about the possible magnitude of the market-clearing interest rate in Yugoslavia is provided by the fact the Yugoslav firms are willing to pay rates of up to 30% for loans negotiated in foreign financial markets.\(^10\) Such evidence indicates that prevailing interest rates in Yugoslav money markets have fallen far short of equilibrium rates.

In a situation where interest rates cannot adjust
to clear markets, the flow of borrowing and borrowers' (investors') demand for goods is limited not by the cost of borrowing but by the flow of funds made available to borrowers by primary lenders (savers). Also, the single interest rate of the perfect Keynesian market model is replaced by a plurality of rates, one for each spending and money-holding unit. Each decision to borrow, invest, or hold money depends on the shadow rate of interest applicable to the individual spender. Unfortunately, these shadow rates are not observable from prevailing market rates. However, some measure or index of shadow rates can be derived from the equilibrium conditions for the product market. Solving the equilibrium equation for the product market

\[ C(y) + I(r) = y = f(L, K_0) \]  

(8)

yields \( r_s \), an index of prevailing shadow rates of return in terms of prevailing levels of real income and investment.\(^\text{11}\) This index is expressed formally as

\[ r_s = g(I, y) \]  

(9)

where \( g_1 < 0 \) and \( g_2 > 0 \).

Since the degree of rationing varies from borrower to borrower, \( r_s \) is best interpreted as an average measure of shadow rates among all borrowers.
Using $r_s$, a new "IS" curve can be derived showing the combinations of $r_s$ and $y$ which just equate supply and demand on the product market. The new IS curve is downward sloping, since a higher level of real income makes possible a larger volume of investment which in turn means a lower average rate of return on investment and hence a lower shadow rate of interest. A new "LM" curve can also be derived, showing the combinations of $r_s$ and $y$ equating supply and demand on the money market. This curve will be upward sloping, indicating that as $y$ increases, thereby increasing the demand for money, $r_s$, the shadow opportunity cost of holding money will increase, to keep the total demand for money just equal to the total fixed supply. Equilibrium will be sustained where the new IS curve just intersects the new LM curve.

The new IS and LM functions reveal the effects of an increase in the money supply on the equilibrium output and shadow rate of interest in an economy with credit rationing. To understand the process by which the money supply increase influences the economy it is best to begin with a discussion of how equilibrium is achieved in a model with credit rationing. Spending units may be assumed to make their plans based on a known set of parameters, including expected future income streams, prices, and the prevailing nominal rate of interest, corrected for the
expected rate of inflation. Subject to these parameters, each unit determines its desired level of real spending (real consumption or investment) and real borrowing or lending (real saving) and its desired holdings of cash balances and other liquid assets. These decisions taken in conjunction with existing balance sheet positions yield real flow demands for commodities, assets and money. Once these decisions are made each unit seeks the amount of real financing required for its desired portfolio adjustments; if the prevailing real market rate of interest is below the clearing rate, some of the spending units find their financing requests denied and are forced to alter their demands. In effect, each spending unit is faced with a real shadow rate of interest which depends on the rationing rules adopted in the loanable funds market. Each unit therefore adjusts its desired balance sheet position to equate the marginal rate of return on assets and liabilities with this interest rate. Adjustments lead to a reformulation of real flow demands for goods, assets, and money, and the entire set of such demands for each spending unit at each individual shadow rate of interest yields equilibrium in the economy.12

Now starting from an equilibrium position let the monetary authorities increase the money supply. Additions to the money supply may initially flow through the
banking system\textsuperscript{13} where they result in a relaxation of credit rationing and a consequent expansion of loans. The flow of new money into the economy gradually produces a discrepancy between actual and desired cash balances for each individual money holder. This discrepancy induces each spending unit to adjust its cash holdings to restore balance sheet equilibrium. The portfolio adjustment of cash balances to their desired levels following an increase in the money supply—called the portfolio effect in the following pages\textsuperscript{14}—represents a flow supply of funds and reduces shadow interest rates in one of two ways. First, an individual unit may reduce its unwanted money balances by directly purchasing commodities; in this sense, the rate of return on cash balances now represents the effective shadow interest rate. Since existing cash balances are larger than equilibrium balances, the effective shadow interest rate has fallen, thereby stimulating flow demands for commodities and assets. Alternatively, the spending unit may choose to use excess real cash to purchase other financial assets.\textsuperscript{15} As purchases of such assets increase, bank and intermediary deposits increase as does the banking system's capacity to make loans. Hence, rationing, which is the quantitative counterpart of shadow interest rates, declines. In either case, the reduction in shadow interest rates induces an adjustment of desired balance
sheet holdings and a flow of expenditures for goods and services. The increased expenditure flow leads to an increase in the level of real income and/or an increase in the price level. Eventually, the discrepancy in cash holdings is eliminated as changes in real income, prices, and the prevailing real rate of interest adjusted for the new expected rate of inflation, restore equality between the actual supply of cash balances and the demand for cash balances consistent with prevailing shadow interest rates.

Summarizing the above discussion, we may conclude that the existence of credit rationing and controlled nominal interest rates does not alter the conclusions about the effects of a money supply increase on prices and real income in the simple Keynesian model. Therefore, if we adjust the simple macroeconomic models of the Yugoslav economy described in the first sections of this chapter to allow for the presence of credit rationing on the Yugoslav capital market, we do not change the conclusions about the effects of monetary expansion on prices and output. However, the assumption of fixed interest rates and credit rationing does mean that monetary expansions and contractions may have no observable effect on prevailing market interest rates; instead, changes in the money supply result in changes in shadow interest rates and in the extent of credit rationing on the capital
Money Supply Changes and the Inflationary Process in Yugoslavia

The analysis of the portfolio effects of a money supply increase on shadow interest rates provides a theoretical framework for examining how money supply changes influence real expenditures and the rate of inflation in Yugoslavia. The analysis indicates that starting from an equilibrium position, a money supply increase produces a discrepancy between actual and desired cash balances which stimulates expenditures flows, thereby increasing aggregate nominal income. These relationships could be formalized in a full macroeconomic model of Yugoslavia by estimating a demand for money function to obtain the level of desired cash balances and by measuring the discrepancy between this level and the actual one. The discrepancy could be added directly to the various aggregate expenditure functions to estimate its influence on the flow of nominal income. The problem with this approach is that the estimation of an aggregate demand for money function for the Yugoslav economy is subject to severe data limitations. Most significantly, it is impossible to measure the shadow rate of interest which should appear as part of the opportunity cost of holding money in the money demand equation. In addition, no quarterly figures on
real income are available for the period under consideration. Moreover, the relatively short period examined makes it virtually impossible to test for secular and cyclical shifts in the money demand function.

Because of these difficulties, no attempt is made here to directly measure the discrepancy between actual and desired cash balances. Instead, following the model of the portfolio effects of changes in the money supply, it is assumed that current and lagged percentage changes in the money supply can be used as a proxy for this discrepancy. In other words, the proposition that changes in the money supply produce discrepancies in cash balances and that such discrepancies produce variations in shadow interest rates and expenditure flows is assumed to imply the proposition that changes in the money supply produce variations in the flow of expenditures. This reasoning leads to an hypothesized relationship of the following form

\[ \dot{y}_t = a_1 + i \neq 0 b_{t-1} \dot{M}_{t-1} + \epsilon_t \]  

(5.1)

where \( \dot{y}_t \) is the current percentage change in nominal income and \( \dot{M}_t \) is the current percentage change in the money supply.

Before estimating this relationship it is important to state clearly the assumptions on which it is based.
First, the rationale for employing percentage changes in the money supply as a proxy for changes in shadow interest rates assumes that money supply changes cause interest rate changes rather than vice versa. If instead, interest rate changes cause money supply changes, then the theory on which equation (5.1) rests is no longer appropriate.

An increase in interest rates can induce an increase in the money supply in one of two ways. A higher interest rate may lead banks to economize on excess cash reserves, thereby reducing the reserve-deposit ratio, and may lead the public to switch out of currency into demand deposits, thereby reducing the currency-deposit ratio. Both changes will increase the money supply and therefore imply a positive association between interest rates and the money supply. If this association prevails, then a positive $b_1$ coefficient in equation (5.1) would imply that an increase in interest rates calls forth an increase in nominal income growth. Such an implication does not appear reasonable; therefore, if the estimated coefficients are positive, it seems fair to assume that the line of causality runs from money supply changes to interest rate changes.

The second important assumption underlying equation (5.1) is that money growth occurs independently of current market developments. This assumption is examined
at length in chapter 6. However, the empirical results presented in this chapter indicate that money growth influences nominal income growth with a substantial lag. Therefore, any link running from contemporaneous changes in nominal income to contemporaneous changes in the money supply probably does not significantly bias these results.

The third assumption on which equation (5.1) rests is the assumption of a stable aggregate demand for money function. This assumption seems to be particularly restrictive, since both secular and cyclical shifts in the demand for money may occur, and depending on their direction, may either amplify or mitigate the influence of money supply changes on shadow interest rates. In the extreme, upward shifts in the demand for money can completely offset money supply increases so that there is no reduction in shadow interest rates. Alternatively, downward shifts in the money demand function can exaggerate the effects of a given money supply increase by reducing shadow rates of interest more than they would have been reduced had the demand for money function remained stable.

The only completely satisfactory method for identifying shifts in the money demand function is to directly test for such shifts by estimating a demand function over different subperiods. However, as noted earlier, this approach is ruled out by data limitations.
As a second best solution, then, I will merely try to identify when such shifts may have occurred during the period covered in the estimation of equation (5.1) and I will discuss how such shifts may be expected to influence the statistical results. Graph 1 and table 5.3 provide the necessary data. Both the graph and the table indicate that until mid-1969, velocity tended to move inversely with cycles in the economy as measured by cycles in the growth rate of industrial production. Velocity tended to increase during cyclical contractions in industrial output and to fall during cyclical expansions.\(^{17}\) This pattern is in contrast with patterns observed in the U.S., where velocity apparently conforms to the cycle, rising during cyclical expansions and falling during contractions.\(^{18}\) After mid-1969, velocity continued to show a pronounced tendency to increase, despite more or less steady growth in industrial production. Both the cyclical behavior of velocity before mid-1969, and the secular rise in velocity after 1969 may be consistent with a stable demand for money function since both may be the result of changes in the unobservable opportunity cost of holding cash balances.

Assuming the worst, both the cyclical movements and the secular increase in velocity may represent shifts in the aggregate demand curve rather than movements along a stable demand curve. How are such shifts likely to
### TABLE 5.3
CYCLES IN VELOCITY AND REAL OUTPUT, 1961-72

<table>
<thead>
<tr>
<th></th>
<th>Average annual rate of growth of industrial production</th>
<th>Velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average value: 1961-72</td>
<td>8.55%</td>
<td>6.89</td>
</tr>
<tr>
<td>1961III-1962III</td>
<td>5.88</td>
<td>10.70</td>
</tr>
<tr>
<td>1962IV-1965I</td>
<td>14.80</td>
<td>6.35</td>
</tr>
<tr>
<td>1965II-1968III</td>
<td>3.49</td>
<td>8.52</td>
</tr>
<tr>
<td>1968IV-1969III</td>
<td>11.80</td>
<td>8.61</td>
</tr>
</tbody>
</table>

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**a** Growth rates calculated from an index of industrial production taken from SDK, *Statisticki Bilten*, various issues, pp. 8-9, table 2.

**b** Velocity is measured as the ratio of gross receipts in the social sector and the money supply. This measure was suggested by Bajt as the best indicator of income velocity in the absence of quarterly national income data. The data on quarterly gross receipts in the social sector are taken from SDK, *Statisticki Bilten*, various issues, p. 7, table 1. The money supply figures are taken from worksheets provided by the National Bank and described in appendix A.5.1. The money supply figures include only currency and the equivalent of deposit money in the Yugoslav economy. The velocity figures have been seasonally adjusted using four quarter moving averages.

Influence the estimation of equation 5.1? On balance, the cyclical variations serve to offset the effects of monetary growth on shadow interest rates. Thus, in expansionary phases, when the money supply is increasing, velocity is falling, and if that implies a rightward shift
Cycles in Velocity and Industrial Growth

\( V \) = Receipts in the social sector/money supply (moving averages)

\( I \) = Annual rate of growth of industrial production

Data sources: See table 5.3
in the demand for money function, then some of the money supply increase will be willingly absorbed into portfolios, thus reducing the possible discrepancy between real and desired cash balances. In contractionary phases, the reverse is true; as the monetary authorities reduce the rate of growth of the money supply, the demand for money shifts downward, reducing desired cash balances and alleviating pressures on shadow interest rates caused by slowing monetary growth. Thus, if cyclical shifts in the demand for money function have occurred then they will bias downward the effect of money supply changes on shadow interest rates, or in other words, they will reduce the sum of the $b_i$ coefficients in equation (5.1) below what it would have been in the absence of such shifts. The effect of the secular increase in velocity in the post-1969 period will be the reverse. During this period, when money supply growth was substantial, a leftward shift in the demand for money function would reinforce the effects of money supply increases on shadow interest rates. If such a shift occurred the sum of the $b_i$ coefficients will overstate the influence of monetary growth on nominal income growth. To the extent that these cyclical and secular biases cancel out, the estimated coefficients will yield a correct measure of how money supply changes influence economic activity.
Money Supply Changes and Nominal Income Changes:
The Empirical Results

Before proceeding to estimate equation 5.1, some hypotheses about the expected pattern of the $b_i$ coefficients should be examined. Assuming exogenous increases in the money supply, this pattern depends on how real cash balances adjust to their final equilibrium value. In a world of full employment where all of the money income change is localized in prices, the pattern of the $b_i$ coefficients and their cumulative sum depends on the income elasticity of the demand for money. If this elasticity is one, the $b_i$ coefficients can be expected to rise to some positive maximum and to turn negative so that their cumulative sum is approximately one. The overshooting of nominal income growth implied by this pattern stems from the lagged response of nominal income to an exogenous increase in the money supply. Starting from an equilibrium position where actual and desired cash balances are equal, real income is constant, and the rate of growth of prices just equals the rate of growth of the money supply, an increase in the rate of growth of the money supply causes the rate of growth of prices to adjust. However, price growth adjusts with a lag so that initially, the rate of growth of the money supply exceeds the rate of growth of prices. Therefore, before the final new equilibrium is reached, the rate of growth of prices must exceed the rate of growth of
the money supply to make up for the adjustment lag. At
the new equilibrium the rate of growth of prices again
equals the rate of growth of the money supply and all other
conditions remain unchanged.19

The simple pattern of positive and negative $b_i$'s
is no longer necessary once changes in real income and
nonunitary elasticities are permitted. Consider what
happens when the income elasticity of the demand for money
is less than unity. Here the cumulative sum of the $b_i$'s
will be greater than one because as nominal income grows,
the nominal income/money ratio declines, indicating that
the cumulative sum of percentage changes in nominal income
exceeds the cumulative sum of percentage changes in the
money supply. Alternatively, consider real income growth
as an adjustment to percentage changes in the money supply.
With real income growing, the natural rate of interest
may decline, causing a reduction in the real shadow rate
of interest, so that in the new equilibrium, spending units
will hold larger cash balances relative to the level of
their nominal incomes. In this case, the cumulative sum
of percentage changes in nominal income will fall short
of the cumulative sum of percentage changes in the money
supply and the sum of the $b_i$ coefficients will be less
than one. Finally, consider the case which is most
appropriate for the Yugoslav economy where both percentage
changes in real income and percentage changes in prices have accompanied percentage changes in the money supply. With fixed nominal interest rates, percentage changes in prices have implied reductions in the real market rate of interest. A priori, we can expect this price effect to work to reduce the equilibrium value of the cash balance/income ratio, while real income growth can be expected to increase its value. Consequently, it is impossible to make any definite prediction about the cumulative value of the $b_i$ coefficients estimated for equation 5.1.

Keeping in mind these conclusions, we can examine the empirical results. Equations of form 5.1 are estimated for three different periods using an Almon polynomial distributed lag of the fourth degree with no endpoint constraints. Each equation is estimated to allow for lagged effects of percentage changes in the money supply over a period of three years (12 quarters). The results of the estimation procedure are reported in table 5.4. Table A.5.1 of the appendix to this chapter contains the data employed in the estimation. Percentage changes in nominal income are measured by percentage changes in an index of nominal income, defined as the product of an index of industrial production and an index of retail prices.

The first row of table 5.4 presents estimates of
TABLE 5.4

REGRESSIONS OF THE RATE OF GROWTH OF NOMINAL INCOME ON THE RATE OF GROWTH OF THE MONEY SUPPLY

<table>
<thead>
<tr>
<th>Equation number</th>
<th>Explanatory Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.1</td>
<td>C R ( *M_t ) ( *M_{t-1} ) ( *M_{t-2} ) ( *M_{t-3} ) ( *M_{t-4} )</td>
</tr>
<tr>
<td></td>
<td>10.0798 26.18 -.0704 .0687 .1138 .1090 .0874</td>
</tr>
<tr>
<td></td>
<td>(3.86) (0.0842) (0.0390) (0.0501) (0.0359) (0.0267)</td>
</tr>
<tr>
<td></td>
<td>( *M_{t-5} ) ( *M_{t-6} ) ( *M_{t-7} ) ( *M_{t-8} ) ( *M_{t-9} ) ( *M_{t-10} ) ( *M_{t-11} )</td>
</tr>
<tr>
<td></td>
<td>.0706 .0693 .0831 .1002 .0981 .0426 -.1112</td>
</tr>
<tr>
<td></td>
<td>(.0346) (.0355) (.0287) (.0355) (.0471) (.0343) (.0873)</td>
</tr>
</tbody>
</table>

Period of Estimation: 1962I-1972II

\( R^2 = .83 \)

Mean Lag = 4.86

\( \frac{1}{11} \sum_{i=0}^{11} b_{t-i} = .66 \)

Standard Error of Lag = 1.22

Standard Error = .12

| R.2             | C R \( *M_t \) \( *M_{t-1} \) \( *M_{t-2} \) \( *M_{t-3} \) \( *M_{t-4} \) |
|-----------------| 3.64 18.54 -.0169 .0302 .0581 .0745 .0850 |
|                 | (3.75) (.0889) (.0472) (.0513) (.0408) (.0347) |
|                 | \( *M_{t-5} \) \( *M_{t-6} \) \( *M_{t-7} \) \( *M_{t-8} \) \( *M_{t-9} \) \( *M_{t-10} \) \( *M_{t-11} \) |
|                 | .0929 .0996 .1043 .1042 .0942 .0673 .0142 |
|                 | (.0395) (.0402) (.0360) (.0400) (.0485) (.0438) (.0893) |

Period of Estimation: 1962I-1972II

\( R^2 = .89 \)

Mean Lag = 6.21

\( \frac{1}{11} \sum_{i=0}^{11} b_{t-1} = .81 \)

Standard Error of Lag = 1.56

Standard Error = .81

\( \rho = .6 \)

| R.3             | C R \( *M_t \) \( *M_{t-1} \) \( *M_{t-2} \) \( *M_{t-3} \) \( *M_{t-4} \) |
|-----------------| 6.91 24.44 -.0542 .0670 .0840 .0601 .0398 |
|                 | (3.40) (.085) (.0408) (.0578) (.0385) (.0243) |
Table 5.4--Continued

<table>
<thead>
<tr>
<th>Equation Number</th>
<th>Explanatory Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M_{t-5}$</td>
<td>$M_{t-6}$</td>
</tr>
<tr>
<td>.0485</td>
<td>.0925</td>
</tr>
<tr>
<td>(.0370)</td>
<td>(.0403)</td>
</tr>
</tbody>
</table>


$R^2 = .939$  Mean Lag = 5.49  \[ \sum_{i=0}^{11} b_{t-1} = .75 \]
D.W. = 1.7  Standard Error of Lag = 1.15  Standard Error = .104

R.4  C  R  $M_t$  $M_{t-1}$  $M_{t-2}$  $M_{t-3}$  $M_{t-4}$
2.59  25.15  .1357  .1590  .1571  .1421  .1234
(3.71) (.0999) (.0453) (.0509) (.0380) (.0300)

$M_{t-5}$  $M_{t-6}$  $M_{t-7}$  $M_{t-8}$  $M_{t-9}$  $M_{t-10}$  $M_{t-11}$
.1069  .0956  .0892  .0843  .0744  .0499  -.0019
(.0363) (.0364) (.0294) (.0352) (.0459) (.0342) (.0901)

Period of Estimation: 1964IV-1972II

$R^2 = .92$  Mean Lag = 4.07  \[ \sum_{i=0}^{11} b_{t-1} = 1.22 \]
D.W. = 2.1  Standard Error of Lag = .795  Standard Error = .1933
$p = .2$

The dependent variable in all equations is the overlapping four quarter rate of growth of the index of nominal income defined in the text. C is a constant term; R is the reform dummy, with a value of 1 from 1965III to 1966II and zero otherwise; $M_t$ is the overlapping four quarter rate of growth of the money supply. All data are contained in appendix A.5.1.

The Durbin-Watson statistic points to significant autocorrelation in the residuals which reduces both the efficiency of the least squares estimators and overstates their
significance. An examination of the residuals from this regression reveals that the fitted values consistently exceed the actual values during the 1962I-1964II and the 1965IV-1967III periods. At least two factors are responsible for these results. First, both periods followed major economic reforms which tended to reduce the growth of real output because of the uncertainties and confusion facing enterprises under the new set of institutional rules. Second, both periods either coincided with or just followed a general price freeze and the tightening of price controls. Consequently, registered price growth was artificially low, making nominal income growth artificially low as well.

To correct for interferences in the timing of adjustments caused by price controls and structural changes in the economy, the original equations were re-estimated using the Hildreth-Lu search technique to find the appropriate value for the autocorrelation coefficient. The results obtained using this procedure are contained in R.2 of table 5.4. Similar results are shown for two other subperiods, 1962II-1969I and 1964IV-1972II. Four important characteristics of the estimated equations should be noted.

1. Each equation explains a large amount of the total variance in the dependent variable, with adjusted
$R^2$ values ranging from .828 to .939. These results are to be contrasted with the results Cagan obtained for the U.S. using an identical model and an identical lag formulation. Cagan found that current and lagged percentage changes in the money supply explained only 41% of total variance in nominal income. The greater explanatory power of money supply changes in the Yugoslav economy undoubtedly reflects the underdeveloped state of the Yugoslav financial capital market. Because most investors in Yugoslavia choose between holding cash and holding goods, a discrepancy between actual and desired cash balances is likely to have a direct impact on expenditures in the product market. In the U.S., where investors choose among a number of financial assets, such a discrepancy will upset interest rates in several asset markets. Interest rate changes will in turn upset expenditure flows on product markets. The fact that a cash discrepancy works indirectly on product flows via interest rate effects may explain the looser relationships between money supply changes and aggregate expenditure changes in the U.S.

2. Ninety-five percent confidence intervals for the cumulative sum of the coefficients of the money supply variables in each of the equations are as follows:

$$R_1 \ ( \ .4275, \ .8946 \ )$$

$$R_2 \ ( \ .3984, \ 1.2167 \ )$$
R.3 (.5363, .6692)
R.4 (.8167, 1.6147)

If we disregard the results from equation R.1, which appears to be significantly distorted by serial correlation in the residuals, the remaining equations suggest mixed conclusions about the total effect of money supply changes on income changes. Equations R.2 and R.4 are clearly consistent with the assumption of unitary income elasticity of the demand for money. In contrast, equation R.3 indicates that the income elasticity is slightly less than one. A comparison of the cumulative effect of money supply changes in equations R.3 and R.2 permits some tentative conclusions about the impact of a possible secular downward shift in the aggregate demand for money function on the estimated results. As noted earlier, if such a shift has occurred, it should work to overstate the effects of money growth on nominal income growth, thereby causing the observed sum of the coefficients on the money supply terms to exceed its true value. Under these conditions, the cumulative sum of the coefficients in equation R.2 should exceed the same sum in equation R.3. Unfortunately, the evidence suggested by the confidence intervals of equations R.2 and R.3 is contradictory in this regard. Although the upper limit on the confidence interval for equation R.3 exceeds the upper limit of the confidence
interval for equation R.2, there is a significant overlap in the middle range of the confidence intervals. Therefore, the statistical evidence, weak as it is, seems to suggest that a possible secular shift in the money demand function during the post-1968 period has not introduced an upward bias into the coefficients estimated over the entire 1962-72 period.

3. For each equation the average or mean lag is quite long indicating that money supply changes influence nominal income changes with a substantial lag. For equations R.2 and R.3, the average lags are 6.20 quarters and 5.49 quarters respectively, suggesting that it takes about one and one-half years for one-half of the total effect of a percentage change in the money supply to be registered in a nominal income change. In equation R.4 the average lag declines to 4.07, so that one-half of the total effect occurs in slightly more than one year. This reduction in lag time suggests that as the Yugoslavs have become more accustomed to inflation, they have reacted more quickly to the depreciating value of their cash balances. The larger sum of the $b_i$ coefficients in equation R.4 is also consistent with this hypothesis since the greater responsiveness of the population to expected inflation rates would induce a greater decline in desired cash balances for given increases in real and nominal income.
4. In each equation a reform dummy variable has been added to capture the effects of administrative price increases which artificially inflated the aggregate price level, thereby causing an artificial increase in nominal income. The coefficients of the reform dummy indicate that the reform had a significant impact on observed rates of growth in nominal income during the 1965-68 period.

In total, the results presented in table 5.4 suggest that money supply changes have produced corresponding changes in nominal income in the manner predicted by the portfolio theory. This theory maintains that money supply changes are linked to nominal income changes by variations in shadow interest rates caused by the gradual adjustment of actual cash balances to their desired levels. If the empirical results are interpreted within this theoretical framework, they provide evidence of the importance of money supply changes as a mechanism for changing conditions of credit availability in a capital market distorted by fixed nominal interest rates and severe credit rationing.

**Money Supply Changes and Inflation**

At this point the reader might legitimately ask how the preceding discussion pertains to the major issue of this paper, namely, the causes of the Yugoslav inflation. After all, it is one thing to predict
nominal income changes from current and lagged changes in the money supply, but it is quite another to predict how a given change in nominal income is distributed between a change in real income and a change in price. Theory suggests that the decomposition depends on such parameters as the formation and adjustment of price expectations, the rigidity of reservation pricing, cyclical variations in velocity, and the short-run rigidity of aggregate supply. In Yugoslavia, one must add several policy factors which have affected both the timing and the amount of price growth such as devaluations, price controls, administrative price increases, price freezes, and structural changes in banking, taxation and government expenditures. Given these sources of randomness, it is almost surprising that the price and wage equations of chapter 4 and the nominal income equations of this chapter perform as well as they do. The empirical results suggest that despite random factors, such as institutional changes, predictable factors, such as the growth of ex ante demand, explain observed changes in nominal income and prices.

Although it is impossible to predict the distribution of a given nominal income change into corresponding price and real income changes, it is still instructive to discuss the factors which influenced this distribution over the 1961-72 period. This task is made easier by
dividing the entire period into the cyclical phases marked out by cycles in the capacity utilization index. Graph 2 identifies three major cycles: an expansionary cycle beginning in 1962III and peaking in 1964IV; a contractionary phase beginning in 1965I and reaching its trough in 1968I; and a recovery phase beginning in 1968II and continuing until the end of 1971. Table 5.5 summarizes the behavior of money supply, real income and prices during each of these cycles.

**TABLE 5.5**

**BUSINESS CYCLES IN YUGOSLAVIA, 1962-72**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average annual rate of growth of</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Money supply<strong>a</strong></td>
<td>31.2</td>
<td>2.3</td>
<td>3.2</td>
<td>16.2</td>
</tr>
<tr>
<td>Industrial production</td>
<td>14.4</td>
<td>.9</td>
<td>3.6</td>
<td>9.6</td>
</tr>
<tr>
<td>Retail prices</td>
<td>6.1</td>
<td>7.8</td>
<td>19.1(16.1)<strong>b</strong></td>
<td>9.5</td>
</tr>
<tr>
<td>Producer prices--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>industrial</td>
<td>2.3</td>
<td>2.7</td>
<td>3.9(6.8)<strong>c</strong></td>
<td>7.5</td>
</tr>
<tr>
<td>Producer prices--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>agricultural</td>
<td>16.4</td>
<td>-.4</td>
<td>17.3</td>
<td>17.4</td>
</tr>
</tbody>
</table>

**a**Money supply figures from which the growth rates are calculated are described in appendix A.5.1. Growth rates for industrial production and all prices calculated from indexes of industrial production and prices taken from SDK, SB, various issues, table 2. Series of growth
rates for prices are presented in appendix A.4.1 of chapter 4.

\(^b\) The figure in parenthesis is the rate of growth of retail prices corrected by using the coefficient for the dummy reform variable presented in footnote (c) of table 4.4.

\(^c\) The figure in parenthesis is the rate of growth of producer prices corrected by using the coefficient of the dummy reform variable in equation 13, table 4.2.

Random and Predictable Factors Influencing the Timing of Inflation

Before trying to relate money supply changes to real income and price changes during the three cycles identified in table 5.5, a clear picture of the institutional and random factors which influenced this relationship is necessary. Here I will mention only a few of the many factors which may be important. First, as table 1.2 of chapter 1 reveals, price controls were particularly severe during the 1962-66 period. These controls applied mostly to producer prices of industrial products although there were also some controls on retail trade margins to moderate changes in retail prices. In contrast, agricultural prices were generally free to fluctuate in response to supply and demand. During this early period, there was also a temporary general price freeze following the 1961 reform, and another freeze in 1965, when the
Cycles in Capacity Utilization

CU = capacity utilization index
MS = average annual rate of
       of money supply
Data Sources:  See table 5.5

Graph 2
government undertook a series of administrative price increases to correct the relative price structure.

The price controls introduced before the general economic reform of March 1965 did not prohibit price growth, as evidenced by the 2.3% average annual growth rate of controlled producer prices during the 1962III-1964IV cycle, but they did influence the timing of price growth. Thus, in the earlier part of the period from 1962III to 1963IV, producer prices were relatively stable, while afterwards, they began to grow rapidly at an average rate of 4.7% from 1964I to 1964IV. The expansion beginning in 1968II was accompanied by a much lower average level of price control; consequently, producer prices could move more freely and more instantaneously in response to excess demand pressures. Agricultural prices remained free also. Therefore, one might expect a much greater coincidence in the timing of changes in excess demand and changes in prices during the second expansion. However, the reintroduction of price ceilings on producer prices at the end of 1970, and the imposition of a general price freeze extending from the last quarter of 1971 through the first quarter of 1972, reduced this coincidence significantly.

Devaluations are a second factor influencing the timing of price changes and divorcing them from
contemporaneous changes in aggregate demand. Table 5.6 shows the extent of the four major devaluations which occurred in Yugoslavia during the 1961-72 period.

**TABLE 5.6**

*DEVALUATIONS OF THE DINAR, 1961-72*

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 1961</td>
<td>from 300-632 dinars per dollar to 750 dinars per dollar.</td>
</tr>
<tr>
<td>July 1965</td>
<td>from 750 dinars per dollar to 1,250 dinars per dollar.</td>
</tr>
<tr>
<td>January 1971</td>
<td>from 12.5 new dinars per dollar to 15.0 new dinars per dollar.</td>
</tr>
<tr>
<td>December 1971</td>
<td>from 15.0 new dinars per dollar to 17.0 new dinars per dollar.</td>
</tr>
</tbody>
</table>


These devaluations significantly increased the costs of domestic producers who were induced to raise their selling prices to cover the higher dinar cost of imported supplies. The Yugoslav devaluations were poorly timed, coming after sustained balance of payments pressure caused, among other things, by domestic price increases. Moreover, the devaluations occurred after domestic market indicators pointed to stagnant or falling demand. The timing of the devaluations may therefore explain why domestic prices continued to increase even when no longer warranted by
domestic demand conditions.

The third and perhaps most important influence on the timing of price increases was the economic reform which occurred between March and December of 1965. The major features of the reform have already been discussed in chapter 2. In the area of prices, the reform had four major goals: (1) an increase in raw material prices relative to finished good prices; (2) an increase in agricultural prices relative to industrial prices; (3) the transfer of turnover taxes from producer prices to retail prices and an increase in retail trade margins; and (4) a graduated increase in rents and other service prices. The price increases planned by the reform and the relative price changes they entailed are shown in table 5.7.

**TABLE 5.7**

PLANNED AND ACTUAL PRICE INCREASES DURING THE 1965 REFORM (PERCENT INCREASES OVER 1964 AVERAGES)

<table>
<thead>
<tr>
<th>Increase in prices (1965)</th>
<th>Planned</th>
<th>Actual</th>
<th>Estimated increase to 1970</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>14</td>
<td>15</td>
<td>48</td>
</tr>
<tr>
<td>Agriculture</td>
<td>32</td>
<td>43</td>
<td>95</td>
</tr>
<tr>
<td>Building</td>
<td>22</td>
<td>21</td>
<td>108</td>
</tr>
<tr>
<td>Services</td>
<td>45</td>
<td>30</td>
<td>145</td>
</tr>
</tbody>
</table>

One way to correct for the reform's influence on price growth is to estimate the price increases that would have occurred in the absence of the reform. I have done this by using the coefficients of the reform dummy variables estimated in chapter 4 to adjust observed increases in the producer price index and the retail price index. The results of this adjustment procedure are contained in table 5.5. When the effects of the price reform are removed, the average rate of growth of retail prices during the 1965I-1968I period falls from 19.1% to 16.1%; similarly, the average rate of growth of producer prices fall from 8.9% to 6.8%. The dummy variable adjustment catches only part of the reform's distorting influence on price changes. Besides imposing direct price increases by decree, the reform set up pressures for further price increases at the enterprise level. Price pressures developed as a result of increases in raw material prices and the reduction or abolition of various subsidies, both of which had an adverse effect on enterprise profitability. In response, many enterprises tried to pass on unexpected cost increases by raising their prices. 26

So far the discussion has focused on random factors affecting the timing of price increases during the 1962-72 period. Next I want to examine several factors which may have influenced the timing and amount
of real income growth. Clearly, such factors determine how much price inflation can be expected to follow a given percentage increase in the money supply. At least three major influences on real income growth can be identified. First, variations in agricultural output have produced variations in aggregate supply. Table 5.8 reveals the size of variations in annual growth rates of agricultural production between 1961 and 1970. Because the supply of agricultural commodities in one year is influenced by the harvest of that year and the year preceding it, I have also taken simple two year averages to measure agricultural growth rates. These averages indicate that agricultural growth fell sharply in 1965 and failed to recover until 1967. Moreover, during the 1968-72 expansion, agricultural output declined and then grew slowly at an average annual rate of only 3%. The poor performance of agriculture coupled with rapid growth in the rest of the economy undoubtedly explains the growth in agricultural prices which accompanied the last economic expansion.

A second random factor influencing real output growth was the effect of the economic reform on business expectations. The discussion in chapter 2 suggests that the reform aimed at eliminating inefficient enterprises by reducing subsidies and other artificial aids to profitability. To the extent that this goal was accomplished,
<table>
<thead>
<tr>
<th>Year</th>
<th>Yearly rate</th>
<th>Average of current and past year rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>- 3%</td>
<td>-13%</td>
</tr>
<tr>
<td>1962</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>1963</td>
<td>10%</td>
<td>1.4%</td>
</tr>
<tr>
<td>1964</td>
<td>6%</td>
<td>16%</td>
</tr>
<tr>
<td>1965</td>
<td>- 9%</td>
<td>- 3%</td>
</tr>
<tr>
<td>1966</td>
<td>16%</td>
<td>7%</td>
</tr>
<tr>
<td>1967</td>
<td>- 1%</td>
<td>15%</td>
</tr>
<tr>
<td>1968</td>
<td>- 4%</td>
<td>- 5%</td>
</tr>
<tr>
<td>1969</td>
<td>10%</td>
<td>6%</td>
</tr>
<tr>
<td>1970</td>
<td>- 4%</td>
<td>6%</td>
</tr>
<tr>
<td>1971</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SOURCE:** Growth rates are calculated from Index of total agricultural production taken from table 107-5; SZS, SG, 1972.

output naturally declined somewhat. But the reform, with its large-scale elimination of subsidies and its new tax and price structure, hurt even the most profitable producers and clearly introduced a large measure of uncertainty into enterprise calculations. Uncertainty probably led enterprises to reduce planned output increases. Therefore, it seems reasonable to suppose the reduction in output which occurred during the reform exceeded what would have occurred in the absence of the reform.²⁷

In his recent study of business cycles in Yugoslavia, Horvat identifies limitations on foreign exchange and import capabilities as still another factor
influencing the rate of growth of output during the 1962-72 period. Horvat compares cycles in an index of trade divergence—defined as the ratio of an index of industrial imports and an index of industrial exports—to cycles in industrial growth rates, and he finds a significant negative correlation, with peaks in the index of divergence lagging peaks in the rate of growth of output by one to three quarters. On the basis of these results, Horvat draws the following hypothesis about cycles of real growth in Yugoslavia:

an acceleration of industrial production leads to a relative increase in the trade deficit. Pressure on foreign exchange reserves increases, foreign exchange is all the more rigidly allocated, and it is increasingly difficult to obtain the necessary imports on time. This strain at a certain moment brings on the turning point of the cycle (in real output growth). . . . The troughs of the index of divergence lag behind the troughs of industrial production by 1-2 quarters. These troughs correspond to troughs in import cycles. That fact indicates that imports probably do not contribute fundamentally to the turning upward of the cycle.

Horvat's theory is similar to simple two-gap models of economic development which point to foreign exchange shortages as the bottleneck factor in rapid economic growth. Such models hypothesize that small, developing economies are structurally dependent on commodity imports which cannot be domestically produced. Because of this structural dependence, devaluations do not significantly improve the balance of payments, since
imports cannot be reduced without causing a corresponding reduction in domestic growth. Under such circumstances, the real growth of the economy depends crucially on the availability of foreign exchange provided by exports, foreign loans and capital flows.29

The two-gap analysis offers one explanation for the slower growth rate in real output characterizing the second expansionary cycle. The figures in table 5.9 indicate that during this cycle the trade divergence index showed a clear tendency to exceed past levels, despite the 1965 devaluation. If, as Horvat suggests, increases in this index are accompanied by greater rationing in foreign exchange and slowdowns in the receipt of raw material imports necessary for domestic production, then bottlenecks in the foreign sector may explain the reduction in average real growth rates which occurred between the first and second cyclical expansions.

### TABLE 5.9

THE TRADE DIVERGENCE INDEXa

<table>
<thead>
<tr>
<th>Period</th>
<th>Index</th>
<th>Period</th>
<th>Index</th>
<th>Period</th>
<th>Index</th>
<th>Period</th>
<th>Index</th>
</tr>
</thead>
</table>

SOURCE: The trade divergence index is calculated from indexes of exports and imports taken from worksheets provided by The Ekonomiski Institut, Ljubljana.
Money Supply Changes, Real Output Growth and Inflation

The above discussion provides the background for an examination of the relationship between money supply changes and price changes during the three business cycles identified in Table 5.5. One way to analyze this relationship is to search for links between money supply changes and capacity utilization levels. Table 5.5 reveals that the three business cycles exhibit high rates of monetary growth during expansionary phases and significantly lower rates of monetary growth during contractions. The relationship between money growth and levels of capacity utilization is shown more clearly in graph 2. The graph indicates that rising levels of capacity utilization are preceded and accompanied by rapid money supply growth while falling capacity utilization in the mid-1966-68 period is accompanied by a severe monetary contraction. The only exception to this rule occurs from mid-1965 to mid-1966 when the money supply growth rate recovers but capacity utilization continues to decline. This aberration can be explained by the distorting
influences of the reform on real output and price formation, and, if the reform observations are removed, the correspondence between reductions in money growth and reductions in capacity utilization levels becomes stronger. The coincidence in the timing of changes in the money supply and changes in the capacity utilization index is even more striking in the 1967-71 period. The upturn in money growth rates in 1967II precedes by two quarters the upturn in capacity utilization; similarly, the reduction in money growth rates in 1969III-IV is followed by the levelling off of capacity utilization in 1970I-II, and the stagnation and reduction in money growth rates from 1970III to 1971III precedes by one to two quarters the reduction in the capacity utilization index in 1972I. Although these results are not conclusive they do suggest the general proposition that percentage changes in the money supply, accompanied by gradual reductions in shadow interest rates, stimulate the flow demand for commodities, thereby increasing the level of aggregate demand in the economy. Changes in aggregate demand in turn induce price pressures which may or may not lead to actual price increases, depending on the short-run elasticity of real output and the severity of existing price controls.

Graph 3 provides a second form for examining
the relationship between money supply changes and price changes. An examination of the graph reveals two distinct phases: the pre-1965-66 phase when price increases followed money supply increases with a significant lag; and the post-1966 period when money supply changes were accompanied by contemporaneous price changes in the same direction. The lack of synchronization between money supply and price changes in the earlier phase is the expected consequence of price controls. The effects of such controls can be seen by performing a simple empirical test. The crudest version of the quantity theory of money predicts that the average rate of growth of prices will approximately equal the difference between the average rate of growth of real output and the average rate of growth of the money supply. Under this assumption, retail prices should have increased by 16.8% during the first expansion, by -.4% during the 1965I-1968I contraction, and by 6.6% during the 1968II-1969 expansion. The actual average price increase of 9.5% in the last period is reasonably close to target, but the 6.1% increase during the first expansion falls far short of its predicted value. Similarly, the 16.1% average annual rate of growth of prices during the contraction clearly exceeds its predicted value.30

If we now combine the 1962III-1965I expansion
with the four quarters of the economic reform, we obtain an average annual real output growth rate of 11.5%, a money supply growth rate of 21.1%, and a predicted inflation rate of 9.6%. The actual inflation rate during this period was 13.5%. Therefore, allowing for lags in the timing of price growth due to price controls and for some excessive price growth due to the reform itself and the accompanying devaluation, the correspondence between actual price growth and predicted price growth is quite reasonable. This result is important because it calls into question some simple theories about the role of monetary factors in the Yugoslav inflation. Because of price controls and the 1965 reform, data from the pre-1967 period do not reveal a simple relationship between money supply changes and changes in the aggregate price level. Using data from this period and earlier periods, Horvat has argued that money supply increases cause real output to increase thereby causing prices to fall so that there is a negative correlation between money supply changes and price changes. Horvat therefore concludes that a monetary expansion leads to reduced price pressures while a monetary contraction stimulates inflation. Horvat describes the link between money supply growth and price changes in the following manner. Let the rate of growth of the money supply decline; then aggregate demand falls,
Annual Rates of Growth of
Money Supply
Industrial Producer Prices
output declines, capacities are underutilized and fixed costs rise. Because labor is not a variable factor of production and worker nominal incomes are rigid, total unit costs rise and under this pressure prices also rise. Consequently, there is a negative correlation between rates of money growth and rates of inflation. 31 A recent World Bank study explains the inverse relationship between the growth of the money supply, the growth of industrial production and the growth of producer prices during the pre-reform period in the following manner: price increases were permitted by the state to allow the accumulation of investment funds or the maintenance of personal income levels during years when receipts from industrial sales declined as a result of falling aggregate demand. In other words, according to the Bank's interpretation, when sales declined, producers requested and obtained price increases to cover net income increases. Such behavior appears to be irrational since falling sales suggest price cuts rather than price increases as the correct policy to stimulate receipts and increase net income flows. Only under very special demand conditions, does an increase in price increase total revenues in the manner suggested. 32

The statistical results presented in table 5.4 and the theory accompanying them contradict Horvat's
conclusions and the conclusions of the IBRD. These results and the simple quantity theory experiments outlined here illustrate that allowing for significant lags, money supply changes influence prices in Yugoslavia in the manner predicted by simple macroeconomic theory. This result is not surprising given the rudimentary nature of the Yugoslav financial market. With few alternative assets to choose from, most spending units in Yugoslavia ultimately decide between holding cash and purchasing commodities. Under such circumstances, a monetary policy which causes actual cash balances to exceed desired levels quickly stimulates both real output and price increases.

Reservation Pricing, Expectations and Inventories: the 1966-68 Contraction

Although the 1968-71 expansion and 1962-65 expansion, including the four quarters of the economic reform, tend to support the simple quantity theory, the contraction running from 1966III to 1968I does not. The rate of growth of prices as predicted by the quantity theory is only 1.4%. The actual rate of growth of prices during the period was 7.8%. Several of the random factors which may explain the divergence between actual and predicted price behavior have been discussed above. Here I want to focus on the role of expectations, reservation pricing and inventory accumulation in the enterprise
sector in the development of price increases.

According to the analysis presented in chapter 3, Yugoslav enterprises cannot freely reduce their work force in response to reductions in demand. Consequently, product supply in the enterprise sector exhibits substantial downward rigidity in the short run. This rigidity has important implications for the method by which the economy adjusts to reductions in aggregate demand. In the traditional Keynesian model adjustments are assumed to be concentrated in output and employment, nominal prices and wages remaining rigid. In contrast, the Walrasian model predicts adjustments in prices and wages at rigid output and employment levels. Because of the apparent downward rigidity of supply in the Yugoslav economy, Walrasian forms of adjustment might be expected to occur more frequently than Keynesian ones. Therefore, one might predict that a sustained contraction in demand, such as that which developed during the 1966-68 period, would lead to a significant reduction in inflation, as producers cut prices to maintain sales at current levels of output. In fact, the rate of inflation did drop sharply during this period, from an average annual rate of 16.2% during 1964 and 1965. Nonetheless, the observed average annual inflation rate of 7.8% still seems too high to be consistent with prevailing market conditions.
characterized by declining capacity utilization levels, increasing inventory accumulation, declining employment and negative rates of growth of the money supply.

The initial failure of prices to adjust to unexpected reductions in aggregate demand at constant levels of output may reflect rational decision-making at the enterprise level. Imagine an enterprise which suddenly finds itself unable to sell all its output at prevailing prices. The option of selling at some lower price is available but may be avoided, because at that price the sale represents a loss, measured as the difference between current costs of producing a commodity and current revenues obtainable from selling it at the lower prices. The loss is analogous to the loss incurred on the sale of an asset at a price lower than its original purchase price. Rather than sustain such a loss, the firm may choose to accumulate inventories of produced goods, valued at their production costs. Such behavior is rational as long as the cost of financing inventories does not exceed the loss sustained by selling them at obtainable market prices.

In Yugoslavia a response pattern of this type is encouraged by practices of enterprise accounting which set product selling prices as the sum of per unit material and labor costs of production. This practice makes
the enterprise highly sensitive to "losses" implied by sales at below-cost prices. The importance of this issue is attested to by the fact that in recent years a number of laws have allowed enterprises to use "restricted" funds or obligatory depreciation allowances to cover "losses" incurred by selling price reductions. In general both the Yugoslav government and Yugoslav enterprises seem to believe that selling products below cost is somehow "unfair" and should be resorted to in only the most extreme circumstances.

The behavior of the Yugoslav firm during periods of falling aggregate demand can be compared to the kind of search behavior for workers described in some recent theories of the Phillips curve. According to these theories, workers have an expected wage rate and they refuse available jobs at lower rates until their search for employment leads them to revise their reservation wage rate downward. Eventually, as job search yields correct market information, the revision of expected wage rates brings about the gradual absorption of the unemployed into the labor force. Implicit in this search hypothesis is the assumption that during periods of job search, the worker is not constrained to live off his current receipts but can run down his past savings and liquidity to finance his expenditures. Once this liquidity is
dissipated current income becomes necessary and the search must be terminated because the worker is forced to accept a job at the obtainable wage rate to guarantee his subsistence.

A similar model can be applied to the Yugoslav firm during periods of falling demand. For reasons which were mentioned in chapter 3 the firm cannot rapidly adjust production to match orders. Moreover, the firm has some sort of expected "reasonable" price, based on cost-markup pricing practices. At the onset of a decline in demand, therefore, the firm adjusts neither output nor price but instead accumulates inventories. In this process the firm acts like an investor who holds off selling his assets (commodities) when their value has declined relative to their original purchase value. The firm's refusal to sell its products at obtainable prices represents a form of search behavior by which the firm gathers the market information necessary for a correct price and output decision. During the period of search the firm continues to regard its net wealth as fixed, despite falling current receipts, and tries to maintain its current level of production, wages and expenditures. The firm protects current production by running down its liquidity or by borrowing from the banking system, until the cost of either method of finance is greater than the loss sustained
by selling output at obtainable market prices.

The model of search behavior explains two of the major characteristics of economic slowdowns in Yugoslavia: the tendency for inventories to increase sharply and for enterprise liquidity to drop sharply during such periods. Both of these characteristics are clearly observable in the data from the 1966-68 contraction presented in table 5.10. The model also explains why prices may have continued to increase during the 1966-68 period despite reductions in aggregate demand. As a result of downward rigidity, in sectors where demand fell, prices remained stable or declined only slightly, while in sectors where demand increased, prices rose; consequently, the general price index continued to increase despite a general contraction in demand. A cost-push theorist examining the data from this period might conclude that downward rigidity in wages was the cause of price growth. However, important changes in other production costs following the reform and the effects of such changes on enterprise pricing behavior as predicted by the expectations or search hypothesis provide equally compelling explanations. I leave it to the cost-push theorist to prove his position against what I consider to be the more reasonable alternative for the Yugoslav self-managed system.
### TABLE 5.10

**INVENTORY STOCKS AND CASH BALANCES IN THE ENTERPRISE SECTOR, 1965-68**

<table>
<thead>
<tr>
<th></th>
<th>Average annual rate of growth of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Final product inventories&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>1965 I</td>
<td>9.2</td>
</tr>
<tr>
<td>II</td>
<td>17.2</td>
</tr>
<tr>
<td>III</td>
<td>19.2</td>
</tr>
<tr>
<td>IV</td>
<td>24.2</td>
</tr>
<tr>
<td>1966 I</td>
<td>25.0</td>
</tr>
<tr>
<td>II</td>
<td>20.0</td>
</tr>
<tr>
<td>III</td>
<td>17.1</td>
</tr>
<tr>
<td>IV</td>
<td>21.3</td>
</tr>
<tr>
<td>1967 I</td>
<td>28.0</td>
</tr>
<tr>
<td>II</td>
<td>30.6</td>
</tr>
<tr>
<td>III</td>
<td>28.4</td>
</tr>
<tr>
<td>IV</td>
<td>23.9</td>
</tr>
<tr>
<td>1968 I</td>
<td>22.3</td>
</tr>
</tbody>
</table>

<sup>a</sup>Growth rates are calculated from an index of real final product inventories in the industrial sector taken from *SZS, Indeks*, various issues.

<sup>b</sup>Growth rates are calculated from an index of real intermediate inventories in the industrial sector taken from *SZS, Statisticki Bilten*, no. 730, p. 69.

<sup>c</sup>Cash balances are the total of enterprise giro accounts, reserve funds, collective consumption funds and depreciation funds deflated by the retail price index.

### Conclusions

In this chapter I have developed some general propositions about the macroeconomic structure of the Yugoslav economy and I have performed some simple tests to determine how money supply changes have influenced
aggregate economic activity. The results indicate that changes in the money supply have had a significant impact on price and real output growth. This suggests that the next step in a study of the Yugoslav inflation should be an examination of the factors underlying money supply changes. Chapter 6 presents the relevant issues.
Appendix A.5.1

Part 1. A description of the sources of data and construction of variables used in regression analysis.

$M_t$ (Rate of Growth of the Money Supply)

The money supply series includes currency and deposit money and corresponds to the U.S. definition of $M_1$. The money supply figures were taken from worksheets provided by the National Bank of Yugoslavia. The figures are published in G. Macesich and D. Dimitrijevic, Money and Finance in Contemporary Yugoslavia (New York: Praeger 1973), appendix C. Rates of change are measured by overlapping four quarter rates of growth. The data series is contained in appendix A.4.1.

$Y_t$ (Rate of Growth of Nominal Income)

An index of nominal income is constructed from an index of industrial production and an index of the cost of living. Both indexes are taken from the OECD, Main Economic Indicators for Yugoslavia. Rates of change are measured by overlapping four quarter rates of growth.

Part 2. Data spanned by the regressions

\[
\dot{Y}_t
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>15.9</td>
<td>14.6</td>
<td>17.7</td>
<td>15.1</td>
</tr>
<tr>
<td>1962</td>
<td>19.3</td>
<td>19.5</td>
<td>15.0</td>
<td>18.9</td>
</tr>
<tr>
<td>1963</td>
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<td>18.8</td>
<td>25.1</td>
<td>22.7</td>
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<td>1964</td>
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<td>30.0</td>
<td>33.6</td>
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<td>1965</td>
<td>37.0</td>
<td>36.1</td>
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<td>59.3</td>
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<td>Year</td>
<td>Quarter</td>
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<td>---------</td>
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<td>1966</td>
<td>I</td>
<td>47.8</td>
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</tr>
<tr>
<td></td>
<td>II</td>
<td>39.9</td>
<td></td>
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<td>10.9</td>
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<td>II</td>
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<td>IV</td>
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<tr>
<td>1971</td>
<td>I</td>
<td>22.9</td>
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<td></td>
<td>II</td>
<td>27.1</td>
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<tr>
<td></td>
<td>III</td>
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<td>IV</td>
<td>26.9</td>
<td></td>
<td></td>
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<tr>
<td>1972</td>
<td>I</td>
<td>28.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>22.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Footnotes

1. This formulation of the Keynesian model is adopted from R. G. D. Allen, Macro-economic Theory; A Mathematical Treatment (London: Macmillan 1968), chap. 7.

2. The most extreme Keynesian formulation of wage rigidity is $w = w_0'$, specifying a constant money wage rate for any real level of employment.


4. Consider an increase in product price, $p$. As long as each firm produces only one output and uses only one variable input, the outcome of the price increase is definite: a doubling of price will double the marginal value product of labor, but the net income per worker will more than double; therefore, labor employment and output will be reduced until the actual marginal value product rises to equality with the new net income per worker.


8. In 1972, the interest rate ceilings were formally abolished. For more on the results of this policy change, see chapter 6.


10. This figure was quoted by the Yugoslav periodical NIN which noted that Yugoslav enterprises accepted bank loans in Great Britain at interest rates as high as 30% during 1970 and 1971. See NIN, no. 1060, May 2, 1971, p. 3.
11. This formulation of the shadow rate of interest and
the Keynesian model with credit rationing is
adopted from F. Modigliani, "The Monetary Mechanism
and Its Interaction with Real Phenomena," Review of

12. An alternative formulation of this adjustment pro-
cess is possible. Suppose each unit makes its
desired balance sheet decisions subject to a con-
straint on the total real volume of available finance
it can receive at the going market rate of interest;
this constraint leads to the same asset, commodity
and money flow demands as the shadow rate of inter-
est approach. In fact, the shadow interest rate is
merely the derivative of the spending unit's
utility function with respect to its loanable funds' constraint.

13. For more on the actual mechanics of increases in
the money supply in Yugoslavia, see chapter .

14. This term is adopted from P. Cagan, The Channels of
Monetary Effects on Interest Rates (New York:

15. In Yugoslavia, other assets take the form of sav-
ings and sight bank accounts. Because interest
rates on these deposits are controlled, the flow of
funds into such accounts due to a discrepancy
between actual and desired real cash balances will
not lower the prevailing market rate of interest
but it will lower the shadow rate of interest
charged to some borrowers.

16. See Cagan, The Channels of Monetary Effects, chap. 6
for a detailed theoretical rationale for this pro-
cedure.

17. For a discussion of the factors underlying the
cyclical behavior of velocity in Yugoslavia, see
chap. 8. Essentially, the increase in velocity
during cyclical contractions seems to be the result
of the propensity of the industrial sector to run
down its cash balances to finance unplanned inven-
tory accumulation during such periods.

18. See M. Friedman and A. Schwartz, "Money and Business
(February 1963).
19. This conclusion ignores the effects of inflationary expectations on the desired stock of cash balances; if the expected rate of inflation increases, the equilibrium volume of cash balances will be smaller than its initial value. For more on this and related points, see J. Behrman, "Price Determination in an Inflationary Economy," in Eckaus and Rosenstein-Rodan, eds., Problems in Economic Development (Amsterdam: North-Holland-Elsevier 1973), pp. 374-75.

20. Such uncertainties arose from changes in foreign trade regulations and the exchange rate, changes in taxes and subsidies, and changes in the field of enterprise income distribution. Horvat notes that "economic organizations lost much time in discussions and attempts to adjust to changes in conditions . . ." following the economic reforms. See B. Horvat, Business Cycles in Yugoslavia (New York: International Arts and Sciences Press 1971), p. 181.

21. See table 1.2, chap. 1 for a measure of price controls during these periods.

22. The search for the autocorrelation coefficient was limited to values of 0, .2, .4, .6, .8 and 1.0.


24. The actual form of the price controls explains their effect on the timing of price increases. An enterprise desiring a price increase on a controlled product had to apply to a federal or republican price commission for approval or had to so change the product form that it could be registered as a new commodity in which case it was free from existing controls. This form of price control introduced two possible sources of delay into price increases. First, when excess demand pressures were first felt, enterprises, viewing them as temporary, probably preferred to maintain their stated price rather than bear the administrative and other costs involved in seeking acceptance of a proposed price increase. Second, even after the enterprise submitted a request for a price change, there was a further delay until the authorities officially accepted the change. These two types of delays probably explain why high levels of aggregate demand during the 1962-63 period did not lead to increases in retail and producer prices until 1964. In contrast, free agricultural prices increased steadily throughout the
expansionary phase in response to increases in aggregate demand.

25. Raw material and capital equipment imports account for 80% of total imports in Yugoslavia.

26. This response pattern was particularly likely because Yugoslav firms generally set their selling prices on the basis of intra-firm transfer prices which are based on material and fixed wage costs. For more on this form of pricing, see chap. 4.

27. A rough indication of the reform's effects on real output levels is suggested by J. Mencinger who calculated a demand for labor equation including a reform dummy variable taking the value of 1 in 1965III and falling by steps of .1 to a final value of .1 in 1967IV. The variable is found to be significant and to explain a 7.3% drop in employment during the reform period. See J. Mencinger, Simulacioni Model Inflacije, p. 16.


29. In Yugoslavia remittances from workers employed abroad are a relatively new and important source of foreign exchange, accounting for approximately 20% of the total inflow of foreign exchange in 1970 and 1971.

30. The growth rate of prices during the contraction is corrected for the effects of the reform by the dummy variable adjustment method discussed in the text.

31. For a detailed description of this theory, see Horvat, Business Cycles in Yugoslavia, pp. 142-43.


34. For more on changes in enterprise liquidity and inventory stocks during economic contractions, see chap. 8.
CHAPTER 6

THE YUGOSLAV BANKING SYSTEM AND
MONETARY CONTROL

Introduction

A study of inflation should try to answer two questions: first, why do the monetary authorities in an economy follow an excessively expansionary policy which either causes or permits a sustained inflation; and second, how do changes in monetary conditions occasioned by such a policy influence aggregate economic activity and price behavior. Chapter 5 suggests some answers to the second of these questions for the Yugoslav economy during the 1961-72 period. In this chapter I return to the first question, and examine how monetary policy has been formulated in Yugoslavia.

Because percentage changes in the money supply are used as a measure of monetary conditions in chapter 5, this chapter begins with a brief analysis of the factors which enter into money supply determination in the Yugoslav banking system. Both the Friedman-Schwartz monetary identity and simple regression analysis are used to relate percentage changes in the money supply to
percentage changes in major determinants of the money supply. After identifying the main components of monetary growth I analyze the sources of growth in each of them. One of the purposes of the discussion is to establish the independence of current changes in the money supply from current changes in nominal income, an independence which is crucial to the unbiasedness of the empirical estimates of equation 5.1. A second broader purpose is to examine the role of political and regional conflicts in the monetary system and to explain money supply changes as the product of attempts to resolve these conflicts in an economy where resolution by other means is impossible because of ideological and political barriers. My basic hypothesis is that money supply increases have been used in Yugoslavia to cover excess demand for bank credit generated at artificially low nominal interest rates, because regional and political clashes have blocked agreement on a binding set of non-price rationing rules and because ideology has made the use of interest rates to equilibrate money and financial markets unacceptable. To provide support for this hypothesis I describe the forms of monetary control linking the Yugoslav National Bank and the network of commercial banks, and I try to illustrate how continuous political pressure on local and republican banks and on the National Bank
itself has made the task of regulating changes in the monetary base, and hence changes in the money supply, a difficult one.

The Question of an Exogenous Money Supply

The model relating percentage changes in nominal income to current and lagged percentage changes in the money supply via the portfolio effect implicitly assumed a stable demand for money function and a money supply function in which the explanatory variables are unrelated to current changes in nominal income. In many models, the money supply is simply taken to be an exogenous variable, determined by the monetary authorities. By now the money demand assumption is widely accepted in the economic literature, but the assumption of exogenous changes in the money supply has recently come under sharp criticism. Criticism has focused on the use of single equation estimation procedures to explain contemporaneous changes in nominal income by lagged and contemporaneous changes in the money supply. According to critics, it is quite possible for observed short-run relationships between changes in nominal income and changes in the money supply to reflect a situation in which changes in nominal income cause changes in the money supply rather than vice versa. The "reverse causation" argument has been widely debated but has yet to be resolved.
The most extensive empirical evidence on the issue has been presented by the monetarists who maintain that both the timing of the relationship between changes in the money supply and changes in nominal income and simple least squares estimation explaining changes in the money supply by changes in nominal income support their contention of an exogenously determined money supply.

The empirical estimates of equation 5.1 indicate that in Yugoslavia percentage changes in the money supply do not begin to influence percentage changes in nominal income until six to nine months (two to three quarters) after their introduction. The length of the lag makes it difficult to believe that the dependent variable, percentage changes in nominal income, influences the significant independent variables which are money supply changes occurring two or more quarters earlier. In other words, the fact that percentage changes in the money supply appear to lead percentage changes in nominal income in Yugoslavia by at least six months is suggestive, though not conclusive, evidence for the independent influence of monetary changes. However, for the 1964-72 period, the empirical estimates of equation 5.1 indicate that current period changes in the money supply do have a significant impact on current changes in nominal income. Therefore, some discussion of the links between percentage
changes in nominal income and percentage changes in the money supply is necessary not only to evaluate the validity of the empirical results in chapter 5 but also to understand the process of money supply formation in Yugoslavia. Such a discussion acts as a prelude to an examination of the various channels through which excess demand for bank credit at controlled interest rates has led to excessive money supply growth and price inflation in the Yugoslav economy.

**Determinants of the Money Supply in Yugoslavia**

The major determinants of the money supply in Yugoslavia can be identified from the definitional equation relating the money supply to base money. This equation, popularized by Friedman and Schwartz in their monetary history of the United States, posits a relationship of the form

\[ M = mB \quad (6.1) \]

where \( M \) is the money supply, \( m \) is the monetary multiplier and \( B \) is base or high-powered money.

In Yugoslavia, where base money consists of currency held by the public and reserves and cash held by the commercial banks, and where the money supply, as defined by the National Bank, is the sum of currency and demand deposits held by the public, this relationship can be
rewritten as follows:4

\[ M = (B) \left[ \frac{(D_m/D)(D/D_b) + C/D_b + P/D_b}{(R_0/D_b) + (R_1/D_b) + C/D_b + P/D_b} \right] \] (6.2)

where \( D_m \) = deposit money (mainly demand deposits) held by the public at commercial banks.

\( D \) = total deposits of non-banking sectors held with the monetary system, including deposits with the central bank; time deposits of more than one year's duration are not included.

\( D_b \) = total deposits of non-banking sectors, excluding deposits with the central bank.

\( C \) = currency in circulation.

\( R_0 \) = the total value of required reserves of the commercial banking system at the central bank.

\( R_1 \) = the total value of excess reserves of the commercial banking system at the central bank and

\( P \) = money float.

According to Yugoslav monetary accounts, total deposits of the public include demand deposits, so-called "quasi-money" or sight deposits which are transferable into cash on request, and other liquid assets consisting mainly of enterprise deposits restricted to specific purpose or timing of use. On average about 27.0% of all quasi-money
deposits are held by private households, while 69.7% of all demand deposits are held by business organizations. By law enterprises are required to carry out their transactions with demand deposits, and their holdings of currency are limited to small volumes of working cash. Consequently, the household sector holds an average of 95.5% of the total currency in circulation.  

Equation (6.2) identifies the factors which have acted as the proximate determinants of the money supply in Yugoslavia during the period under consideration. An examination of these factors reveals the ways in which current changes in nominal income may have influenced current changes in the money supply.

**Base Money**

Base money has been created primarily by the extension of short-term credits from the National Bank to the commercial banking system and to various government bodies and secondarily by changes in the foreign asset holdings of the National Bank. The figures in table 6.1 reveal that over the 1964-70 period, National Bank credits to the banking system and to government accounted for approximately 90% of total gross base money; of this total 51% was attributable to National Bank credits to commercial banks. Although the National Bank has been able to control the volume of gross base money
TABLE 6.1

THE MONETARY BASE (CHANGES OR FLOWS PER YEAR)

<table>
<thead>
<tr>
<th></th>
<th>Position at year-end</th>
<th>Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>National bank credits to banks</td>
<td>19.398&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.3</td>
</tr>
<tr>
<td>to governments</td>
<td>18.247</td>
<td>0.5</td>
</tr>
<tr>
<td>total</td>
<td>37.645</td>
<td>3.8</td>
</tr>
<tr>
<td>Foreign assets (net)</td>
<td>3.465</td>
<td>0.6</td>
</tr>
<tr>
<td>Total gross base money</td>
<td>41.110</td>
<td>4.5</td>
</tr>
<tr>
<td>minus deposits of non-bank sectors at national bank</td>
<td>12.248</td>
<td>-0.8</td>
</tr>
<tr>
<td>Net base money</td>
<td>28.862</td>
<td>3.7</td>
</tr>
</tbody>
</table>

| Changes in deposits of non-bank sectors at national bank as a percentage of total change in gross base money | 17.8% | 75.0% | 69.2% | 2.9% | 32.4% | 44.7% |


by regulating its crediting of bank and government borrowers, it has been unable to control the volume of base money ultimately injected into the monetary system at any point in time. Lack of control has stemmed from the ability of the federal government to sterilize or release a portion of available base money by forcing enterprises to increase
or reduce their deposits at the National Bank. The institution of earmarking funds for deposit at the National Bank has often been employed by the government to attain a specific economic objective, such as stabilization of the foreign exchange market or restriction of local government spending. The influence of this tool on changes in the volume of base money entering the monetary system can be seen from the figures in table 6.1. The table reveals that in a single year changes in the volume of deposits held at the National Bank have accounted for as much as 75% of the total change in the volume of base money.

The Money Multiplier

The Yugoslav monetary multiplier consists of five monetary variables: the ratio of float to total commercial bank deposits; the ratio of required reserves to total commercial bank deposits; the ratio of excess reserves to total commercial bank deposits; the ratio of currency to total commercial bank deposits; and the ratio of demand deposits to total commercial bank deposits. The first two of these variables have probably not been influenced by current changes in nominal income or current economic conditions. Changes in float reflect changes in the efficiency of the payments mechanism while changes in the required reserve ratio reflect changes in National Bank policies. Because reserve requirements have
been stable over much of the 1961-71 period (see table 6.8 of this chapter) and because the National Bank has failed to respond immediately to changes in economic activity, it seems reasonable to assume that changes in nominal income have not led to contemporaneous changes in the required reserve ratio. In contrast, the excess reserve ratio, the currency-deposit ratio and the deposit money-total deposit ratio, all of which are affected by the independent choices of households, enterprises and commercial banks, provide potential channels transmitting impulses from the current economic situation to changes in the money supply. Therefore, these three variables, along with changes in the volume of base money, may establish a chain of reverse causation through which changes in nominal income induce changes in the money supply. Ordinary least squares regression analysis can be used to test whether such reverse causation has occurred.

Table 6.2 presents the results of least-squares estimation of several equations relating percentage changes in the money supply to percentage changes in the four components of monetary growth which are likely to be directly influenced by current changes in economic activity. In equation R.6.1, the rate of growth of the money supply is regressed on the rate of growth of the net monetary base, defined to exclude the volume of required
reserves. The results reveal that percentage changes in the corrected monetary base account for 45% of the variation in percentage changes in the money supply. Equation R.6.2 includes percentage changes in the currency/demand-deposit ratio as an independent variable along with percentage changes in the corrected monetary base. Both variables are significant at the .05 significance level and together they explain 92% of the variation in percentage changes in the money supply. In equation R.6.3 these independent variables are combined with two other components of money supply formation which may be influenced by changes in current economic conditions—percentage changes in the excess reserve ratio, defined as the volume of free bank reserves divided by the volume of demand and sight deposits, and percentage changes in the deposit money-total deposit ratio. Non-monetary deposits are defined to include only those deposits which represent the public's choice about the composition of its asset portfolio. Therefore, the volume of non-monetary deposits which enterprises have been required to hold and which have been restricted as to purpose or timing of use are excluded.

The results of equation R.6.3 indicate that neither the free reserve ratio nor the deposit money-total deposit ratio are significant at the .05 significance
### TABLE 6.2

**FACTORS DETERMINING THE RATE OF GROWTH OF THE MONEY SUPPLY**

<table>
<thead>
<tr>
<th>Equation number</th>
<th>Independent variables</th>
<th>$R^2$</th>
<th>D.W.</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.6.1</td>
<td>C</td>
<td>-1.71</td>
<td>1.07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.51)</td>
<td>(.19)$^a$</td>
</tr>
<tr>
<td>R.6.2</td>
<td>C</td>
<td>12.78</td>
<td>.509</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.70)</td>
<td>(.085)</td>
</tr>
<tr>
<td>R.6.3</td>
<td>C</td>
<td>9.96</td>
<td>.610</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.21)</td>
<td>(.009)</td>
</tr>
</tbody>
</table>


$^a$Standard error: variables: the dependent variable is overlapping four quarter rates of growth of the money supply. GMB is the overlapping four quarter rate of growth of the net monetary base, defined as the sum of currency, excess bank reserves and float; GDCR is the overlapping four quarter rate of change in the demand deposit-currency ratio; GQMR is the overlapping four quarter rate of change in the deposit money-total deposit ratio, where total deposits exclude restricted deposits of the enterprise sector and GERR is the overlapping four quarter rate of change in the excess reserve ratio. A full description of these variables and the sources from which they are taken are given in appendix A.6.1.

Level. An $F$ test indicates that the inclusion of these two variables does not significantly improve the overall performance of the equation. Therefore, equation R.6.2 is chosen as the best regression explaining percentage changes in the money supply, and percentage changes in the money base and in the demand deposit-currency ratio are taken as the major determinants of monetary growth over
the cycle.\textsuperscript{9}

The signs of the estimated coefficients in equation R.6.2 indicate that cyclical movements in high-power base money have been reinforced by cyclical variations in the deposit-currency ratio. The importance of cyclical variations in the deposit-currency ratio reflects the unique institutional arrangement which has placed the bulk of currency holdings in the household sector and the bulk of demand deposit holdings with the enterprise sector. Because the effects of tight monetary policy, as measured by reductions in the rate of growth of the monetary base, have tended to fall most heavily on the enterprise sector, the deposit-currency ratio has exhibited significant cyclical changes in the same direction as the monetary base itself. Restrictive monetary measures in Yugoslavia have generally taken the form of reductions in National Bank credits to commercial banks and corresponding reductions in commercial bank loans to enterprises.\textsuperscript{10} Deceleration in the rate of growth of bank loans to the enterprise sector has increased the shadow rate of interest thereby inducing individual enterprises to economize on cash balances. Because the enterprise sector exhibits a much higher deposit-currency ratio than the household sector, a decline in enterprise cash balances has had a greater effect on holdings of deposits than on holdings of currency.
Consequently, the aggregate deposit-currency ratio has declined in periods of tight monetary policy and has increased during periods of easy monetary policy.

**Reverse Causation and the Deposit-Currency Ratio**

Although it is impossible to devise a strict test of the reverse causality proposition the identification of two major components of monetary growth in Yugoslavia suggests some simple ways to measure possible effects of current nominal income changes in the money supply. One approach is to examine how changes in nominal income influence changes in the deposit-currency ratio. If statistical tests suggest that current changes in this ratio are not influenced by current or past changes in the growth of nominal income, then we can eliminate such changes as a potential transmission mechanism linking nominal income growth and money supply changes. Table 6.3 presents results obtained by regressing current percentage changes in the deposit-currency ratio on lagged and current changes in the growth of nominal income and on current changes in the monetary base. In order to improve the comparability of these results with those presented in chapter 5, the regressions were estimated using an Almon polynomial distributed lag of the fourth degree with no end point constraints. Each equation was estimated to allow for lagged effects of percentage changes in nominal income over a period of two years. The results support the conclusion
that current and lagged percentage changes in nominal income do not explain current changes in the deposit-currency ratio. In equation R.6.4, only the coefficient of nominal income growth lagged eight quarters is statistically significant at the .05 level. The coefficients of all other lagged nominal income variables are insignificant. Equation R.6.5 adds the growth of the monetary base as an independent variable. An F test comparing the sum of squared residuals from equations R.6.4 and R.6.5 shows that the inclusion of this variable significantly improves the fit of the equation.\(^{11}\) In R.6.5, the superior equation, not a single one of the nominal income change variables has a statistically significant coefficient. Therefore, the results of this equation support the proposition that current changes in the deposit-currency ratio are not explained by current or lagged changes in nominal income. The significance of the time variable in the equations considered reflects the downward trend in the deposit-currency ratio which has characterized the observation period. This trend is due to a reduction in the volume of enterprise cash balances, caused by an apparent downward shift in the demand for money schedule of the enterprise sector.\(^{12}\)
## TABLE 6.3

CHANGES IN THE DEMAND DEPOSIT-CURRENCY RATIO

<table>
<thead>
<tr>
<th>Equation number</th>
<th>Independent variables</th>
<th>R^2</th>
<th>D.W.</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.6.4</td>
<td>C 1.001 (.077) a</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>T -0.006 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y -0.004 (.003)</td>
<td>.64</td>
<td>1.02</td>
</tr>
<tr>
<td></td>
<td>Y_1 0.003 (.003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_2 0.002 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_3 -0.001 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_4 -0.002 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_5 -0.001 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_6 -0.0005 (.0002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_7 0.005 (.003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R.6.5</td>
<td>C 0.214 (.089)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>T -0.007 (-0.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GMB 0.008 (.003)</td>
<td>.73</td>
<td>1.08</td>
</tr>
<tr>
<td></td>
<td>Y -0.002 (.003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_1 0.002 (.002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_2 0.0005 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_3 -0.002 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_4 -0.003 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_5 -0.002 (.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_6 -0.0004 (.002)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y_7 -0.006 (.003)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Period of Estimation: 1962III-1972II

---

*aStandard errors: variables: T is a time trend variable; \( \dot{Y} \) is the rate of growth of nominal income, defined as in chapter 5 and contained in appendix A.5.1. \( \dot{Y}_t \) is \( \dot{Y} \) lagged \( t \) quarters.
Reverse Causation and the Monetary Base

Changes in the monetary base provide a second channel through which current or lagged percentage changes in nominal income may have influenced percentage changes in the money supply. Table 6.4 contains the results of some simple statistical tests attempting to measure the possible importance of this relationship. In equation R.6.6, changes in the monetary base are regressed on current and lagged changes in nominal income. The coefficients of both of these variables are insignificant at the .05 significance level and the regression explains only 3% of the total variance in the dependent variable. Equations R.6.7 and R.6.8 were estimated using an Almon polynomial distributed lag of the fourth degree with no endpoint constraints. Again the equations allowed for lagged effects of nominal income growth on monetary base growth ranging over eight quarters. On the basis of an F test, the null hypothesis of a zero restriction on the coefficient of the reform dummy variable was rejected, thereby suggesting that equation R.6.8 is the superior equation. In this equation, only nominal income growth lagged eight quarters has a statistically significant coefficient at the .05 level of significance. These results indicate that if nominal income growth influences growth in the monetary base, it does so with a substantial
### TABLE 6.4

**CHANGES IN THE MONETARY BASE**

<table>
<thead>
<tr>
<th>Equation number</th>
<th>Independent variables</th>
<th>( R^2 )</th>
<th>D.W.</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.6.6</td>
<td>C ( \hat{Y} ) ( \hat{Y}_1 )</td>
<td>.03</td>
<td>.59</td>
</tr>
<tr>
<td></td>
<td>13.75 (.210)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.114) (2.79)a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R.6.7</td>
<td>C ( \hat{Y} ) ( \hat{Y}_1 ) ( \hat{Y}_2 ) ( \hat{Y}_3 ) ( \hat{Y}_4 ) ( \hat{Y}_5 ) ( \hat{Y}_6 ) ( \hat{Y}_7 )</td>
<td>.58</td>
<td>1.28</td>
</tr>
<tr>
<td></td>
<td>25.10 (.151) ( (2.77) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-.276 (.133)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.127 (.075)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.130 (.083)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.055 (.083)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.052 (.074)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.100 (.074)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.008 (.132)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-.588 (.150)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R.6.8</td>
<td>C ( R ) ( \hat{Y} ) ( \hat{Y}_1 ) ( \hat{Y}_2 ) ( \hat{Y}_3 ) ( \hat{Y}_4 ) ( \hat{Y}_5 ) ( \hat{Y}_6 ) ( \hat{Y}_7 )</td>
<td>.64</td>
<td>1.60</td>
</tr>
<tr>
<td></td>
<td>19.64 (3.54) ( (3.54) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-10.00 (4.38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-.120 (.158)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.1738 (.127)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.136 (.070)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.050 (.078)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.045 (.078)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.095 (0.070)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.021 (.125)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-.512 (.145)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Period of estimation:** 1962III-1972II

\(^a\)Standard error: \( R \) is the reform dummy defined in table 5.4 of chapter 5.
lag.\textsuperscript{13}

The results of equation R.6.8, in conjunction with the results of equations R.6.5 and R.6.2, strongly suggest that current changes in the money supply are independent of current and lagged changes in nominal income. Table 6.5 presents one more test of this hypothesis, obtained by regressing changes in the money supply on current and lagged changes in nominal income, using the Almon distributed lag form discussed above. In keeping with the empirical results presented in tables 6.3 and 6.4, equation R.6.9 indicates that current changes in the money supply are independent of current changes in nominal income. Only nominal income growth lagged eight quarters has a statistically significant effect on money supply growth. This result reinforces the conclusion that if nominal income growth has influenced money supply growth, it has done so only with a substantial lag.

As mentioned in chapter 5, the specification and estimation of equations relating changes in nominal income to current and past changes in the money supply rests on the assumption of independence between current changes in the money supply and current changes in nominal income. The empirical tests and results reported in tables 6.3 and 6.5 appear to support this assumption for Yugoslavia during the period of estimation. Therefore,
it seems reasonable to conclude that the coefficients presented in table 5.4 provide an unbiased measure of the total effect of money supply changes on nominal income changes in the Yugoslav economy.

**TABLE 6.5**

**CHANGES IN THE MONEY SUPPLY**

<table>
<thead>
<tr>
<th>Equation number</th>
<th>Independent variables</th>
<th>$R^2$</th>
<th>D.W.</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.6.9</td>
<td>$C \quad \dot{Y} \quad \dot{Y}_1 \quad \dot{Y}_2 \quad \dot{Y}_3$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>35.42 \quad -.459 \quad .235 \quad .175 \quad -.045</td>
<td>.43</td>
<td>.52</td>
</tr>
<tr>
<td></td>
<td>(5.22) \quad (.284) \quad (.250) \quad (.140) \quad (.156)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\dot{Y}_4 \quad \dot{Y}_5 \quad \dot{Y}_6 \quad \dot{Y}_7$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-.115 \quad -.014 \quad -.006 \quad -.640</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.156) \quad (.140) \quad (.249) \quad (.282)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Period of estimation: 1962III-1972II

**Monetary Policy and Inflation: The Institutional Background**

In the first part of this chapter I have identified the major determinants of percentage changes in the money supply and I have tried to demonstrate that these determinants are largely independent of contemporaneous changes in nominal income. In keeping with the conclusions reached in studies of other economies, changes in the monetary base and changes in the demand deposit-currency ratio were found to be major sources of cyclical variations
in money supply growth. These variables seemed to work to reinforce one another, so that a policy-induced reduction in the monetary base growth rate was accompanied by a reduction in the deposit-currency ratio and both of these reductions depressed the rate of growth of the money supply. If, as seems likely, cyclical variations in the deposit-currency ratio have been the product of shifts in the ease or tightness of monetary policy, as measured by changes in the growth of the monetary base, and if, in the absence of such shifts, the deposit-currency ratio has acted to reduce the rate of growth of the money supply, as suggested by the gradual decline of this ratio over the 1962–72 period, then the large percentage increases in the money supply which explain the growth of inflationary pressures in the Yugoslav economy have ultimately been the product of excessively expansionary monetary policy.¹⁴

This conclusion is certainly not unorthodox nor does it suggest that the unique institutional structure of the Yugoslav economy has interfered with the macroeconomic relationships suggested by economic theory. Quite the opposite, the Yugoslav case seems to conform to inflationary patterns in other economies, as illustrated most clearly by the simple cross-country comparisons presented in table 3.1. But while the outcome of an
excessively expansionary monetary policy in Yugoslavia has not been distorted by its unique economic and political institutions, the impetus behind the adoption of such policies is rooted in these same institutions. Therefore, to understand the inflationary process in Yugoslavia, it is first necessary to study some of these institutions in detail to ascertain how they have influenced monetary policy. In the following sections I try to accomplish this task by focusing on the special characteristics of the Yugoslav banking system and its inter-relationships with political organizations and enterprises. My purpose is to illustrate how the strong forms of control exercised by the local political organizations and local enterprises on the local banking system and on the Nacional Bank have introduced an inflationary bias into the money creation process. In my analysis I try also to identify the major unresolved political, ethnic and economic conflicts in Yugoslavia and to indicate how, for want of alternative means, the monetary system has been caught up in an effort to temporarily resolve these conflicts. The predictable, but not desirable, outcome of this process has been a high and accelerating rate of inflation.
The Yugoslav Banking System

The National Bank and the
Other Monetary Authorities

During the 1961-72 period the monetary system underwent a number of structural reforms which significantly changed the character of its operation. Despite these changes the basic principles underlying monetary policy formation retained a degree of cohesiveness and provided a stable framework in which credit and monetary measures could be undertaken. Throughout the period major responsibility for monetary developments rested with the National Bank, which under order from or with the consent of the Federal Assembly and the Federal Executive Council, established monetary objectives and chose the tools to attain such objectives. Among the tools available to the National Bank were some traditional ones, such as the extension of loans and rediscounts to the commercial banks, the extension of loans to the federal government to cover budgetary deficits, the establishment of compulsory reserve requirements, the purchase and sale of foreign exchange, and the imposition of overall limitations on the volume of commercial bank loans. Various other tools were periodically adopted to cope with special problems of the Yugoslav money market. For example, a wide variety of policies, such as the imposition of additional reserve obligations, regulations on the composition of short-term
commercial bank loans, and the introduction of rules
guiding the use of short-term and long-term bank assets,
were designed to safeguard the liquidity of the commercial
banks. In addition, some policies, such as restrictions
on the use of various types of bank and enterprise funds,
were carry-overs from an earlier period when the National
Bank, like the "mono-banks" of centrally-planned econ-
nomies, had directly regulated enterprise and bank pay-
ment and expenditure behavior.

At least one major principle guiding National Bank
activity remained untouched despite the numerous insti-
tutional changes which occurred between 1961 and 1972.
This principle was the use of non-price rationing to
allocate National Bank loans among competing users at
fixed interest rates set by the Bank itself or by the
Bank in cooperation with the Federal Executive Council.
In theory, of course, non-price rationing is a viable
method of allocating a scarce commodity. If we view the
National Bank as a monopolist and its output as credits
to the banking system and to the federal government, then,
like any monopolist, the Bank can either choose a price
and allow quantity to adjust or choose a quantity and
allow price to adjust. In Yugoslavia, where ideology was
biased against the use of interest rate changes to
equilibrate financial markets, price setting and quantity
adjustments were adopted to clear the market for central bank credit.

Accepting the principles of fixed interest rates and non-price rationing of central bank credit, the National Bank employed a variety of methods to achieve its monetary goals. Again, despite frequent changes, two distinct periods of National Bank operations can be identified. During the 1961–66 period the National Bank made its lending decisions in accordance with qualitative rather than quantitative targets. This procedure meant that the Bank satisfied any commercial bank request for a loan provided the loan adhered to National Bank and Federal Assembly guidelines as to purpose, interest rates and course of repayment. Predictably, qualitative control involved the National Bank in constant supervision of commercial bank and enterprise requests for credit to determine whether the appropriate guidelines were obeyed. Local and republican government control over commercial banks and the close links between local political bodies and local enterprises made effective supervision exceedingly difficult; and the National Bank, in internal documents from the period, noted frequent examples of falsification of loan requests or failure of local banks to judge the credit-worthiness of its potential borrowers before making a loan and then requesting a National Bank credit to
cover it. Until the 1966 credit reform, local governmental control over banking institutions was virtually guaranteed because all commercial banks were founded by communal governments responsible for choosing bank managers and directing bank policy. Moreover, from 1961 to 1963, republican banks were established to act as intermediaries between communal banks and the National Bank; the republican banks injected still another source of potential political influence into the credit extension process. The role of political factors in credit allocation was enhanced by the institution of "guarantees" whereby local businesses could obtain commercial bank loans despite their inability to comply with National Bank credit regulations, provided local government officials promised to "guarantee" repayment of these loans. Once a guarantee was issued, local banks granted loans regardless of debtor credit-worthiness and the National Bank covered these loans, if necessary, by the extension of additional central bank credit.

Although the National Bank tried to regulate the volume of loans to the commercial banking system by detailed qualitative guidelines, it had no similar weapon to regulate the flow of lending to the federal government. Throughout the 1960's, with the approval of the Federal Assembly, the federal government could obtain whatever
National Bank credit it required to cover budget deficits. From 1961 to 1966, when disenchantment with federal power and interest in decentralization had still not significantly reduced the activities of the federal government, the size of these deficits and the volume of National Bank credits needed for their finance increased substantially. Table 6.6 reveals that even after 1967, when the Federal budget moved from deficit to surplus, National Bank credits to the federal government for extra-budgetary activities and to other federal agencies such as the army and the commodity reserve funds, remained high and the share of such credits in total National Bank credits declined only slightly.\(^{18}\) In contrast to the federal government, local governments and local quasi-governmental organizations (funds)\(^{19}\) could not borrow directly from the National Bank. However, until 1966, the law allowed these governmental and quasi-governmental organizations to obtain the volume of commercial bank loans they required to cover "temporary" deficits due to the uneven timing of expenditures and receipts. Because these loans fell within federal credit guidelines, the National Bank agreed to finance them whenever necessary, by the extension of central bank credit to the commercial banks.

The above discussion reveals that during the 1961-66 period the Yugoslav National Bank did not exercise
### TABLE 6.6  
**FEDERAL GOVERNMENT DEFICITS AND NATIONAL BANK LOANS, 1961-71**

<table>
<thead>
<tr>
<th>Year</th>
<th>Federal Government Deficits</th>
<th>National Bank Loans to the Federation</th>
<th>Total National Bank Loans</th>
<th>Loans to Federation as a Percentage of Total National Bank Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td></td>
<td>4286&lt;sup&gt;C&lt;/sup&gt;</td>
<td>15477&lt;sup&gt;C&lt;/sup&gt;</td>
<td>27.7%</td>
</tr>
<tr>
<td>1962</td>
<td>a, b</td>
<td>6497</td>
<td>17532</td>
<td>37.1</td>
</tr>
<tr>
<td>1963</td>
<td>34400</td>
<td>6676</td>
<td>20275</td>
<td>32.9</td>
</tr>
<tr>
<td>1964</td>
<td>4800</td>
<td>7490</td>
<td>22288</td>
<td>33.6</td>
</tr>
<tr>
<td>1965</td>
<td>10800</td>
<td>10129</td>
<td>25044</td>
<td>40.4</td>
</tr>
<tr>
<td>1966</td>
<td>63100</td>
<td>10933</td>
<td>23818</td>
<td>45.9</td>
</tr>
<tr>
<td>1967</td>
<td>27800</td>
<td>11778</td>
<td>24206</td>
<td>48.7</td>
</tr>
<tr>
<td>1968</td>
<td>-1200 (surplus)</td>
<td>11794</td>
<td>26201</td>
<td>45.0</td>
</tr>
<tr>
<td>1969</td>
<td>-3600</td>
<td>13029</td>
<td>27640</td>
<td>47.1</td>
</tr>
<tr>
<td>1970</td>
<td>23400</td>
<td>15751</td>
<td>35921</td>
<td>43.8</td>
</tr>
<tr>
<td>1971</td>
<td>32800</td>
<td>18749</td>
<td>42837</td>
<td>43.8</td>
</tr>
</tbody>
</table>

<sup>a</sup>Millions of dinars.


<sup>c</sup>National Bank loans to the federation are estimated by total short-term National Bank loans to all non-bank customers, of which the federation is the largest. Figures are from table 5 of SDK, *Statisticki Bilten*, February 1972.
direct control over the quantity of base money which entered the economy. Its attempts to regulate the volume of credit to the banking system by qualitative guidelines were partially thwarted by the efforts of political leaders to obtain the flow of credit needed for local economic and political objectives. Lacking control over the volume of base money, the National Bank acted much like a price-setting monopolist, granting the quantity of base money demanded at the going price.

The 1965 economic reform introduced a new banking and credit law calling for the adoption of direct quantitative control over base money injections and over the rate of growth of the money supply. In 1965 and 1966, before this law became fully effective, the National Bank continued to regulate monetary developments by issuing detailed credit guidelines. The 1965-66 stabilization efforts witnessed a much stricter supervision and enforcement of these guidelines at all levels of the monetary system. In addition, the law permitting local banks to cover temporary deficits of local political bodies was abolished (1966), thereby cutting off an important source of pressure on the loan capability of the local banking system and on the extension of base money from the National Bank. As a result of these and similar measures, the average annual rate of growth of base money declined
from 19.8% in the 1962-64 period to 13.8% in the 1965-66 period.

With the full introduction of the new banking law in 1967, the National Bank entered a second phase in the formation of monetary policy, characterized by an attempt to regulate the rate of growth of the money supply directly. In this phase the National Bank used an elaborate system of monetary accounts to plan target increases in the money supply and to choose the policies necessary to achieve these targets. In keeping with this new approach to monetary policy, National Bank lending policies to the commercial banks changed significantly. Before 1967, the National Bank had granted credits in the amount requested by local banks provided loan policies adhered to National Bank regulations. After 1967, each local bank received an annual rediscOUNT limit which depended on the average monthly volume of its deposits. Within this limit each bank was permitted to rediscOUNT loans granted for certain specified purposes, including export and import finance, housing construction and inventory accumulation. Each bank was also entitled to an additional volume of National Bank loans or "special credits" in the amount of its indebtedness to the National Bank at the time the banking reform was enacted. During the 1967-72 period, the National Bank varied the rate of repayment of these
special loans in accordance with the needs of the overall monetary situation.

The rediscount policy of the National Bank was designed to achieve both quantitative and qualitative lending goals. Global targets were to be achieved by variations in the volume of rediscounts while selective allocation goals were to be achieved by changes in the criteria for rediscounting eligibility. In practice, increasing emphasis on selectivity and on broadening the range of commercial bank loans rediscountable at the National Bank gradually undermined the use of rediscount limits as an effective form of quantitative control. Immediately after the 1967 reform, the National Bank began to exceed its rediscount limit to finance export loans extended by the commercial banks. Gradually succumbing to pressure from other interest groups, the Bank was forced to expand both the types of activity for which it would "guarantee" refinancing (e.g., for which it would grant loans in excess of stated rediscount limits) and the aggregate volume of such refinancing. The pressure which led to this expansion was mainly political. Firms operating in sectors for which the rediscounting of loans was not a privilege and banks whose clients could not obtain rediscountable loans petitioned local and republican governments and the National Bank for an extension of
rediscounting into new areas of bank lending. Where such petitioning failed, banks and enterprises sometimes resorted to disguising the true purpose of their loans to obtain National Bank support. 23

As a result of growing political dissatisfaction, National Bank lending operations gradually widened to include a variety of commercial bank loans not originally rediscountable. The practice of exceeding stated rediscount limits which began as an exception to stimulate export projects gradually became a rule guiding National Bank lending behavior. Table 6.7 reveals the quantitative importance of rediscounting beyond the limit established by the National Bank. In some cases the volume of loans ultimately rediscounted by the National Bank has been more than one and one-half times as large as the volume specified in the limit figure.

At least part of the problem of excessive rediscounting has resulted from the efforts of individual republics to obtain a "fair share" of the overall volume of National Bank rediscounts. Republican dissatisfaction with federally-determined rediscount volume and composition was highlighted during the 1971 discussions about constitutional reforms when republican political and business representatives demanded a role in choosing the economic sectors and activities to receive privileged
rediscount status at the National Bank. As a result of these discussions and in order to alleviate republican conflicts, the National Bank introduced a new rediscount program for 1972. Under this program, the National Bank published a global rediscount limit, in contrast to the individual bank limits published in the preceding years. A share of the global limit was allotted to each republic to be allocated among competing users in accordance with its own selective criteria.

TABLE 6.7

REDISCOUNT LIMITS AND ACTUAL REDISCOUNTS GRANTED, 1969
(Millions of dinars, December 31, 1969)

<table>
<thead>
<tr>
<th>Borrower</th>
<th>Value: Rediscount Limit</th>
<th>Value: Rediscount Used</th>
<th>(2)/(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td></td>
</tr>
<tr>
<td>Jugobanka(^b)</td>
<td>4,890</td>
<td>20,790</td>
<td>325.3%</td>
</tr>
<tr>
<td>Poljoprivredna Banka</td>
<td>1,390</td>
<td>3,580</td>
<td>157.5</td>
</tr>
<tr>
<td>Investiciana Banka</td>
<td>1,180</td>
<td>650</td>
<td>55.1</td>
</tr>
<tr>
<td>Bosnia-Hercegovina(^c)</td>
<td>2,450</td>
<td>5,480</td>
<td>123.9</td>
</tr>
<tr>
<td>Montenegro</td>
<td>570</td>
<td>1,390</td>
<td>143.4</td>
</tr>
<tr>
<td>Croatia</td>
<td>7,310</td>
<td>17,440</td>
<td>138.6</td>
</tr>
<tr>
<td>Macedonia</td>
<td>2,230</td>
<td>4,410</td>
<td>197.8</td>
</tr>
<tr>
<td>Slovenia</td>
<td>5,230</td>
<td>12,240</td>
<td>134.0</td>
</tr>
<tr>
<td>Serbia</td>
<td>10,680</td>
<td>26,110</td>
<td>144.4</td>
</tr>
</tbody>
</table>


\(^a\)Because 1969 was a year of restrictive monetary policy the figures in column (3) probably understate the extent of excessive rediscounting in easy credit years.
TABLE 6.7--Continued

bJugobanka, Poljoprivredna Banka, and Investiciona Banka are three specialized Yugoslav banking institutions respectively limiting their loans to foreign trade projects, agriculture and certain investment projects. Each bank receives its own rediscount limit from the National Bank which it can use to grant loans to other banks or non-bank borrowers.

cThe rediscount limit for each region refers to the total amount of rediscountable credit extended to all banks whose headquarters are within that region.

Just as the growing weakness of the rediscount mechanism slowly eroded strict quantitative control over the volume of base money entering the monetary system via National Bank credits to the commercial banks, so the continued role of the National Bank as the creditor for federation budget deficits and special expenditure programs reduced quantitative control over the volume of base money entering the monetary system through direct loans to the government. These loans declined during the early years of the new monetary policy only to increase again in 1970 and 1971, indicating the renewed importance of the government deficit in the process of money supply formation. During the entire period the federation maintained its right to request and obtain desired National Bank loans by passage of an appropriate law in the Federal Assembly. Because the market for government bonds was limited, the federation depended on this procedure to
finance important "extra-ordinary" expenditures. Naturally, each time a new law permitted an unforeseen increase in National Bank credits to the government, the volume of base money unexpectedly increased by the same amount, thereby destroying the possibility of effective monetary planning by the National Bank.  

Despite many difficulties the introduction of quantitative targets in 1967 probably did increase National Bank control over the volume of base money. Consequently, it is inappropriate to characterize the post-1967 banking system as one in which the monetary authorities set the price of central bank credit and satisfied demand for credit at that price. It seems equally inappropriate, however, to characterize the system as one in which the monetary authorities closely rationed scarce National Bank loans by definite non-price rationing rules. Instead, the 1967 monetary system must be understood as one in which the National Bank, as the principal formulator and implementor of monetary policy, set a quantity target on base money and then tried to attain this target despite substantial pressure generated within the banking system itself and by other monetary-policy actors, such as the Federal Assembly and the Federal Executive Council. To the extent that it succumbed to this pressure, the National Bank moved closer to the position of a price-setting
monopolist, satisfying all credit demands at the chosen nominal interest rate. To the extent that it acquiesced to the credit policy adopted by the Federal Assembly or the Federal Executive Council, the National Bank admitted its subordination to the ultimate monetary authorities. In this case, the attainment of quantitative monetary targets was not thwarted by forces outside the policy-making circle but was rather transformed through a conflict among members of that circle. In either case, the degree of control which the National Bank maintained over the rate of growth of the money supply, its specific quantity target in the 1967-72 monetary plans, depended on whether unexpected discrepancies between actual and target rates of growth of the monetary base could be offset by variations in other policy tools. These other tools included changes in both the level and basis of reserve requirements, transfers of money into non-monetary accounts by the imposition of restrictions on enterprise and bank expenditures, and direct quantitative limits on the volume of commercial bank lending.

Each of these tools was employed by the National Bank throughout the 1967-72 period to an extent that was consistent with both tradition and with the needs of the current monetary situation. For example, variations in reserve requirements, while available as a monetary policy
measure since late 1956, went more or less unused in the pre-1967 period. Thereafter, as table 6.8 reveals, the National Bank began to vary reserve requirements over the business cycle and to broaden the base of deposits to which such requirements applied. After May 1968, reserve requirements changes were frequent in number and an enlarged deposit base increased the absolute effect of a given reserve rate change. A second and more important tool of monetary regulation was the imposition of earmarking laws which temporarily siphoned off a share of the potential money supply into so-called non-monetary accounts, including both blocked deposits held at the National Bank and restricted deposits held at the commercial banks. Table 6.9 shows the role of non-monetary accounts in the formation of the money supply. The table distinguishes between involuntary non-monetary accounts imposed on spending units by law and voluntary non-monetary accounts which represent the free choice of the public about the composition of its asset portfolio. Only the former provide an accurate measure of a monetary tool employed by the monetary policy-makers. The table indicates that the draining off of funds into involuntary, non-monetary deposits has offset as much as 78% and as little as 10% of the potential increase in the money supply. The flow of funds into involuntary, non-monetary
### TABLE 6.8

**THE RESERVE REQUIREMENT RATIO, 1961-71**

<table>
<thead>
<tr>
<th>Period</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961-January 1964</td>
<td>30%</td>
</tr>
<tr>
<td>Jan-Oct 1964</td>
<td>20</td>
</tr>
<tr>
<td>Oct 1964-May 1965</td>
<td>30</td>
</tr>
<tr>
<td>May 1965-Feb 1968</td>
<td>35</td>
</tr>
<tr>
<td>Feb 1968 – March 1968</td>
<td>33</td>
</tr>
<tr>
<td>March – April 1968</td>
<td>31</td>
</tr>
<tr>
<td>April – May 1968</td>
<td>28</td>
</tr>
<tr>
<td>May – July 1968</td>
<td>31</td>
</tr>
<tr>
<td>July – Sept 1968</td>
<td>25</td>
</tr>
<tr>
<td>September – Dec 1968</td>
<td>27</td>
</tr>
<tr>
<td>December 1968 – Jan 1969</td>
<td>30%</td>
</tr>
<tr>
<td>January – March 1969</td>
<td>31</td>
</tr>
<tr>
<td>March – July 1969</td>
<td>32</td>
</tr>
<tr>
<td>July – Dec 1969</td>
<td>30</td>
</tr>
<tr>
<td>Dec 1969 – July 1970</td>
<td>30</td>
</tr>
<tr>
<td>July 1970 – Aug 1970</td>
<td>31</td>
</tr>
<tr>
<td>July 1971</td>
<td>34</td>
</tr>
<tr>
<td>July – Sept 1971</td>
<td>33-34</td>
</tr>
<tr>
<td>Nov – December 1971</td>
<td>33</td>
</tr>
</tbody>
</table>


### TABLE 6.9

**CHANNELS OF MONEY SUPPLY CREATION, 1963-71**  
(Annual Changes, millions of dinars)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>5131</td>
<td>4419</td>
<td>5566</td>
<td>1483</td>
<td>2491</td>
<td>7985</td>
<td>9042</td>
<td>11243</td>
<td>10184</td>
</tr>
<tr>
<td>2.</td>
<td>-1211</td>
<td>-1011</td>
<td>-44</td>
<td>1716</td>
<td>-1284</td>
<td>902</td>
<td>929</td>
<td>-3343</td>
<td>-2645</td>
</tr>
<tr>
<td>3.</td>
<td>-149</td>
<td>995</td>
<td>-529</td>
<td>696</td>
<td>-157</td>
<td>-209</td>
<td>1958</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>-1757</td>
<td>483</td>
<td>-2962</td>
<td>-905</td>
<td>-128</td>
<td>-1504</td>
<td>-1781</td>
<td>-1538</td>
<td>-734</td>
</tr>
<tr>
<td>b.</td>
<td>546</td>
<td>-1271</td>
<td>-1113</td>
<td>-1951</td>
<td>-729</td>
<td>-1387</td>
<td>-2608</td>
<td>-2474</td>
<td>-1366</td>
</tr>
<tr>
<td>5.</td>
<td>5341</td>
<td>4403</td>
<td>4993</td>
<td>3895</td>
<td>1447</td>
<td>8730</td>
<td>7904</td>
<td>9858</td>
<td>7539</td>
</tr>
<tr>
<td>6a/5</td>
<td>.329</td>
<td>.110</td>
<td>.593</td>
<td>.232</td>
<td>.780</td>
<td>.172</td>
<td>.217</td>
<td>.156</td>
<td>.097</td>
</tr>
</tbody>
</table>

accounts was particularly crucial in tight money years—such as 1965, 1967, and 1969—when the stated goal of monetary policy, as revealed in National Bank documents and Federal Assembly resolutions, was macroeconomic stabilization. Because most decisions about account blocking and freezing were made outside the National Bank the importance of this monetary tool again suggests that the Federal Assembly and the Federal Executive Council are the ultimate decision-makers in monetary policy. In fact, in some years, unexpected changes in the laws regulating non-monetary deposits completely disrupted the basis on which the National Bank had designed its quantitative targets and had chosen the policies needed to achieve these targets.25

A third policy employed by the monetary authorities to attain money supply growth targets was the imposition of quantitative limits on the outstanding volume of commercial bank loans. Such limitations or "credit freezes" were applied from mid-1966 to the end of March 1967, and again, periodically, throughout 1970 and 1971. During a credit freeze banks were directed to adjust their asset portfolios so that the volume of their outstanding loans did not exceed some specified amount. As long as some categories of bank loans remained exempt from the freeze, both banks and bank clients endeavored to switch to these
loans to obtain the credit they required for other purposes. To the extent that such switches were feasible, the realized rate of growth of bank credit exceeded the target rate set down the National Bank.²⁶

The Monetary Authorities: Some Conclusions about Forms of Control

The preceding description of the Yugoslav monetary authorities focused on two major issues: first, the sources of growth in the monetary base during the 1961-72 period and the policies underlying such growth; and second, the actions taken by the monetary authorities to realize target increases in the money supply. The discussion identified the problems besetting National Bank efforts to regulate the volume of its loans whether by regulating the purposes for which such loans could be used or by controlling their quantity. The analysis distinguished similar problems in the implementation of other monetary policies designed to modify the effects of a given increase in the monetary base on the realized growth in the money supply. Some of these problems were shown to stem from conflicts between the National Bank on the one hand and the federal organizations responsible for monetary policy formation on the other. In each case of conflict, the National Bank succumbed to the directives of these other organizations. Interference with National Bank control
over the money supply was also shown to be the result of pressures placed on the monetary authorities by the commercial banking system, backed up by local political groups and economic organizations. These pressures took the form of direct efforts to change monetary policies and concealed efforts to violate these policies whenever necessary. In order to understand how the banking system was able to engage in such activities and how it was able to achieve success in several instances, it is necessary to examine the political and economic ties linking the officials of local governments, enterprises, and banks to one another and to the federal monetary authorities. Such an examination also provides some working hypotheses about the principles motivating commercial bank lending behavior in Yugoslavia and about the inherent conflict between these principles and the goal of macroeconomic stability.

The Political Economy of the Yugoslav Commercial Banking Systems

During the 1961-72 period the commercial banking system in Yugoslavia took on all of the functions traditionally associated with commercial banks in modern industrial economies. Moreover, beginning in 1963, when the federal and republican governments began to transfer their investment resources to the banking system, the commercial banks also became the major financial intermediary
involved in investment lending. The annual balance sheet accounts presented in table 6.10 reveal some of the important characteristics of the banking system in each of its roles. The accounts clearly illustrate the simple asset composition of commercial bank portfolios and the importance of National Bank credits among total bank liabilities. The figures suggest that during the 1961-72 period, the commercial banks were in substantial and continuous debt to the National Bank. National Bank loans constituted the single largest liability of the banking system throughout the period. These facts alone suggest a strong degree of responsiveness of the banking system to National Bank lending policies. On the asset side, the lack of financial securities which could be liquidated in a period of financial stringency meant that restrictive National Bank lending policies could have a direct effect on the volume of commercial bank loans. On the liability side, the predominance of National Bank credits as a source of finance indicated that any change in either their volume or the terms on which they were granted could induce corresponding changes in bank lending behavior.

The banking system's freedom of action was also restricted by continued government ownership of a large share of the funds available for investment lending. In table 6.10 government-owned funds include both "government
### TABLE 6.10

CONSOLIDATED BALANCE SHEETS OF COMMERCIAL BANKS
(End-of-year positions)

<table>
<thead>
<tr>
<th></th>
<th>1964</th>
<th></th>
<th>1968</th>
<th></th>
<th>1971</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Billions of Dinars</td>
<td>% of Total</td>
<td>Billions of Dinars</td>
<td>% of Total</td>
<td>Billions of Dinars</td>
<td>% of Total</td>
</tr>
<tr>
<td><strong>I. Short-term Operations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign assets</td>
<td>392</td>
<td>1.1</td>
<td>1,091</td>
<td>1.9</td>
<td>247</td>
<td>.3</td>
</tr>
<tr>
<td>Enterprise loans</td>
<td>21,563</td>
<td>58.0</td>
<td>35,019</td>
<td>62.4</td>
<td>53,742</td>
<td>57.0</td>
</tr>
<tr>
<td>Consumer loans</td>
<td>4,074</td>
<td>11.0</td>
<td>3,923</td>
<td>7.0</td>
<td>5,923</td>
<td>6.3</td>
</tr>
<tr>
<td>Foreign exchange loans to domestic residents</td>
<td>715</td>
<td>1.9</td>
<td>1,137</td>
<td>2.0</td>
<td>11,142</td>
<td>11.8</td>
</tr>
<tr>
<td>Use of short-term sources for investment loans</td>
<td>1,164</td>
<td>3.1</td>
<td>1,976</td>
<td>3.5</td>
<td>22,814</td>
<td>24.2</td>
</tr>
<tr>
<td>Deposits at National Bank</td>
<td>7,601</td>
<td>20.5</td>
<td>10,381</td>
<td>18.5</td>
<td>12,933</td>
<td>13.7</td>
</tr>
<tr>
<td>Excess reserves</td>
<td>2,305</td>
<td>6.2</td>
<td>1,517</td>
<td>2.7</td>
<td>1,276</td>
<td>1.4</td>
</tr>
<tr>
<td>Required reserves</td>
<td>4,447</td>
<td>12.0</td>
<td>6,481</td>
<td>11.6</td>
<td>10,457</td>
<td>11.1</td>
</tr>
<tr>
<td>Other deposits</td>
<td>849</td>
<td>2.3</td>
<td>2,383</td>
<td>4.2</td>
<td>4,200</td>
<td>4.5</td>
</tr>
<tr>
<td>Other assets</td>
<td>1,650</td>
<td>4.4</td>
<td>2,579</td>
<td>4.6</td>
<td>11,638</td>
<td>12.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>37,159</td>
<td>100.0</td>
<td>56,106</td>
<td>100.0</td>
<td>94,269</td>
<td>100.0</td>
</tr>
</tbody>
</table>

| **Liabilities**     |             |         |             |         |             |         |
| Foreign liabilities | 444         | 1.2     | 2,073       | 3.7     | 5,764       | 6.1     |
| Foreign exchange deposits of residents | 480         | 1.3     | 5,278       | 9.4     | 13,350      | 14.2    |
| Deposits            | 20,626      | 55.5    | 31,323      | 55.8    | 45,344      | 48.1    |

---

383
TABLE 6.10--Continued

<table>
<thead>
<tr>
<th></th>
<th>1964</th>
<th></th>
<th>1968</th>
<th></th>
<th>1971</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Billions of Dinars</td>
<td>% of Total</td>
<td>Billions of Dinars</td>
<td>% of Total</td>
<td>Billions of Dinars</td>
<td>% of Total</td>
</tr>
<tr>
<td>Giro and similar accounts</td>
<td>13,853</td>
<td>37.3</td>
<td>15,827</td>
<td>28.2</td>
<td>22,093</td>
<td>23.4</td>
</tr>
<tr>
<td>Other sight deposits</td>
<td>3,742</td>
<td>10.1</td>
<td>8,085</td>
<td>14.4</td>
<td>12,851</td>
<td>13.6</td>
</tr>
<tr>
<td>Restricted deposits</td>
<td>3,031</td>
<td>8.2</td>
<td>7,411</td>
<td>13.2</td>
<td>10,300</td>
<td>10.9</td>
</tr>
<tr>
<td>Borrowings from National Bank</td>
<td>14,678</td>
<td>39.5</td>
<td>13,562</td>
<td>24.2</td>
<td>24,630</td>
<td>26.1</td>
</tr>
<tr>
<td>Other liabilities&lt;sup&gt;b&lt;/sup&gt;</td>
<td>931</td>
<td>2.5</td>
<td>2,870</td>
<td>5.1</td>
<td>3,181</td>
<td>3.4</td>
</tr>
</tbody>
</table>

<sup>a</sup>Until 1971, official Yugoslav accounting distinguished short-term bank operations (generally those involving assets or liabilities of less than one year's duration) from long-term operations. Balance sheets for both types of operations can therefore be distinguished.

<sup>b</sup>Other assets and other liabilities include flows of credit between the commercial banks and the three specialized banks.

II. Long-term Operations<sup>a</sup>

<table>
<thead>
<tr>
<th></th>
<th>1964</th>
<th></th>
<th>1968</th>
<th></th>
<th>1971</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Billions of Dinars</td>
<td>% of Total</td>
<td>Billions of Dinars</td>
<td>% of Total</td>
<td>Billions of Dinars</td>
<td>% of Total</td>
</tr>
<tr>
<td>Assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment loans</td>
<td>59,318</td>
<td>99.7%</td>
<td>122,422</td>
<td>99.5%</td>
<td>144,522</td>
<td>98.9%</td>
</tr>
<tr>
<td>Other</td>
<td>193</td>
<td>.3</td>
<td>148</td>
<td>.5</td>
<td>1,630</td>
<td>1.1</td>
</tr>
</tbody>
</table>
### TABLE 6.10--Continued

<table>
<thead>
<tr>
<th>Liabilities</th>
<th>1964</th>
<th>% of Total</th>
<th>1968</th>
<th>% of Total</th>
<th>1971</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>59,511</td>
<td></td>
<td>123,070</td>
<td></td>
<td>146,152</td>
<td></td>
</tr>
<tr>
<td>Foreign exchange</td>
<td>271</td>
<td>.5%</td>
<td>5,016</td>
<td>4.1%</td>
<td>17,178</td>
<td>11.8%</td>
</tr>
<tr>
<td>Own funds (credit fund)</td>
<td>23,791</td>
<td>40.0%</td>
<td>9,791</td>
<td>9.0%</td>
<td>7,940</td>
<td>5.4%</td>
</tr>
<tr>
<td>Time and restricted deposits</td>
<td>5,508</td>
<td>9.3%</td>
<td>22,997</td>
<td>18.7%</td>
<td>40,504</td>
<td>27.7%</td>
</tr>
<tr>
<td>Transfers to short-term balance sheet</td>
<td>1,211</td>
<td>2.0%</td>
<td>1,344</td>
<td>1.1%</td>
<td>1,312</td>
<td>.9%</td>
</tr>
<tr>
<td>Government credits for investment</td>
<td>5,725</td>
<td>9.6%</td>
<td>53,193</td>
<td>43.2%</td>
<td>47,654</td>
<td>32.6%</td>
</tr>
<tr>
<td>Communal-government funds</td>
<td>22,092</td>
<td>37.1%</td>
<td>14,808</td>
<td>12.0%</td>
<td>1,827</td>
<td>1.3%</td>
</tr>
<tr>
<td>Housing funds&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-</td>
<td></td>
<td>15,252</td>
<td>12.4%</td>
<td>25,329</td>
<td>17.3%</td>
</tr>
<tr>
<td>Other</td>
<td>1,184</td>
<td>1.5%</td>
<td>669</td>
<td>.5%</td>
<td>4,408</td>
<td>3.0%</td>
</tr>
</tbody>
</table>

**SOURCES:** All figures from SDK, Statisticki Bilten, February 1972, pp. 16-19.

<sup>a</sup> See note (a) to balance sheet for short-term operations.

<sup>b</sup> Housing funds refer to specialized deposits held by individuals or enterprises in conjunction with mortgage loans.
credits for investment loans" and "communal and government funds"; an unspecified share of long-term deposits and credit fund holdings are also owned by different government organizations. The figures disclose that the government's share in total investment funds as measured by the identifiable sources ranged from 46.7% in 1964 to 33.9% in 1971. Until 1969, all levels of government--federal, republican and communal--committed the bulk of their investment funds to the banks which invested them in accordance with contractual obligations about their use. In October 1969, the federal government withdrew its funds from the banks and began to grant investment credits in its own name, using the banking system solely as an intermediary agent. However, this policy change did not radically transform commercial bank operations since federal authorities had always maintained close control over the distribution of federal funds.\textsuperscript{27} Greater independence of the banking system in investment lending occurred only as a result of the growth of credit funds, long-term deposits and foreign exchange accounts, the three sources of funds over which the banking authorities exercised full discretion. The share of these sources in total funds rose from 30.8% in 1968 to 44.8% in 1971, thus providing the foundation for greater bank autonomy in investment loan decisions.
Despite numerous institutional restraints, banks maintained substantial management power over important aspects of monetary and financial markets. Individual banks were responsible for varying the composition of their asset portfolios, for collecting funds via time and demand deposits, and for stipulating the non-price terms for a portion of their short-term and investment loans. Because of the rigidity of nominal interest rates, this last function meant that banks effectively determined the allocation of credit by whatever rationing rules they chose to adopt. An understanding of bank behavior in this area requires knowledge about the principles motivating bank decision-makers. Studies of commercial banks in the U.S. usually assume the existence of risk averse bank managers whose decisions are guided by the goal of profit maximization. The adoption of a similar behavioral assumption for Yugoslav bankers necessitates a careful analysis of the various social and political groups whose interactions influence bank activity.

The Influence Structure in Commercial Bank Decision-Making

Perhaps the most outstanding feature of the Yugoslav commercial banking system has been its regional character. From 1961 to 1964, this feature was incorporated into banking legislation which established republican banks to act as central bankers for commercial or
communal banks and which limited the role of the National Bank to regulating the credit potential and lending policies of the republican banks. Ironically, the federal government adopted this legislation partly in response to criticism of the previous system under which local communal governments had directed bank activities, thereby rendering impossible a sound policy of profitable lending. The new system merely replaced communal political boundaries with boundaries of a wider geographic scope and did nothing to consolidate the six republican credit markets. The credit and banking reform of 1965 represented another attempt to create a national banking network by reducing local and republican government control over banking institutions.29 After 1967, no formal barriers prevented banks from operating in more than one republic. Nonetheless, because of informal barriers and tradition, banks were slow to expand their activities into new areas. By 1969, only two banks had opened branch offices outside the republics in which their head offices were located.30 Thereafter this trend spread slowly, and by 1972, the eleven largest banks were operating branches in more than one republic.31 Most of this extra-republican business, however, was limited to the establishment of small offices in Belgrade, the center of the federal government and hence the central location for the disbursement of federal
investment funds and government allocations. All the remaining commercial banks—thirty-four in number—continued to respect traditional republican boundaries. Such evidence supports the conclusion that territorial considerations have been a major determinant of bank behavior—or alternatively, that maximization of bank objective functions has been subject to geographic, or more exactly, ethnic constraints.

The second salient feature of the Yugoslav banking system has been the strong subordination of individual banks to the controlling influence of bank borrowers and local governments. While other banking systems—notably the West German one—exhibit strong interrelationships between the business community and the banks which serve it, the line of control customarily runs from banks to borrowers. In Yugoslavia, however, influence has run in the reverse direction, with large business and government borrowers determining bank credit policy. Borrower control over bank decision-making has not been an accidental development; instead, it has been a necessary outgrowth of legislation concerning the creation and management of commercial banks.

From 1961 to 1966, commercial banks were founded by local and republican governments and were managed by a group of directors, two-thirds of whom were representatives
of local enterprises and the remainder of whom were local government officials. Republican banks in turn monitored the behavior of the local commercial banks thereby, in theory, enforcing National Bank credit guidelines at the local level. The communal-republican bank structure represented a continuation of the decentralization scheme adopted in the fifties, when the soviet model of a one-bank system was discarded in favor of a multi-bank system. Unfortunately, decentralization provided no solution to the problem of how to replace political control at the center with diffuse, economically-motivated control on the periphery. Therefore, from 1961 to 1966, decentralization meant de facto control of bank decisions by an ever-changing combination of local and republican political interests. In 1967, an effort was made to alleviate the distortions of this system by reducing the influence of government organizations and by increasing the role of enterprises and private borrowers in bank credit allocation decisions.\textsuperscript{33}

Under the new system individual bank policy was determined by a managing assembly consisting of representatives of the bank's employees and of the business firms and government bodies holding deposits at that bank. The voting power of each depositor was dependent upon its share in long-term time deposits and in the bank's credit
fund. The credit fund was the value of capital the bank was required to have to receive a charter for operation. Usually, this capital was obtained by contributions from enterprises and local governments. These contributions were much like purchases of equity, giving the contributors a right to a variable share in the profits of the bank's operations. Although prospective contributors could buy as large a share in the credit fund as they wished, their voting power was limited to 10% of the total vote on the managing board to prevent the monopolization of banking policy by a single decision-maker. Table 6.11 shows the breakdown of contributors to bank credit funds and their representation in bank assemblies. The table also gives the composition of bank executive boards which were elected by the bank assemblies to implement credit and loan policies. In every republic business interests dominated both organs. The executive committees cooperated with the Credit Committees which were composed of bank experts hired to decide on individual requests for credit in keeping with the Assemblies' guidelines.

It was hoped that this organizational system would free bank lending policy from political influence, since depositors would insist that their money be invested according to economic rather than political criteria. Instead, enterprise shareholders tended to view their
TABLE 6.11
THE COMPOSITION OF BANK MANAGEMENT BOARDS

<table>
<thead>
<tr>
<th></th>
<th>Share of Total Votes in Bank Assembly</th>
<th>Share of Total Membership on Bank Executive Boards</th>
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</thead>
<tbody>
<tr>
<td><strong>Bosnia-Hercegovina</strong></td>
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<td></td>
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<td>78.2%</td>
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<td>1.9</td>
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<td>Other</td>
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<td>19.9</td>
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TABLE 6.11--Continued

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<th>Shares of Total Votes in Bank Assembly</th>
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<td>Other</td>
<td>19.5</td>
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ccontributions to bank credit funds, not as a financial investment on which to maximize financial returns, but as a means to purchase control over bank lending decisions and a share in scarce bank loans. Since nominal interest rates were controlled and real interest rates were often negative, bank loans were allocated by non-price rationing rules and the enterprise able to influence these rules by its vote on the bank management board was often the enterprise which received the real resource transfer attached to a loan with a negative real interest charge. The influence of bank membership on the terms of bank finance is illustrated by the fact that bank loans to non-member enterprises frequently carried interest rates as high as 25%; moreover, the volume of such loans remained quite small, in the order of 5% of total bank loans.34 The importance of bank loans as a source of finance for enterprise investment in fixed and working capital enhanced the importance of participation in the
bank decision-making process to guarantee adequate finance for continued business operations. As table 6.12 reveals, after the transfer of government investments resources to the banking system in 1963, commercial banks became the largest external suppliers of funds to the enterprise sector.

| TABLE 6.12 |
| BORROWED FUNDS OF ENTERPRISES, 1961-71 |
| (Annual changes) |
| 1961 | 1965 | 1968 | 1971 |
| Net short-term bank loans | 1511\(^a\) | 2680 | 5378 | 8146 |
| Net long-term bank loans | - | 16201 | 10391 | 12846 |
| Net long-term loans from other sources | 6654 | -8432 | 1580 | -213 |
| Foreign loans | - | 1191 | 6380 | 4078 |
| Bank loans as % of total | 16.7 | 1.62 | 66.5 | 84.5 |


\(^a\)Billions of dinars.

The dependence of the enterprise sector on commercial bank finance meant that the new system of bank management functioned much like the old, with bank policy based on a struggle between those groups which gained control over the bank decision-making process. In this struggle the larger an enterprise, the larger its
contribution to bank credit funds, and the larger the volume of time deposits which it held, the greater its influence over bank rationing rules and hence the greater the likelihood of approval for its bank loan requests.\textsuperscript{35} Therefore, in Yugoslavia, as elsewhere, rationing of bank loans has probably led to the selective refusal of the loan requests of smaller firms and the selective approval of the loan requests of larger ones.\textsuperscript{36}

Unfortunately, without individual enterprise data it is difficult to test propositions about loan rationing among firms. However, data broken down by sector of production allow a rough test of the correlation between contributions to bank credit funds and time deposit holdings on the one hand and bank loans granted to each sector on the other. Using data for twenty-nine production sectors in 1970, the rank correlation coefficients between sectoral shares in total bank capital (credit funds and time deposit holdings) and sectoral shares in total bank loans (both short-term and long-term) is calculated to be .83.\textsuperscript{37} The size and significance of this correlation indicates the extent to which credit fund contributions and time deposits have bought firms a guaranteed share in the volume of bank loans.\textsuperscript{38}

The use of bank credit funds and time deposits to purchase a vote in credit allocation decisions has been
widely discussed in Yugoslavia during recent years because of an apparent contradiction between the growing number and value of defaulted trade bills\textsuperscript{39} and the growing volume of limited-use time deposits held by the business sector. During the 1968-71 period, when the outstanding volume of defaulted trade bills increased year by year, enterprise time deposit holdings increased by 60.1\%.\textsuperscript{39} Government officials attacked the banks for fostering these trends by forcing enterprises to hold long-term bank deposits as a pre-condition for loan approval.\textsuperscript{40} Whether the banks exercised such force is irrelevant since the organizational structure of bank management necessarily implies that loan decisions depend on the size of a borrower's contribution to bank capital.\textsuperscript{41}

\textbf{A Behavioral Assumption for Commercial Banks}

The preceding paragraphs identify local and republican governments and business firms as the actors who have shaped commercial bank decisions about asset composition, deposit collection and non-price credit rationing principles. Because the interests of these actors have often been contradictory, bank decisions have been the outcome of a struggle. As a result, it is unreasonable to assume that observed bank behavior has reflected underlying profit maximization by bank decision-makers. Once the principle of profit maximization is discarded, the task
of explaining and predicting bank actions becomes more
difficult for want of an alternative simplifying assump-
tion. Efforts to develop such an assumption appear inap-
propriate, however, because informal controls, swiftly
changing alliances between political and economic forces,
and offsetting motivations among economic agents have
been of the essence of the actual Yugoslav situation and
such phenomena are antithetical in both form and spirit
to the idea of a simple behavioral rule. Therefore, the
next sections of this chapter examine certain characteris-
tics of the monetary and financial markets which reflect
the pattern of decision-making discussed above without
devising a rigorous behavioral model of bank behavior.
The examination is selective rather than complete, focusing
on those factors which have complicated the task of mon-
tary control by the National Bank.

**Commercial Bank Behavior and Monetary Control**

Although borrower control over credit decisions
may have important allocational implications, it does not
of necessity give rise to macroeconomic distortions. Even
when rationing of credit is required because of interest
rate ceilings, macroeconomic stability can be maintained
provided the monetary authorities can effectively control
the quantity of loans extended by the commercial banks.
In contrast, if the monetary authorities succumb to
pressures to finance frustrated loan requests at prevailing interest rates, then borrower influence over bank decision-making of the type characterizing the Yugoslav banking system becomes an important determinant of macroeconomic stability. This has certainly been true in Yugoslavia where realized money supply increases have frequently exceeded target increases, as a result of National Bank efforts to reduce excess demand on the market for bank loans.

It is easy to see how excessive money supply increases occurred during the 1961-66 period when commercial banks were able to obtain the credit they required from the National Bank provided they satisfied certain qualitative lending guidelines. Because the National Bank could not police each credit request it received and because no other agent responsible for processing such requests had an interest in doing so, these conditions were unenforceable. In short, the actual volume of credit extended often depended almost entirely on the volume of demand for bank loans generated at the fixed interest rates. Consequently, quantitative control over the extension of National Bank loans was frequently non-existent. Periodically, however, as in 1961 and again in 1965, the National Bank successfully reduced the rate of growth of the money supply and short-term bank loans by imposing
direct quantitative restrictions on bank lending and by immobilizing certain bank deposits. The experience of these years suggests that ex ante excess demand for credit did not necessarily imply its ex post realization, provided the National Bank introduced strictly enforceable quantitative targets.

Since the end of 1966, when quantitative control became the custom for the new banking system, the scope for borrower-induced credit expansions has been drastically reduced. Because of the paucity of liquid assets in commercial bank portfolios and because of the dominant position of National Bank credits among commercial bank liabilities (see table 6.10) small changes in National Bank policies have required rapid adjustments in bank lending behavior. Banks have temporarily postponed such adjustments by running down their excess reserves and by violating National Bank regulations.

Commercial bank violations of National Bank directives apparently occurred both before and after the introduction of the bank reform in 1967. Although it is impossible to measure the quantitative importance of such violations, anecdotal evidence sheds some light on the issue. For example, in 1966, the National Bank noted that at least 12% of total bank loans granted during that year had been illegally extended either on the basis of
fictitious documentation or for purposes not specified in the binding credit regulations. 42 Apparently, the 1967 reform did not eliminate commercial bank violations and in 1969, the National Bank was again forced to issue a series of complaints against commercial banks for illegal activities which included permanent employment of special reserve funds for financing customer loans, maximum use of rediscounting by fictitious documentation, failure to repay expired credits to the central bank and failure to keep up required reserves. 43 Commercial bank infractions of National Bank regulations were so widespread in that year that one observer charged that the lack of credit discipline and the disorder of the business banks successfully reversed the effects of the monetary-credit measures taken by the National Bank. 44

Commercial banks have also delayed adjustments to changes in National Bank credit policy by varying their excess reserves. As a result, as graph 1 indicates, the excess reserve ratio—defined as the ratio between bank cash reserves held at the National Bank and bank deposits which are subject to reserve requirements—has exhibited both a sharp downward trend and noticeable cyclical variability in recent years. An explanation of these phenomena highlights the motivations underlying commercial bank behavior and provides another indication
Excess Bank Reserves

$R = \text{free reserves plus special reserve funds as a percentage of bank demand and sight deposits.}$

Source: SDK, Statisticki Bilten, table 6, various issues.
of the extent to which the institutional structure of the banking system has made the task of monetary control more difficult.

In most analyses of commercial bank behavior, the volume of excess reserves is functionally related to the level of bank deposits and to the opportunity cost of holding cash, measured as the difference between the commercial bank loan rate and the rediscount rate. These relationships are usually expressed in the following form: \[ R^* = f(D, r_i - r_d) \] (6.1)

where

- \( R^* \) is the desired value of free reserves;
- \( D \) is the value of bank deposits
- \( r_i \) is the prevailing interest rate on commercial bank loans;
- \( r_d \) is the central bank discount rate.

By assumption, \( f_1 > 0 \) and \( f_2 < 0 \).

Actual reserves may differ from desired reserves because of lags in adjustment and because bank behavior is often limited by certain constraints, the major of which is the need for banks to meet short-term customer demand for loans. This constraint reflects the fact that, even in an independently-controlled banking system, the volume of
bank loans lies at the initiative of the customers, at least in the short run. Because commercial loans are crucial to customer relationships, banks endeavor to accommodate increases in the demand for such loans in the short run by increasing borrowings from the central bank and by cutting excess reserves. Given sufficient time, these variations give rise to bank efforts to adjust the volume of loans by interest rate or loan term corrections, or to readjust other asset holdings to their optimal levels, given the new volume of loans.

The impetus for such a chain of events has been much stronger in Yugoslavia where customer pressure to expand commercial loans is much more direct than in the economies for which the above model was derived. Therefore, in the short run, an unexpected increase in the demand for bank loans and/or a decrease in the volume of National Bank credits can be expected to lead to a substantial deterioration in the liquidity of the Yugoslav commercial banking system. This proposition partially explains the excess reserve losses which occurred from 1966II to 1967IV and from 1968III to 1969III when the National Bank followed a course of monetary restrictiveness. It also explains—at least in part—why excess reserves failed to recover to previous levels in 1968 and 1970, years of substantial monetary leniency, and
therefore, why the excess reserve-deposit ratio exhibited a downward trend throughout the 1967-72 period. Both conditions can be attributed to steady increases in the demand for bank credit at constant nominal and falling real interest rates. Banks have covered these increases by National Bank credits when available and by reserve losses otherwise; periods of monetary ease have not been used to rebuild needed liquidity but to grant additional loans to bank customers. This behavior has led to increasing occurrences of illiquidity on the part of individual banks, increasing use of special reserve funds to cover loan increases rather than to cover temporary deposit drains, and renewed efforts by the National Bank to directly regulate the volume of reserves held by the banking system.

**Commercial Bank Behavior and Investment Lending**

The preceding discussion focuses on the failure of the commercial banks to develop binding rationing rules for short-term loans and on their efforts to expand the volume of such loans by manipulating qualitative credit conditions, varying excess reserves and violating National Bank regulations. The impetus behind these activities is rooted in the banking structure which places responsibility for the allocation of credit with major bank borrowers. Borrower control over credit allocation
has also significantly influenced the principles guiding bank extensions of long-term or investment loans. Perhaps the most important consequence has been the development of investment "guarantees."

Investment guarantees are bank promises to cover enterprise debt incurred in conjunction with a given investment project. In theory, a guarantee is exactly analogous to an investment loan because the bank agrees to cover all enterprise investment expenditures up to an agreed upon amount, should the enterprise so request. Because Yugoslav law requires that an investment project be licensed only after the resources for its finance are "insured" by advance payment, letters of credit or bank guarantees, customer pressure on banks for the extension of investment guarantees has been substantial. Consequently, banks have been induced to grant guarantees far in excess of their financing capabilities.

Although the over-extension of guarantees cannot be directly measured, rough estimates of the magnitude of the problem can be made. For example, in recent years the total value of unpaid, expired debt for already completed investment work has averaged around 25-28% of the value of total cash payments on investment projects. A large portion of this debt is probably covered by bank guarantees. Similarly, the Federal Statistical Office
has estimated that trade credit or other delayed payment arrangements cover anywhere from 15% to 25% of annual investment expenditures. A large fraction of this total probably reflects involuntary credit extension by suppliers who cannot obtain payment from the banks "guaranteeing" their customers.\(^51\)

In recent years the inability of the banking system to honor its investment guarantees has fostered the growth of payments defaults within the enterprise sector and has aggravated the so-called illiquidity crises during which increasing numbers of enterprises have failed to pay their debts on time for lack of liquid resources.\(^52\) The discussion in chapters 7 and 8 suggests that such crises have caused the National Bank to ease monetary restrictions to reduce the threat of widespread bankruptcy. Thus, the guarantee system and its misuse can be seen as another source of leverage through which the banking system has induced the monetary authorities to provide the flow of lending desired by bank borrowers.

Conclusions

The above discussion suggests the following hypothesis about the Yugoslav inflation: excessive growth of the money supply has been the unplanned consequence of the National Bank's inability to effectively control the quantity of bank loans granted by local banks to local economic agents. The discussion of illiquidity crises
and inflation in chapters 7 and 8 gives support to this hypothesis. In recent years, National Bank efforts to reduce bank lending by restricting the growth of the monetary base have quickly brought on an illiquidity crisis in the banking system and in the enterprise sector and the threat of widespread bankruptcy has forced the National Bank to reverse its policy. Ultimately, then, the credit demands of the local banks and the local political alliances have determined the course of base money growth and the course of growth in the money supply. As the cycles of restrictive monetary policy, illiquidity and monetary expansion have recurred, the entire situation has deteriorated because of the expectations set up from previous experience. The fact that the National Bank has been forced to reverse its policies in the face of business and bank bankruptcy has encouraged both groups to maintain spending and to drastically cut their liquidity during restrictive periods under the expectation that adverse consequences will be averted by a new injection of credit at just the right moment. As the discussion in chapters 7 and 8 reveals, this expectation has reduced enterprise responsiveness to monetary policy and has made the task of effective monetary control increasingly difficult.
Appendix A.6.1

Part 1. A Description of the Sources of Data and Construction of the Variables Used in the Regression Analysis

The Money Supply (MS)

The money supply figures are the same as those described in appendix A.4.1.

The Monetary Base (MB)

The monetary base is measured as the sum of currency in circulation (gotov novac u opticaju), excess reserves of the banking system held at the National Bank (sredstva banaka, ziro racuni), and float (sredstva u obracunu po platnom prometu). The series for each of the components of the monetary base are taken from the Statisticki Bilten of the Social Accounting Service (SDK), table 3.

Demand Deposits (DD)

A series on the volume of demand deposits is obtained by subtracting the series on currency in circulation from the series on the money supply.

The Demand-Deposit-Currency Ratio (DCR)

This ratio is measured as the ratio between demand deposits and currency in circulation.

Voluntary Non-monetary Deposits (QM)

A series on the volume of voluntary non-monetary deposits held by the public at the commercial banks is obtained by subtracting the series on the money supply from a series on "quasi-money," defined as the total of M1 and sight deposits (excluding restricted deposits) held at the commercial banks. The "quasi-money" series is published in G. Macesich and D. Dimitrijevic, Money and Finance in Contemporary Yugoslavia, Appendix C, "Quasi-Money, according to the 1966 definition."
Total Bank Deposits (BD)

Total bank deposits are measured as the total of demand deposits and voluntary non-monetary deposits.

The Non-money-deposit-demand-deposit Ratio (QMR)

This ratio is measured as the ratio between the total volume of voluntary, non-monetary deposits and demand deposits.

The Excess Reserve Ratio (ERR)

This ratio is measured as the ratio between the total volume of excess reserves held by the commercial banks at the National Bank and the total volume of bank deposits.

Part 2. Data Used in the Regressions

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<th>Year</th>
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<td>13.7</td>
<td>- 2.9</td>
<td>7.5</td>
<td>- 7.9</td>
</tr>
<tr>
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<td>0.6</td>
<td>- 2.5</td>
<td>-10.1</td>
</tr>
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<td>-13.1</td>
<td>15.7</td>
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<td>- 9.1</td>
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<td>9.4</td>
<td>-21.8</td>
</tr>
<tr>
<td>IV</td>
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<td>23.1</td>
<td>- 9.0</td>
<td>6.4</td>
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<tr>
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<td>- 6.9</td>
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<td>-10.3</td>
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<tr>
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<td>25.1</td>
<td>- 7.4</td>
<td>-12.0</td>
<td>- 5.6</td>
</tr>
</tbody>
</table>

<sup>a</sup>All figures are overlapping four quarter rates of growth.
Footnotes


5. All percentages are averages for 1965-71 and are calculated from the National Bank Money Flow Accounts presented in the appendix of the National Bank's Annual Reports for 1969, 1970, and 1971.

6. For example, in 1969, the federal government, in agreement with the National Bank, forced enterprises to transfer dinar deposits held as cover for imports from the commercial banks to the National Bank. The goal of this policy was to reduce the lending capabilities of the banking system. See Narodna Banka, Pregled, February 1970, for more on this policy tool.

7. Exclusion of the volume of required reserves was necessary because the available data did not permit the correction of random fluctuations in the monetary base caused by frequent changes in the size and type of deposits subject to reserve requirements.

8. F test is as follows: R.6.2 is the restricted equation where the restrictions assign a coefficient of zero to GERR and GO MR. R.6.3 is the unrestricted equation. The null hypothesis that the restrictions are true can be tested by the following ratio
Sum of squared residuals (R.6.2) 
- sum of squared residuals (R.6.3) 
\[ \frac{2}{\text{Sum of squared residuals (R.6.3)}} \] 
Degrees of Freedom (R.6.2)

Using the data from these regressions this ratio becomes:

\[ \frac{(496.077 - 445.391)/2}{(445.391)/35} = 1.99 \]

Under the null hypothesis, this ratio is distributed as F(2,35). The value 1.99 falls within the acceptable region for F of the null hypothesis that the restrictions are true is not rejected.

9. These results are similar to the results presented by Michael Keran in his study of monetary policy and business cycles in postwar Japan. Keran found that a regression including percentage changes in the money base and in the deposit-currency ratio as the independent variables explained 94% of the total variance of percentage changes in the money supply. Cagan observed similar results in his study of the U.S. money stock which led him to conclude that base money is the major determinant of secular changes in the money supply, while the deposit-currency ratio is the major determinant of cyclical changes. For more on these results, see M. Keran, "Monetary Policy and Business Cycles in Postwar Japan," in D. Meiselman, ed., Varieties of Monetary Experience (Chicago: University of Chicago Press, 1970).

10. Commercial bank loans to enterprises accounted for an average of 77.1% of total commercial bank loans during the 1962-72 period.

11. Under the null hypothesis of a zero restriction on the coefficients of GMB, the following statistic is distributed as F(1,32):

\[ \frac{(.278193 - .209927)/1}{(.209927)/32} = 10.4 \]

This value of F implies that the null hypothesis should be rejected.
12. For more on this shift and its causes, see chapter 7.

13. In equation R.6.7, current nominal income growth influences current growth in the monetary base; therefore, if this equation is used as a basis of evaluation, current changes in the money supply can no longer be viewed as independent of current period changes in nominal income. As noted in the text, however, this equation is statistically inferior to equation R.6.8 which is therefore chosen as the current standard for measuring the influence of nominal income changes on changes in the monetary base.

14. The responsiveness of the demand deposit-currency ratio to changes in monetary policy, as measured by changes in the rate of growth of the monetary base, and the apparent downward drift of this ratio over the 1962-72 period are illustrated by the following equation:

\[ GDCR = -0.0179 -0.0057T + 0.0097 \cdot 6HB (-2.67) (-3.692) (4.183) \]

\[ R^2 = 0.43 \quad D.W. = 0.38 \]

\( t \) statistic

15. By law commercial bank loans could be granted for a variety of purposes including: loans to cover inter-enterprise and household credit sales; loans to cover inventory accumulation; loans to cover export preparation and sales; and loans to cover imports. Besides loan purpose and interest rates, the National Bank lending guidelines also specified repayment periods and self-financing shares for each type of loan.

16. For evidence of this type of commercial behavior see p. 400 of this chapter.


18. Yugoslav law and accounting practice distinguishes between budgetary expenditures and extra-budgetary
expenditures at each level of government. This distinction makes the exact calculation of the total deficit of any level of government difficult. The figures in table 6.6 are estimates of the federal deficit on both budgetary and extra-budgetary account made by the International Monetary Fund.

19. In the Yugoslav fiscal system, health, education and certain welfare expenditures are directed by special funds which receive their own inflow of receipts from specific tax sources and which are administered by an independent group of elected or appointed decision-makers.

20. For an extended discussion of how flow of funds accounts are used in the formation of Yugoslav monetary policy, see D. Dimitrijević, "The Use of Flow of Funds Accounts in Monetary Planning in Yugoslavia," Review of Income and Wealth, no. 1 (1969), and Dimitrijević and Macesich, Money and Finance, chapter 13.

21. A commercial bank was free to use its entire rediscount limit only if it fulfilled two conditions of credit-worthiness: (1) its total indebtedness to the National Bank could not exceed the value of its demand deposit holdings; and (2) at least one-half of its short-term loans had to consist of loans with repayment periods of less than three months. The first condition reflected the National Bank's desire to stimulate the use of deposits by all banks while the second condition was one of several "liquidity regulations" designed to deal with the apparent tendency of the commercial banks to use short-term loans to cover investment projects. See, D. Petrović, "Kreditno-monetarna politika, instrumenti, mjere i efekti na položaj privrede i banaka," Poduzete Banke, no. 1 (January 1972), pp. 23-33.


23. Cirović also discusses how business obtained rediscountable credits by disguising the purposes for which bank loans were actually used.
24. For example in 1970, the National Bank planned to grant the federation 200 million dinars in new loans. The actual volume of loans granted amounted to ten times as much. To offset the monetary effects of this additional injection of base money, the National Bank tried to reduce its loans to the commercial banking system and increased reserve requirements. Neither of these policies completely offset the expansionary influence of the government deficit as a result of which the actual rate of growth of the money supply was above the target rate of growth by 6%. See D. Dimitrijević, "Kreditno-monetarna politika u 1970, jedna od najtežih godina," Jugoslovensko Bankarstvo, #2 (February 1971), pp. 3-6.

25. For example, in 1968, the rate of growth of the money supply planned by the National Bank was 5%; the realized growth rate was 24%. Internal National Bank documents identify unexpected changes, such as the freeing of blocked accounts for part of the discrepancy. These changes included: (1) the freeing of 500 million dinars from restricted deposits in July; (2) the freeing of 433 million dinars of blocked accounts in August; (3) a decision permitting a portion of the savings accounts and sight deposits held by the population to be used to finance bank loans for housing, and an order that a portion of the loans so granted be discounted by the National Bank, which caused the rediscount limit to be exceeded by 500 million dinars; and (4) a May decision of the Federal Executive Council which prolonged the term for a certain class of restricted accounts, amounting to 2,200 million dinars. All of these policy changes were made by the Federal Executive Council or the Federal Assembly, independently of the National Bank. See Narodna Banka, Pregled, February 1969.

26. For a discussion of how these exemptions led to an excess of the realized rate of growth of bank credit over the target rate of growth see the last section of this chapter.

27. This point is made in the National Bank Annual Report, (1969), p. 47.

28. See, for example, Stephen Goldfeld's Commercial Bank Behavior and Economic Activity (Amsterdam: North-Holland, 1969).


31. See "A Report on the Twenty Largest Yugoslav Banks," Ekonomска Politika (October 8, 1972), pp. 22-25. Since the ten largest banks in Yugoslavia control nearly 60% of short-term loans and nearly 100% of investment loans, the "de-territorialization" of these banks has meant the potential "de-territorialization" of a significant portion of all loans.


33. See S. Acharya, Decentralization in Yugoslavia, p. 23.

34. Ibid., p. 68.

35. Actually this conclusion must be modified somewhat since political support was probably a good substitute for size in the outcome of many loan decisions.

36. Studies of rationing in the U.S. economy suggest that the loan requests of smaller firms are more frequently denied than the loan requests of larger ones. See, for example, A. Meltzer, "Mercantile Credit, Monetary Policy, and Size of Firms," Review of Economics and Statistics, 1960. The hypothesis about selective bank loan rationing in favor of large borrowers has important implications for the analysis of trade credit presented in chapters 7 and 8. There it is argued that trade credit extended by one set of firms can serve to re-allocate scarce bank credit from those firms which are not rationed on the bank loan market to those firms which are. Given the extent of non-price rationing of loans which must have existed at various times in Yugoslavia, trade credit must have played an important role in determining the final allocation of credit among competing enterprise and regions.
37. The data used in this calculation are taken from the end-of-year annual reports of social sector enterprises collected by SDK. The data were made available to me by the library of the Ekonomski Fakultet in Ljubljana.

38. Underlying this conclusion is the assumption that enterprise contributions to bank credit funds and enterprise holdings of time deposits are involuntary, in the sense that enterprises are forced to undertake such financial investments in order to guarantee their access to bank credit. If instead, such investments are voluntary financial investments, then the fact that larger investments are correlated with larger bank loans may only mean that as enterprise investment in financial capital increases, so also does enterprise indebtedness to the banking system as a source of finance.

39. Data on changes in the value of defaulted trade bills are presented in chapter 8, table 8.1.

40. The Yugoslav-government Draft Capital Market Study notes that "a great number of enterprise time deposits are compensatory transactions (i.e., a prerequisite for the granting of investment loans)." See Acharya, Decentralization in Yugoslavia, p. 26.

41. In 1971, in response to the growing illiquidity of the business sector, the government issued a series of regulations prohibiting firms from increasing their time deposit holdings and credit fund contributions if they failed to pay current trade credit bills as they fell due or if they operated with a loss. See, National Bank, Pregled, December 1971. For a more detailed discussion of other "illiquidity" policies and of the number of firms falling under these measures, see chapters 7 and 8.

42. See Narodna Banka, Pregled, February 1967 for a full discussion of how the estimate was made.


44. D. Petrović, "Kreditno-Monetarna politika," pp. 28-33. As a result of the 1969 experience, the National Bank introduced a series of regulations to deal
directly with each type of violation. For example, in 1970, concise rules laid down the conditions for use of "special reserve funds," which were funds the banks were required to set aside to cover temporary losses or drains on liquidity. Also in that year a more precise legal form was given to the instrument of the minimum liquidity ratio or the minimum ratio between excess reserves and certain types of bank deposits. Instead of the earlier practice of determining the level of this ratio in agreement with the banks, the National Bank issued a decision establishing a binding minimum. In 1971, the National Bank strengthened the force of this decision by refusing to increase credits to business banks failing to comply with the liquidity ratio unless such credits were used exclusively for the improvement of that ratio. In spite of this provision it was not until September 1972, that all banks achieved the legally prescribed rate of liquidity.

45. See, for example, Stephen Goldfeld, Commercial Bank Behavior, chapter 2.

46. Goldfeld elaborates on this hypothesis as it pertains to the U.S. banking system. See Commercial Bank Behavior, pp. 14-15 and pp. 63-68.

47. During these years, nominal interest rates did not change much, so changes in the excess reserve ratio cannot be explained by changes in the opportunity cost of holding these reserves.

48. Another important factor contributing to the decline in bank cash reserves in 1967, and again in 1969, was the failure of bank borrowers to repay loans as they fell due. The volume of overdue and defaulted loans expanded sharply in the 1967 and post-1968 liquidity crises and banks were often forced to cover new commitments by cash reserves rather than by existing loan liquidation as planned. See chapters 7 and 8 for a further discussion of the liquidity crises.

49. In March 1972, it was reported that 41 banks—or approximately 75% of the banks in Yugoslavia—did not regularly meet their obligations. See, Privredna Kretanja u Periodu January-September, 1972, no. 11 (October 1972), published by the Ekonomski Institut, Zagreb.
50. This estimate is made on the basis of figures reported in *Ekonomski Politika*, in October 1972. According to these figures, in August 1972, the volume of unreconciled, expired d.5t for completed investment work was 8,120 million dinars or 28% of the total cash payments on investment made from January to August of the same year. See *Ekonomski Politika*, 2 October 1972.

51. Two types of investment measures are collected in Yugoslavia: the Federal Statistical Office collects data on the actual realization of investment in fixed assets while the Social Accounting Service collects data on the actual payments for investment purposes. In recent years, the difference between payments for investment and the actual realization of investment has been about 15% for net figures and 25% for gross figures. It is commonly held that the difference between the payments and the realization figures is mainly due to investment realization based on inter-firm crediting arrangements. See Dragomir Vojnić, "Investiciona potrosnja u svjetlu stabilnosti privrednih kretanja," *Poduzeća-Banka*. no. 9 (1972), pp. 1-8.

52. In light of such evidence, recent efforts to alleviate illiquidity crisis have included measures aimed at controlling the disbursement of bank investment resources. Thus, in 1971, the National Bank issued a new regulation obliging business banks to report on their activity in relation to the granting and utilization of investment credits and investment guarantees. Towards the end of 1971, this measure was supplemented by a new regulation stipulating that business banks which failed to meet their obligations regularly both as regards the disbursement of resources for investment credit and for guarantees they had taken upon themselves, could neither contract new investment credits nor issue new investment guarantees. See *Narodna Bank*, *Annual Report*, 1971, p. 65.
CHAPTER 7

TRADE CREDIT AND ILLIQUIDITY CRISSES

Introduction

A student of recent economic and political developments in Yugoslavia soon discovers that the so-called "illiquidity crisis" is the major topic of interest among Yugoslav policy makers. As defined in the Yugoslav press, an illiquidity crisis refers to the inability of large numbers of firms to pay their debts as they fall due. Since the beginning of 1969, enterprise after enterprise has defaulted on trade credit bills, expired bank loans, tax obligations, and occasionally wage payments, and a series of multiple and repeated defaults has threatened nearly one-third of the enterprise sector with bankruptcy. In response to this threat, government officials and economists have struggled to identify the source of the illiquidity phenomenon and to eliminate it with appropriate policy measures.

The search for the cause of enterprise illiquidity, has failed to yield its goal. Consequently, palliatives rather than cures have been adopted to cope with the adverse effects of illiquidity. Among the most
popular and most widely used palliatives has been the easing of monetary policy to feed additional credits into the illiquid enterprise sector. The use of monetary policy in this fashion is not a new development. During the 1962 and 1967-68 illiquidity crises the creation of bank credit represented the last-ditch efforts of the government to avert the potential economic and political disaster implied by large-scale bankruptcies. Thus, in the manner alluded to in the concluding sections of chapter 6, illiquidity and threatened bankruptcy have frequently forced the Yugoslav monetary authorities to reverse restrictive policies designed to dampen inflationary pressures. Quite simply, the Yugoslav monetary authorities have faced a tradeoff between bankruptcy of an extent which threatens to disrupt production and employment in epic proportions and inflation.

How does the problem of enterprise illiquidity reach a crisis state in the Yugoslav economy? In chapters 7 and 8 I provide some answers to this question by examining the illiquidity phenomenon as a consequence of developments in the market for inter-enterprise trade credit. Trade credit is a popular form of financial intermediation in Yugoslavia and is used by competing enterprises to obtain the external finance they desire at prevailing nominal interest rates. During easy money
periods, this form of intermediation acts to funnel bank credit from firms which have more or less unlimited access to bank lending windows to borrowers which are rationed out of part of the bank credit they desire. Lenders on the trade credit market choose to extend credit to borrowers provided the return they receive on such credit exceeds the cost of financing it. Similarly, borrowers choose to borrow provided the cost of trade credit is less than the shadow rate of interest they face in the bank credit market.

During tight money periods borrowers of trade credit attempt to obtain additional credit from involuntary enterprise lenders by defaulting or by postponing payment on outstanding trade bills. Defaults in one enterprise lead to defaults in other enterprises and to a huge increase in the stock of trade credit within the enterprise sector. Illiquidity, or the widespread defaulting on debt incurred in inter-enterprise transactions, is the outward manifestation of this process.

The major purpose of chapters 7 and 8 is to relate liquidity crises to developments occurring in the market for trade credit and to illustrate how these developments impinge on the formation and implementation of monetary policy in Yugoslavia. To provide a theoretical framework with which to examine these relationships I first present
some general propositions about the interactions between trade credit and monetary policy which are derived from a simple model of enterprise asset holding and borrowing behavior. These propositions are then tested against Yugoslav data for the 1961-72 period and the empirical results are discussed. Finally, in chapter 8 I turn to a discussion of the links between trade credit, illiquidity and monetary policy. Particular attention is given to the institutional and political factors encouraging enterprises to try to obtain additional credit, if necessary, by failing to honor their previous payment commitments. An analysis of these factors supports the conclusion that local governments form alliances with local banks and local business interests to compete for scarce financial resources. Under the shield of its local alliance, an indebted enterprise expects to be able to default on outstanding trade bills with impunity, because its local sponsors are expected to come to its aid should its "involuntary creditors" threaten court action or other legal sanctions. Thus, the alliance network works to reduce or eliminate expected sanctions against temporary illiquidity and payments defaults. Therefore, from the point of view of the individual enterprise, there is very little return on holding cash balances as a reserve to guarantee the steady repayment
of trade bills on schedule and there is little cost involved in trying to obtain additional credit from unwilling creditors. Consequently, it is not surprising that the imposition of restrictions in the bank credit market quickly leads to a sharp reduction in enterprise cash balances and to a huge increase in the stock of trade credit, as each protected enterprise attempts to replace more expensive bank credit with the practically costless credit it can gain by postponing payment on its financial obligations. Eventually, this process leads to an untenable situation in which flows of both money and goods among a large sub-circuit of firms have virtually ceased and in which recourse to the court system is the only possible channel for restoring order in inter-enterprise accounts. At this point illiquidity reaches a crisis state requiring the intervention of the monetary authorities to provide illiquid enterprises with bank credit to cover payments on defaulted bills. In this way illiquidity and threatened bankruptcy finally force a reversal of monetary policy. It is in this sense that the Yugoslav monetary authorities can be viewed as facing a tradeoff between inflation and macroeconomic stability on the one hand and illiquidity and bankruptcy on the other.
Trade Credit and Monetary Policy: Some Theoretical Relationships

A Model of Enterprise Financial Behavior

Consider a firm which holds only two kinds of financial assets—money balances in the form of cash and demand deposits, and trade credit or accounts receivable (hereafter referred to as ARs) in the form of interest bearing liabilities created by its customers.¹ Both of these assets together constitute the total transactions balances held by the firm. These assets differ in type, however, because ARs, unlike money, are not marketable and free of default risk.² Because trade credit is not freely transferable (a realistic assumption for most modern economies, including with some important modifications, Yugoslavia) or marketable (discountable), it cannot substitute for the generalized purchasing power provided by money balances.

In addition to its financial assets the firm also maintains a stock of real capital, consisting of both plant and equipment and inventories. The firm finances its total asset position by internal savings and by two types of external borrowing—borrowing from the banking system and borrowing from other firms. Therefore, the simple balance sheet of the firm can be written in the following manner:
### Unconsolidated Balance Sheet of Firm \( i \)

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Balances (MB(_i))</td>
<td>Bank Loans (BL(_i))</td>
</tr>
<tr>
<td>Accounts Receivable (AR(_i))</td>
<td>Accounts Payable (AP(_i))</td>
</tr>
<tr>
<td>Real capital and inventories (RK(_i))</td>
<td>Net Worth</td>
</tr>
</tbody>
</table>

As long as trade credit is limited to inter-enterprise transactions, the total value of outstanding accounts receivable just equals the total value of outstanding accounts payable within the consolidated firm sector.\(^3\)

Therefore, these items can be dropped from the asset and liability columns, and the consolidated balance sheet for the enterprise sector can be written as:

### Consolidated Balance Sheet of Enterprise Sector

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Balances (MB)</td>
<td>Bank Loans (BL)</td>
</tr>
<tr>
<td>Real Capital (RK)</td>
<td>Net Worth</td>
</tr>
</tbody>
</table>

As this balance sheet reveals, the only source of external finance for the enterprise sector is the banking system.\(^4\)

Equilibrium in the volume and composition of a firm's assets will be attained where the marginal rate of return on each asset just equals the cost of external finance. The equilibrium condition characterizing an optimal asset position for a single firm is given by
\[ r^i_m = r^i_{ar} = r^i_k = r^i_b = r^i_{ap} \] (7.1)

where: \( r^i_m \) is the real rate of return on cash balances; 
\( r^i_{ar} \) is the real rate of return on accounts receivable; 
\( r^i_k \) is the real rate of return on the real capital stock; 
\( r^i_{ap} \) is the real rate of interest charged on accounts payable; \( r^i_b \) is the real rate of interest charged on bank loans; and \( i \) refers to firm \( i \). If firm \( i \) is rationed on the bank loan market, \( r^i_b \) is the real shadow rate of interest on bank loans; if no rationing occurs, \( r^i_b \) is simply the prevailing nominal interest rate on bank loans less the rate of inflation.  

The Rate of Return on Cash Balances

Money holdings are assumed to earn no pecuniary return; consequently the rate of return on cash depends solely on certain implicit returns to money which arise from its unique role as the economy's only universally acceptable means of payment. Money holding enable the firm to minimize the costs and risks attributable to the lack of symmetry between its receipts and expenditures. Usually the implicit return to money from this source is discussed in terms of the transactions and the precautionary demands for money. The distinction between these types of demand stems from the distinction between a certain pattern of receipts and expenditures in the
transactions demand case and uncertain pattern in the precautionary demand case. As the Baumol-Tobin type models suggest, money may be held by the firm even in cases of complete certainty in the pattern of expected net disbursements because of the transactions costs involved in moving into and out of money when needed. Usually these costs are analyzed in terms of the direct expenses and inconveniences (such as lost time) involved in transferring funds from interest earning monetary assets to cash. However, in the simple model developed here where there are no alternative monetary assets, the choice which the firm faces is not the choice between holding money and holding another earning asset but the choice between borrowing from the banking system at a cost of $r_b$ per dollar to hold money for future expenditures and borrowing from the banks whenever money is needed to finance a net disbursement. Therefore, the appropriate measure of transactions costs in this model is the cost incurred in negotiating bank loans rather than the cost incurred in switching from one asset to another.  

The existence of a constant transactions cost associated with bank loan negotiation explains the simultaneous appearance of non-interest earning money balances and interest-bearing bank loans in the balance sheets of the enterprise sector. If such a transactions cost
exists, then the implicit return on cash balances, which makes them a desirable asset even in a situation of certainty about the pattern of expenditures and receipts, is the savings on such costs which an additional dollar of cash makes possible. The size of such savings in turn depends on four factors: the real interest rate on bank loans, the transactions costs involved in obtaining bank loans, the outstanding stock of cash balances, and the volume of monetary transactions. Therefore, the implicit rate of return on money from this source can be expressed as:

$$ r_{mt}^i = g(r_b^i, v, MT^i, MB^i) \quad (7.2) $$

where: $r_{mt}^i$ is the real rate of return on transactions balances, $v$ is the constant transactions costs of bank loan negotiations, $MT^i$ is the real volume of monetary transactions, and $MB^i$ is the current stock of real cash balances; by assumption, $g_1 < 0$, $g_2 > 0$, $g_3 > 0$ and $g_4 < 0$.

The derivation of expression (7.2) is based on the assumption of perfect certainty in both the expected pattern of receipts and expenditures and in future interest rates, prices, and the availability of bank credit. Under these conditions, the rate of return on cash balances is
likely to be quite small. The only return on "voluntary" cash balances, e.g., those which exceed the minimum necessary to establish and maintain lines of credit with the banking system, is the savings of any additional transactions costs involved in obtaining bank credit and these costs in turn refer not to money costs but to such inconveniences as waiting and time lost in negotiating bank loans. In a modern economy such costs are quite small since loans can be speedily arranged by a telephone call between firms and the banks at which they hold the necessary compensating balances.

More convincing explanations of enterprise cash reserves stem from a consideration of the various types of uncertainty under which firm decisions are made. Two types of uncertainty appear to be important: uncertainty about the pattern of receipts and expenditures and uncertainty about the price and availability of future bank loans. Assuming that payments and receipts occur randomly during an accounting period according to some stochastic process, at each point in time there is a certain probability of a net disbursement which the firm must cover either by its own financing—through a decrement in its money balances—or through bank loans. Failure to provide financing can cost the firm in one of two ways—possible insolvency and the penalty it involves or the
necessity of foregoing the return on an otherwise profitable expenditure. However, if bank financing is always available at some fixed, known cost, then the uncertainty of the timing of a net disbursement is not sufficient to explain the existence of cash holdings in excess of those required for transactions purposes. Rather, it is uncertainty in the pattern of receipts combined with uncertainty about the terms and availability of external financing that accounts for additional cash reserves. Therefore, ceteris paribus, firms which are more likely to be rationed on the bank loan market are likely to hold larger cash balances than firms which are prime bank borrowers. Moreover, desired cash balances of each firm may be expected to increase in periods of credit restriction and rising interest rates, if the uncertainty surrounding the terms of future bank loans increases.

Money balances held as a reserve in a situation of uncertainty are most easily understood in reference to the precautionary demand for money. The implicit rate of return on such money balances can be defined as the marginal decrease in the expected cost of illiquidity per unit increase in money held. The expected cost of illiquidity in turn can be defined as follows:
$E(c)_i = p_i c_i$  \hspace{1cm} (7.3)

where $p_i$ is the probability that net cash disbursements will exceed precautionary balances held and $c_i$ is the cost of illiquidity per occurrence of insufficient cash. (p and c naturally may differ for individual firms.) $p_i$ can be shown to depend on the current stock of cash balances and on the volume of monetary receipts and disbursements and their variability. $c_i$ depends on four factors: (1) the cost of obtaining bank credit in the event of an unforeseen necessity; (2) the reliability of obtaining bank credit in such a situation; (3) the costs imposed on a firm which cannot finance an unexpected net disbursement including the costs or penalties of insolvency and bankruptcy; and (4) the loss imposed on a firm which is forced to forego a profitable expenditure because of lack of funds.\textsuperscript{7}

By keeping cash reserves the firm reduces the expected cost of illiquidity; therefore, the implicit rate of return on its precautionary money balances can be defined as

$$r_i^P = \frac{dE(c)_i}{dMB_i}$$  \hspace{1cm} (7.4)

where $\frac{dE(c)_i}{dMB_i}$ is the marginal decrease in the expected cost
of illiquidity per unit increase in cash reserves.

Combining equations (7.2) and (7.4), the total real rate of return on a firm's cash holdings can be expressed as:

\[ r_m^i = r_p^i + r_{mt}^i = h(V, MT_i, r_b^i, c_i, \sigma_{MT_i}^2, MB_i) \]  

(7.5)

where: \( \sigma_{MT_i}^2 \) is some measure of the variability of the \( i \)th firm's monetary transactions; and the other variables are defined in (7.1)-(7.4). By assumption, \( h, >0; h_2>0; h_3<0; h_4>0; h_5>0; \) and \( h_6<0; \) the sign of \( h_3 \) is indeterminate because an increase in \( r_b^i \) reduces the return on transactions balances but may increase the return on precautionary balances if uncertainty about the terms of future bank loans increases as \( r_b \) rises.

**The Rate of Return on Accounts Receivable**

Accounts receivable, which form part of the total financial assets held by the firm, are directly related to the level of the firm's transactions. At any moment in time, however, the optimal relationship between the stock of ARs and the level of transactions depends on the implicit and explicit rates of return earned from the extension of an extra dollar of trade credit. In equilibrium, the sum of these rates of return must equal the rate of return earned by the firm's other assets and the opportunity
cost of holding these assets.

Accounts receivable earn an explicit pecuniary return in the form of an interest charge levied on customers who make use of such credit. If a customer pays cash for its purchase, then the price is generally below the price paid if the purchase is made on a credit basis. The price premium on the credit sale corrected for depreciation due to inflation serves as a real interest charge  per dollar of trade credit extended. In order to calculate the total net pecuniary return earned by the firm on its stock of accounts receivable, the explicit interest charge must be reduced to reflect the default risk which the firm incurs in its trade credit operations.

The risk of default on a trade bill actually consists of two parts: the risk resulting from temporary delays in the repayment of the bill as it falls due and the risk resulting from actual failures to repay the bill. Both of these risks can be assumed to increase as the credit-worthiness of the marginal borrower decreases in response to an increase in the quantity of trade credit extended. If the growth of trade credit is limited to enterprises which have proven themselves to be financially sound credit customers, then the risk of default probably increases only slightly as the outstanding stock of accounts receivable grows. In contrast, if the growth of
trade credit is concentrated among enterprises who are judged to be less credit-worthy than previous credit customers, then the risk of default is likely to increase sharply as the outstanding stock of accounts receivable grows. Therefore, although the risk of default may be expressed as a function of the stock of accounts receivable, the rate at which the default risk increases as this stock grows depends on how new credit is allocated among trusted borrowers and marginal borrowers.

The ability of the lender firm to finance accounts receivable without jeopardizing its own financial and liquidity position is another factor which enters into the calculation of the perceived rate of return on accounts receivable. This factor, which is a qualitative and non-price phenomenon, can be approximated by some measure of the liquidity position of the lender. When the liquidity position of the lender is strong, it may extend more trade credit, even to marginal borrowers, to advance sales. In doing so, the lender lowers its credit standard and assumes greater default risk. In contrast, when the firm's own need for working capital is great, it may refrain from further extension of credit by making its credit standards more stringent.9

The above discussion suggests that the net pecuniary return on an additional dollar of accounts receivable can
\[ i_{sc} - \sigma_{ij}^i + \psi^i \]  

(7.6)

where \( \sigma_{ij}^i \) is the risk of default on trade credit extended from firm \( i \) to firm \( j \) and \( \psi^i \) is some measure of the liquidity position of firm \( i \). By assumption \( \sigma_{ij}^i = f_{ij}^i(AR_{ij}^i) \) where \( AR_{ij}^i \) is the volume of credit extended from firm \( i \) to firm \( j \); if firm \( j \) is judged to be less credit-worthy than firm \( k \), then \( (f_{ij}^i)' > (f_{ik}^i)' \).

In addition to a net pecuniary return the firm receives some implicit non-pecuniary returns from its stock of accounts receivable. One such implicit return is the gain in resources which trade credit brings to the firm by extending its market to new customers and by strengthening its relationships with old customers. This return is similar in nature to the rate of return on investments in advertising and other sales techniques designed to maintain customer rapport and good will. The extension of trade credit can sometimes be viewed as just another investment of this type. The rate of return on accounts receivable from this source will be designated as a constant amount \( b^i \) per dollar of credit extended.

Another implicit return on trade credit arises under conditions of uncertainty about future sales
prospects. Consider a firm which has its product and sales plans realized under prevailing economic conditions and which accumulates and runs off inventory holdings at some planned optimal rate, consistent with these plans. Now imagine an unexpected decline in demand for the firm's output. If production is not immediately adjustable, then this decline will compel the enterprise to accumulate unplanned final product inventories. If the firm can find a buyer willing to purchase a part of these inventories on credit, then the firm will supply the desired credit as long as the net expected rate of return earned on the credit thus extended exceeds the net expected rate of return on unplanned inventory holdings. To determine the circumstances under which this condition is satisfied, it is necessary to examine each of these expected rates of return in some detail.

An increase in the extension of trade credit brings an expected pecuniary return which depends on both the prevailing trade credit service charge and on the expected default risk. Thus, the expected net rate of return on a dollar increase in the stock of trade credit extended to the buyer firm can be expressed as

\[
(i_{sc}^i)^e = i_{sc}^i - \sigma_j^i(AR_j^i) + \psi^i 
\]

(7.7)
where \( j \) is the buyer firm. The expected pecuniary return on unplanned final product inventory holdings depends on the cost of storing and insuring these holdings, the rate at which the value of these holdings is expected to appreciate, and the probability that this value will be realized through cash sale before the end of the relevant trade credit period. Thus, the expected net rate of return on an additional dollar of unplanned inventory holdings can be expressed as:

\[
\left( \frac{\hat{p}_i}{p_i} \right)_e = (\hat{\pi}_i)(p_s) - \gamma_i
\]

(7.8)

where \( \hat{\pi}_i \) is the expected rate of appreciation in the value of inventories, \( p_s \) is the probability of a cash sale during the credit period and \( \gamma_i \) is the storage and insurance cost per dollar of inventory.

Now consider the balance sheet implications of a dollar increase in accounts receivable and a dollar increase in unplanned final product inventories. Either of these increases must be financed by an equal increase in the firm's liabilities or an equal decrease in the firm's other assets. Therefore, the expected finance cost is the same in either case, and the firm will choose the alternative which promises the greater expected net rate of return. Thus, as long as the expected rate of return on
trade credit extension, as defined in expression (7.7) exceeds the expected net rate of return on unplanned inventory holdings, as defined in expression (7.8), the firm will be willing to increase its crediting of other firms in order to avoid unplanned inventory accumulation.

The above discussion indicates that there may be an implicit rate of return on trade credit extension during periods of business uncertainty. Imagine some exogenous shock—such as the imposition of a restrictive monetary policy—which reduces the predictability of future levels of aggregate demand. Greater uncertainty about future sales prospects in turn increases the probability of unplanned inventory accumulation as perceived by the individual firm (it may or may not increase the actual probability but the important factor is the firm's perception of this probability). Confronted with the threat of unplanned inventory growth, each firm will try to estimate the net cost incurred in financing unplanned inventories and the net cost incurred in extending trade credit in an effort to sell off these inventories. As the above discussion indicates, as long as \( \hat{p}_i/p_i \text{e}^e < i_{\text{sc}}^i \text{e}^e \), the firm can save by using its credit operations to ward off inventory accumulation. In fact, the expected net savings from such a policy is exactly equal to \( i_{\text{sc}}^i \text{e}^e - (\hat{p}_i/p_i)^{\text{e}^e} \).

The extension of trade credit in a period of business
uncertainty can therefore earn an implicit return in the form of the expected net savings on the cost of financing unplanned inventories. If the expected net cost of unplanned inventory finance is \( r_b^i \) and the probability of unplanned inventory accumulation is \( p_a \), then the expected net savings from trade credit extension or the implicit return on AR as an alternative to unplanned inventory holdings can be written as:

\[
  s_i^e = p_a \left( (i_{sc}^i)^e - (\dot{p}_i/p_i)^e \right)
\]

(7.9)

During periods of stable business conditions \( p_a = 0 \), and this implicit return disappears.

Summarizing the above discussion, the total net explicit and implicit return to firm \( i \) per dollar of trade credit extended to firm \( j \) can be expressed as

\[
  (r_{ar}^i)_j = (i_{sc}^i)_j + b^i + s_i^e - \sigma_j^i + \psi^i
\]

(7.10)

\[
  = k(b^i, \sigma_j^i, (i_{sc}^i)_j, p_a, (\dot{p}_i/p_i)^e, \psi^i)
\]

The theory behind this formulation provides the following hypotheses about the sign of the derivatives of the \( k \) function: \( k_1 > 0; k_2 < 0; k_3 > 0; k_4 > 0; k_5 < 0; \) and \( k_6 > 0 \). Exogenous factors, such as changes in monetary policy, are
expected to influence the desired stock of accounts receivable in accordance with their influence on each of the arguments of the \( k \) function. In particular, the introduction of a restrictive monetary policy is likely to increase \( p_a \), to reduce \( (p_1/p_\lambda) e \) and to reduce \( \psi^1 \). The first two effects work to increase the rate of return on trade credit extension while the latter works to reduce it. Therefore, the effects of the monetary policy on trade credit extension cannot be specified a priori.

**Accounts Payable: The Demand for Trade Credit by Purchasers**

So far the discussion has focused on identifying the factors which motivate an individual firm to extend credit to its actual and prospective customers. No reasons have been developed to explain why these customers may desire to employ such credit. As the balance sheet of the individual firm suggests, it is possible for each firm to credit and to be credited by its business partners at the same time. The rationality of such an interfirm system of crediting depends on the marginal costs and returns involved and these in turn depend on the availability and cost of alternative forms of financing.

Consider a situation where all firms can obtain whatever amount of bank finance they need at the same real rate of interest \( r_b \). In this case, asset equilibrium for
the lender firm occurs when \( r_b = (r_{ar}^i)^j \) while financing equilibrium for the borrower firm occurs when \( (i_{sc}^i)_j = r_b \) (where \( i \) again refers to the lender firm and \( j \) refers to the borrower firm). Since by (7.10), the rate of return on a dollar of trade credit extended from firm \( i \) to firm \( j \) equals \( b^i + s^e_i + (i_{sc}^i)_j - \sigma^i_j + \psi^i \), the dual conditions for lender and borrower equilibrium can be combined to yield the following condition

\[
b^i + s^e_i + \psi^i - \sigma^i_j = 0 \tag{7.11}
\]

Equation (7.11) is a necessary but not a sufficient condition for the extension and use of trade credit between firms \( i \) and \( j \) when there is no rationing on the bank credit market, that is, when both firms can borrow as much as they want at the same real rate of interest. This condition can be generalized into a necessary condition for the extension of trade credit between any two firms. Let \( \sigma^i_j \) be the risk of default associated with the most credit-worthy enterprise borrower. If there exists some lender firm \( i \) such that condition (7.11) is satisfied for this choice of \( \sigma^i_j \), then inter-firm trade crediting may occur. Equation (7.11) is not a sufficient condition for trade crediting in this case because \( b^i + s^e_i + \psi^i - \sigma^i_j \) may just equal zero at the zero level of accounts receivable for every possible
lender firm, or, in other words, the risk of default on trade credit extended to the most credit-worthy firm may be so high as to make it completely undesirable at the prevailing rate of interest.

If equation (7.11) holds for any choice of i and j, then firm j will be indifferent between borrowing from the banking system and borrowing from the trade credit system, while firm i will be willing to lend to firm j until the volume of accounts receivable just reduces $b^i + s^e_i + \psi^i - \sigma^i_j$ to zero. In this situation firm i may be both a lender to firm j and a borrower from firm j and from other firms for which equation (7.11) holds at some positive level of ARs.

A second set of circumstances can lead to the appearance of trade credit lending and borrowing even when the service charge on accounts receivable exceeds the real rate of interest on bank credit. The crucial element in this case is the existence of rationing on the bank loan market. A firm which is rationed by the banking system faces a real cost of external financing $r^j_b$ which exceeds the prevailing interest rate $r_b$. Such a firm will be desirous of firm financing provided it can find a lender such that $r^i_b < (i^i_{sc})_j \leq r^j_b$. For those firms which are rationed on the bank loan market, the lender and borrower equilibrium conditions on the trade credit market may be
rewritten as \((r_{ar}^i)_j = r_b^i\) (lender condition) and \((i_{sc}^i)_j = r_b^j\) (borrower condition).

Two final cases must be considered to complete the picture of the possible relations between \(r_b^i\) and \((i_{sc}^i)_j\). First, if the service charge necessary to make ARs an attractive asset is greater than the interest rate on bank loans for all possible lenders and borrowers and if there is no rationing on the bank market, trade credit will not exist because both potential lenders and borrowers will have no incentive to develop it. As this proposition indicates, trade crediting will be introduced only when the costs of borrowing from the banking system rise sufficiently to make the appearance of interfirm credit profitable. In this light, trade credit like other forms of financial intermediation, can be viewed as the result of efforts by the firm sector to develop substitutes for bank credit as the price of such credit rises.

The last case to be considered explains the simultaneous appearance of both trade credit and bank credit in a situation where the equilibrium real rate of interest \(r_b^i\) exceeds \((i_{sc}^i)_j\) for every choice of \(i\) and \(j\). This situation is stable only if there is rationing on the trade credit market, so that some borrowers are frustrated in their attempt to obtain all the inter-firm trade credit they desire. For these rationed borrowers, which are likely to be the greatest credit risks from the viewpoint of the
lender firms, the shadow service charge on trade credit will exceed the bank interest rate. As a result, these borrowers will finance part or all of their asset holdings with bank loans. If no such trade credit rationing exists, then demand for the cheaper trade credit will drive up the service charge (by driving down the non-pecuniary return \( b_i + s^e_i - \sigma^i_j + \psi^i \)) until it just equals \( r_b \) and the conditions of the first case will prevail.

**Trade Credit and Monetary Policy**

The existence of a credit instrument which can serve as a substitute for money balances on the asset side and for bank credits on the liability side of firm balance sheets can influence the effectiveness of monetary policy as a stabilization tool. Trade credit is just such an instrument and can therefore be expected to have implications for the results of monetary policy. The extent of these implications depends of course on the degree of substitutability between trade credit and the money balances and bank credit which the monetary authorities directly control. In general, the greater the substitutability involved, the greater the likelihood that trade credit will have a substantial impact on the effectiveness of a given monetary policy. This point can be made more precise. The existence of a close substitute for money increases the interest elasticity of the demand
for money. The higher the interest elasticity, the larger the change in the quantity of money necessary to achieve a given change in market rates of return.\textsuperscript{11}

As is illustrated by the consolidated firm balance sheet, trade credit cannot free the firm sector as a whole from dependence on the banking system. In the process of consolidation, ARs exactly offset APs thereby leaving the firm sector to finance its holdings of money balances and real capital through bank loans. This fact may lead to the conclusion that trade credit has no net effect. However, this conclusion is fallacious because it fails to take account of the influence of trade credit on the equilibrium volume of desired money balances and on the characteristics of the demand for money function. Like any limited substitute for money, trade credit can be shown to influence both the amount of money demanded at a given interest rate and the sensitivity of the money demand function to changes in the interest rate.\textsuperscript{12} As equation (7.4) indicates, the return on cash balances for the individual firm varies positively with the volume of its monetary transactions which in turn depends on the degree to which credited transactions can replace cash transactions. The degree of replacement is limited by the existence of certain firm transactions, such as wage payments to households or tax payments to governments which must be made in cash. The fact that trade credit substitutes for cash
only on interfirm transactions and not firm-household
transactions is sufficient to limit the substitutability
of ARs and cash balances and to explain some positive
demand for cash by the whole firm sector. Of course, a
large number of interfirm transactions are generally
also carried out through the medium of cash so that the
actual substitutability of cash and trade credit is some-
what more restricted than appears in the extreme case
where cash transactions occur only between firm and non-
firm sectors.

Trade credit is not a perfect substitute for money
in the firm's transactions balances. Neither is it able
to satisfy completely the firm's demand for precautionary
reserves. As long as trade credit is not freely trans-
ferable among firms as an acceptable means of payment, it
cannot protect the firm from the possible costs of
illiquidity summarized in equation (7.3). A firm which
does not have the cash necessary to finance an unexpected
net disbursement will be forced to bear the resulting
illiquidity penalty even if it holds a large stock of ARs
because the firm cannot finance a purchase from one sup-
plier by a credit owed from a previous but different buyer.
Only if trade credit were freely transferable and riskless
would it be a perfect substitute for money in satisfying
the firm's precautionary demand for money.13
Because trade credit is an apparent but limited substitute for money in firm portfolios it follows that the desired volume of cash balances held in an economy where there is no trade credit will exceed the desired volume held in a system where trade crediting does occur, all other things being equal. This proposition reveals nothing about the relative responsiveness of the two economies to a given monetary policy although it does indicate that in the trade credit economy the absolute dependence of the firm sector on external bank finance will be smaller because the holdings of money balances to be financed by bank loans will be smaller. However, this fact alone yields no information about the response of the two economies to a reduction in the volume (or an increase in the price) of bank credit.

Consider the case of two otherwise identical economies called A and Y, the former of which does not permit trade crediting among firms and the latter of which does. Starting from initial equilibrium conditions, the introduction of a restrictive monetary policy, either in the form of an increase in \( r_B \) or an increase in rationing, will initiate adjustments in the firm balance sheets of both economies. The monetary policy reduces the equilibrium volume of outstanding bank loans and this decline must be matched by a corresponding decline in the total volume of
assets held by the firm sector as a whole. How this decline is divided between adjustments in real capital holdings and money balances depends on several factors but of major importance is the influence of trade credit. It is assumed for simplicity that the volume of trade credit does not affect either the rate of return on real capital assets or the firm's demand schedule for such assets. Therefore, trade credit operates only through its influence on the demand for money schedule. Now consider how the firm sector in each economy responds to an increase in the cost of holding money balances in the form of an increase in \( r_b \). The initial asset-liability equilibrium in which \( r_m = r_b \) for each firm is disturbed by the new monetary policy and firms begin to run down their money balances, thus driving up the return on them until it rises to equality with the higher \( r_b \). The actual volume of cash balances freed in this way depends of course on the speed with which \( r_m \) rises as MB declines and this in turn depends on the speed with which \( r_{mt} \) and \( r_p \) rise.

The existence of trade credit per se should have no effect on the rate at which \( r_{mt} \) rises as money balances decline because with a constant volume of monetary transactions and a constant transactions fee \( v \), an equal decrease in money balances in both economies means
an equal rise in the cost of negotiating bank loans $v(T/MB)$ for each firm and hence an equal increase in $r_{mt}$. However, the same conclusion does not hold for increases in $r_p$, the return on the firm's precautionary cash balances.

The fundamental proposition to be examined here states that $r_p$ will increase more slowly or, in other words, that the volume of cash balances run off by firms in response to a given monetary policy will be larger in economy Y where trade credit serves as an imperfect substitute for money. In economy A where there is no substitute for cash on firm transactions, as money balances decrease, the expected cost of illiquidity as perceived by the individual firm rises rapidly as the possibility of financial embarrassment due to lack of cash increases. In economy Y, on the other hand, each individual firm has the possible opportunity of utilizing trade credit from its suppliers as a substitute for cash, thereby reducing the rate at which the expected cost of illiquidity rises. In short, the probability of a net disbursement which cannot be financed—referred to as $p$ above—will not rise as rapidly in economy Y, because for each firm there is some offsetting probability that such a disbursement may be financed by credit from its suppliers. From this it can be concluded that
for each firm $i$ in $A$ and $Y$

from which can be derived the following inequality

$$\left(\frac{\partial r^i}{\partial MB^i}\right)_A = \left(\frac{\partial r^i}{\partial MB^i} + \frac{\partial r^i}{\partial MB^i}\right)_A = \left(\frac{\partial E(c)_i}{\partial MB^i} + \frac{\partial r^i}{\partial MB^i}\right)_Y$$

Equation (7.13) reveals that the same increase in $r_b$ will free a larger volume of cash balances in economy $Y$ than in economy $A$. Therefore, starting from the same initial equilibrium configuration $(r_b, MB_i)$ and aggregating over all firms, this relationship yields the following expression

$$\left[\left(\frac{\partial MB}{\partial r_n}\right) \left(\frac{r_b}{MB}\right)\right]_A < \left[\left(\frac{\partial MB}{\partial r_n}\right) \left(\frac{r_b}{MB}\right)\right]_Y$$

which states that the demand for money schedule of the firm sector in economy $A$ is less elastic than the corresponding schedule in economy $Y$.\textsuperscript{14}

Consider now an equal increase in $r_b$ in both economies. Because the elasticity of the demand for money schedule in economy $Y$ is larger, this increase in $r_b$ induces a larger economizing on firm cash balances than the same increase in economy $A$. Economy $Y$ therefore has the
potential for a greater increase in the velocity of money in response to a restrictive monetary policy. Because monetary policy induces a larger decrease in the flow demand for money in economy Y, it will result in a smaller decrease in the flow demand for goods and services. Money balances run off by the firm sector in economy Y substitute for bank credit in financing the existing level of transactions and economic activity.

**Monetary Policy and the Volume of Trade Credit**

The above discussion examines the relationship between changes in money balances and changes in $r_b$ under the assumption that all other conditions in the economy are unchanged. This assumption is not realistic, particularly in an economy where trade crediting exists. Empirical information indicates that the volume of trade credit is highly sensitive to changes in monetary policy, although the direction and degree of this sensitivity appears to differ widely among different economies.\(^{15}\)

Therefore, it is necessary to analyze the manner in which monetary policy induces adjustments in this alternative source of credit and the implications which these adjustments have for the final equilibrium position of the firm sector.

Trade credit can be understood as a financial asset created by firms acting as financial intermediaries
in their own behalf. Viewed in this way, the issue of the responsiveness of trade credit to a change in monetary policy is exactly analogous to the issue of the responsiveness of any other form of financial intermediation to such a policy change. A restrictive monetary policy is likely to induce an expansion in the stock of assets created by uncontrolled financial intermediaries, and in the manner discussed in the last section, such an expansion is likely to reduce the effectiveness of that monetary policy. The extent of the growth in uncontrolled forms of financial intermediation will in turn depend on two effects. First, if the monetary policy acts to increase the rate of return on the intermediary assets, then this will cause a shift out of cash balances into these assets. This effect is the substitution effect. Second, if the economic agents acting as financial intermediaries maintain a certain relationship between cash and the volume of assets which they create, then the expansion of assets encouraged by the restrictive monetary policy will be limited by the need to protect this ratio. In the limiting case where the ratio is fixed by tradition, money balances and the assets of the financial intermediaries will be complements and a restrictive monetary policy will not induce any expansion of the intermediary assets. In the case of an uncontrolled financial intermediary, this ratio
is likely to exhibit some cyclical flexibility, so that on balance, a restrictive monetary policy is likely to induce some growth in the volume of intermediary assets. In short, in most instances a restrictive monetary policy is likely to lead to some increase in the volume of assets created by uncontrolled financial intermediaries, and this increase is likely to reduce the effectiveness of a given dose of monetary policy.

In the case of trade credit the uncontrolled financial intermediary is the buyer firm which seeks to create a claim on itself and to use this claim as a substitute for cash in interfirm transactions. Whether a restrictive monetary policy will result in an increase or a decrease in the total volume of such claims then depends on whether such a firm will seek to increase its stock of claims under such circumstances, and, if it chooses to do so, whether it can find seller firms willing to accept additional claims as payment for the transfer of goods and services. Therefore, to determine the impact of a restrictive monetary policy on the volume of trade credit it is necessary to examine the motivations of both borrower and lender firms.

An individual firm can obtain external finance from either the bank credit system or the trade credit system. Therefore, in response to a restrictive monetary
policy which raises the real rate of interest on bank
loans, each firm will increase its demand for substitute
financing in the form of accounts payable. Starting from
an initial point of equilibrium on the aggregate trade
credit market where the supply of trade credit given (ARs)
just equals the demand for trade credit taken (APs), a
restrictive monetary policy will shift the aggregate demand
schedule upward. Simultaneously, however, the willingness
of each firm to supply its purchasers with credit may
decline as the cost of financing additional holdings of ARs
increases. Therefore, the aggregate supply of ARs curve
may shift upward. The new equilibrium position will be
characterized by an increase in the service charge or
cost of trade credit and by either an increase or a de-
crease in the equilibrium volume of trade credit held
depending on the relative size of shifts in the demand and
supply curves.

An increase in the aggregate volume of trade credit--
or an increase in the aggregate volume of claims created
by enterprises acting as their own financial inter-
mediaries--in response to a restrictive monetary policy
is possible only if some firms in the economy are willing
to increase their holdings of ARs. Such behavior is
rational only if the rate of return on these holdings
increases as the opportunity cost of holding them, as
measured by $r_b$ increases.

A restrictive monetary policy can increase the rate of return on trade credit in one of two ways. First, some lender firms may be able to find customers who are willing to pay a higher service charge on trade bills, as long as that service charge falls short of the shadow rate of interest which they are charged on bank loans. In this case the total implicit and explicit rate of return on accounts receivable as perceived by some lender firms may exceed the shadow rate of interest which they must pay on bank loans. Alternatively, the rate of return on trade credit extension may increase due to an increase in $s_1$, the implicit savings earned by substituting a dollar of ARs for a dollar of unplanned inventory accumulation. In either case, some lender firms will find it profitable to reduce their holdings of cash and real capital until the rate of return on these assets just equals the new higher rate of return on trade credit. The actual increase in the volume of trade credit extended before a new equilibrium is reached depends crucially on the shape of the supply curve for accounts receivable, and that depends on the speed with which default risk increases as trade credit increases. If this risk increases quickly, then additions to the stock of trade credit will be small, and the increase in demand for trade credit will lead to a rapid
increase in the service charge on accounts receivable until it just equals the interest rate charged to borrowers in the bank loan market. Only when lender firms are willing to extend additional credit to would-be borrowers at an effective interest rate which falls short of the shadow rate of interest on bank loans, will the growth of trade credit reduce the effectiveness of the restrictive monetary policy.

A number of authors, including Brechling and Lipsey (1963), Laffer (1970), Meltzer (1960), and Jaffee (1971), have attempted to define conditions under which increases in the stock of trade credit will act to reduce the impact of a restrictive monetary policy on real expenditures. Usually these conditions have been defined as the existence of idle money balances which can be mobilized to finance additional ARs and the existence of credit rationing on the bank loan market. The theories which have based their conclusions on these assumptions have been called net trade credit theories because of their emphasis on changes in the net credit positions of individual firms.

According to the net trade credit models, firms which have large stocks of idle cash or liquid financial assets extend resources in the form of credit sales to firms whose bank loan requests are denied as a result of overall monetary tightness. Such an extension of resources
occurs either through an increase in the net trade credit position (AR-AP) of the lender firms or through a decrease in the net trade credit position of the borrowers or through a combination of both. The resulting redistribution of trade credit dampens the effects of credit rationing on real expenditures as long as the cost of additional trade credit to the borrower firms is not substantially higher than the shadow rate of interest on bank loans and as long as the opportunity cost of financing additional ARs falls short of the rate of return on them. These conclusions, while similar to those derived here, are based on a different and perhaps faulty assumption concerning the existence of a reserve of idle cash which can be mobilized to finance increases in the stock of trade credit. This assumption contradicts the model of a profit-maximizing firm which continuously adjusts its asset holdings to obtain the maximum pecuniary and non-pecuniary return. Even outside the framework of such a model the idea that firms hold large stocks of idle cash while simultaneously borrowing from the banking system appears quite unrealistic. Therefore, a simultaneous increase in net trade credit and a decrease in cash balances in lender firm balance sheets should not be interpreted as the mobilization of idle cash to support credit extension but as the profit-maximizing adjustments to changes in the relative
rates of return on money and trade credit induced by changes in monetary policy. Alternatively, if the increase in trade credit results from repayment delays or additional credit requests initiated by the borrowers, the decrease in lender cash reserves should be understood as the temporary adjustment of lenders to the imposition of a constraint on their profit-maximizing behavior. In either case, the cash which finances new trade credit becomes available only in response to changes in economic variables which themselves are consequences of changes in the overall monetary and financial situation.

**Involuntary Trade Crediting**

In the preceding discussion, changes in the volume or terms of trade credit were explained as a consequence of the profit maximizing behavior of firms. Provided a sufficiently long period of adjustment is assumed, such experiments do yield adequate predictions about the direction of change in each variable. In the short run, however, variations in the volume of trade credit may result not from any conscious decision on the part of the lender firms but from independent action on the part of the borrowers. Variations in the volume of trade credit as measured in firm balance sheets depend on both the volume of credited sales and the collection period for a trade bill. For example, if the credit period is defined in
terms of weeks and if the firm has weekly credit sales of a certain amount, then the volume of ARs held at any point in time will be the product of average weekly credit sales and the credit period. It follows that with a constant flow of weekly credit sales, any delay in bill collection will increase the effective credit period and the outstanding stock of ARs as well.\textsuperscript{19} Moreover, if no penalty interest charge is applied to overdue bills, then payment delays reduce the weekly interest rate received by the lender.\textsuperscript{20} Thus, payment delays alone can influence both the stock of trade credit held and its price.

Of course, variations in the stock of trade credit and its price occasioned by payment lags are validated by lenders' failure to initiate legal proceedings against tardy debtors. In this sense, then the acquiescence of the lenders may reflect their willingness to extend a greater volume of credit at a lower price during periods of bank loan rationing either in order to maintain the flow of sales at planned levels or in order to meet additional credit requests from important customers.\textsuperscript{21} On the other hand, lender acquiescence to temporary delays in bill clearing may equally well reflect the fact that action to police repayment of outstanding bills is expensive and requires considerable time to produce the desired results. Because of these factors, firms may decide that it is
preferable to reduce money holdings to finance an unplanned increase in trade credit as long as the opportunity cost incurred is less than the actual cost involved in obtaining repayment through legal channels. If a firm is both a creditor and a debtor on the trade credit market, then it may absorb the pressure of delays in bill clearing by postponing payments to its own suppliers. In this case, within a subcircuit of firms a temporary increase in the credit period induced by the tardiness of one debtor may result in an increase in the volume of trade credit held by each firm, though there may be no increase—or merely a short-lived one—in the net trade credit position (AR-AP) of any one of them. This process will terminate when one of the firms in the group forces payment on its outstanding trade bills and thus makes the further extension of trade credit periods impossible.²²

The situations described here identify borrower action and adjustment lags as possible sources of variations in the volume of trade credit during periods of monetary stringency. These cases complete the discussion of the various circumstances under which additions to the stock of trade credit are likely to accompany restrictive monetary policy.
Trade Credit in the Yugoslav Economy

Yugoslav enterprises have been permitted to sell to one another and to their customers in the household and government sector on a credit basis since the middle of the 1950's. The option of credit sales has enjoyed a great deal of popularity among firms and, as a result, the outstanding stock of trade credit has tended to grow both absolutely and as a share of total enterprise transactions. Table 7.1 contains figures for the average annual stock of trade credit held during the 1958 to 1971 period. As the table illustrates, the real stock of accounts receivable has steadily increased from a total of 9,201 thousand dinars in 1958 to a high of 58,358 thousand dinars in 1971. Moreover, starting in 1965, the rate of growth of the stock of accounts receivable has consistently exceeded the rate of growth of enterprise transactions, so that the ratio between trade credit and enterprise transactions has increased to a maximum value of 28.7, which is 2.04 times as large as the value of that ratio in 1966.

A closer examination of table 7.1 suggests that an increase in enterprise use of trade credit may have occurred at some point between the years 1966 and 1968. Before 1967, the highest ratio between the stock of accounts receivable and the volume of enterprise transactions was 17.0, while the average ratio during the entire 1958-66
TABLE 7.1

ACCOUNTS RECEIVABLE: ABSOLUTE VALUE AND AS A SHARE OF TRANSACTIONS
(End of year figures)

<table>
<thead>
<tr>
<th>Year</th>
<th>Nominal Value of Accounts Receivable</th>
<th>Real Value of Accounts Receivable</th>
<th>Nominal Value of Transactions</th>
<th>Accounts Receivable as a Share of Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1958</td>
<td>7,085</td>
<td>9,201</td>
<td>57,715</td>
<td>12.3%</td>
</tr>
<tr>
<td>1959</td>
<td>8,094</td>
<td>10,377</td>
<td>68,021</td>
<td>11.9</td>
</tr>
<tr>
<td>1960</td>
<td>11,277</td>
<td>13,587</td>
<td>80,200</td>
<td>14.1</td>
</tr>
<tr>
<td>1961</td>
<td>15,823</td>
<td>17,581</td>
<td>92,939</td>
<td>17.0</td>
</tr>
<tr>
<td>1962</td>
<td>12,522</td>
<td>13,044</td>
<td>108,806</td>
<td>11.5</td>
</tr>
<tr>
<td>1963</td>
<td>14,925</td>
<td>14,925</td>
<td>125,107</td>
<td>11.9</td>
</tr>
<tr>
<td>1964</td>
<td>17,605</td>
<td>16,151</td>
<td>157,459</td>
<td>11.2</td>
</tr>
<tr>
<td>1965</td>
<td>25,185</td>
<td>17,862</td>
<td>194,658</td>
<td>12.9</td>
</tr>
<tr>
<td>1966</td>
<td>34,309</td>
<td>19,718</td>
<td>243,607</td>
<td>14.1</td>
</tr>
<tr>
<td>1967</td>
<td>47,545</td>
<td>25,562</td>
<td>264,448</td>
<td>18.0</td>
</tr>
<tr>
<td>1968</td>
<td>62,094</td>
<td>32,173</td>
<td>272,496</td>
<td>22.8</td>
</tr>
<tr>
<td>1969</td>
<td>80,094</td>
<td>38,693</td>
<td>324,276</td>
<td>24.7</td>
</tr>
<tr>
<td>1970</td>
<td>105,314</td>
<td>46,394</td>
<td>403,737</td>
<td>26.1</td>
</tr>
<tr>
<td>1971</td>
<td>152,314</td>
<td>58,358</td>
<td>531,510</td>
<td>28.7</td>
</tr>
</tbody>
</table>

\(^a\) Thousands of dinars

\(^b\) Deflated by retail price index, 1963 \(\bar{Q} = 100\); accounts receivable is the stock of credit granted by enterprises in the social sector to all domestic and foreign customers. Figures are for the value of credit outstanding at the end of year (December). Transactions is the total value of enterprise receipts in the social sector during the year.

period was only 13.3. After 1967, however, the accounts receivable-sales ratio consistently exceeded the maximum level reached in the earlier period. Moreover, the average ratio for the entire 1967-71 period was 24.1 which was 84% larger than the average ratio for the 1958-66 period.

The possible change in the realtionship between trade credit and enterprise sales in the post-1966-67 years may be the product of several distinct factors of which the most important are: increases in the rate of return on accounts receivable, stemming from increases in the various components which make up this rate of return; changes in the opportunity cost of holding trade credit, in the form of changes in the nominal interest rate on bank loans or changes in the expected rate of inflation; and changes in the rate of return on cash balances which serve as a partial substitute for trade credit in total enterprise transactions balances. One way to determine whether the increase in the trade-credit-sales ratio is the result of a change in the rate of return on cash balances is to compare the behavior of this ratio with the behavior of the cash-balances-sales ratio. Both cash balances and accounts receivable which together form enterprise transactions balances are positively related to enterprise sales. Changes in the ratio between the
sum of cash balances and accounts receivable and the total of enterprise sales is the result of changes in \( r_b \), the opportunity cost of holding transactions balances, while changes in the composition of these balances is the result of changes in the relative rates of return on cash and accounts receivable. Table 7.2 contains the data relevant to an analysis of these propositions. The data reveal that in the post-1967 period the total volume of transactions balances rose as a percentage of total enterprise sales, indicating that the opportunity cost of holding such balances declined relative to the rate of return on such balances or alternatively, that the rate of return on these balances increased relative to their opportunity cost. In contrast to this trend, however, the money-balance-sales ratio tended to decline during the same period, indicating that while total transactions balances were growing in profitability, changes in the relative rates of return on cash and accounts receivable were working to favor a larger portion of trade credit and a smaller portion of cash in the total. Unfortunately, the data in table 7.2 cannot alone distinguish whether the growing use of trade credit relative to cash was caused by a rise in the rate of return on accounts receivable relative to the rate of return on cash or a drop in the rate of return on cash relative to the rate of return on
<table>
<thead>
<tr>
<th>Nominal Value of Cash Balances&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Real Value of Cash Balances&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Cash Balances as a Percentage of Transactions</th>
<th>AR + Cash Balances as a Percentage of Transactions</th>
<th>Percentage Growth of the Money Supply&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1958</td>
<td>2,522</td>
<td>3,275</td>
<td>4.4%</td>
<td>16.6%</td>
</tr>
<tr>
<td>1959</td>
<td>2,915</td>
<td>3,737</td>
<td>4.3</td>
<td>16.2</td>
</tr>
<tr>
<td>1960</td>
<td>3,086</td>
<td>3,718</td>
<td>3.8</td>
<td>17.9</td>
</tr>
<tr>
<td>1961</td>
<td>3,479</td>
<td>3,866</td>
<td>3.7</td>
<td>20.8</td>
</tr>
<tr>
<td>1962</td>
<td>5,247</td>
<td>5,466</td>
<td>4.8</td>
<td>16.3</td>
</tr>
<tr>
<td>1963</td>
<td>5,731</td>
<td>5,731</td>
<td>4.6</td>
<td>16.5</td>
</tr>
<tr>
<td>1964</td>
<td>6,763</td>
<td>6,205</td>
<td>4.3</td>
<td>15.5</td>
</tr>
<tr>
<td>1965</td>
<td>8,246</td>
<td>5,848</td>
<td>4.2</td>
<td>17.2</td>
</tr>
<tr>
<td>1966</td>
<td>7,784</td>
<td>4,474</td>
<td>3.2</td>
<td>17.3</td>
</tr>
<tr>
<td>1967</td>
<td>6,784</td>
<td>3,647</td>
<td>2.6</td>
<td>20.5</td>
</tr>
<tr>
<td>1968</td>
<td>7,527</td>
<td>3,900</td>
<td>2.8</td>
<td>25.5</td>
</tr>
<tr>
<td>1969</td>
<td>7,275</td>
<td>3,514</td>
<td>2.2</td>
<td>26.9</td>
</tr>
<tr>
<td>1970</td>
<td>8,072</td>
<td>3,556</td>
<td>2.0</td>
<td>28.1</td>
</tr>
<tr>
<td>1971</td>
<td>8,927</td>
<td>3,420</td>
<td>1.7</td>
<td>30.4</td>
</tr>
</tbody>
</table>


<sup>a</sup> Thousands of dinars.

<sup>b</sup> Deflated by retail price index, 1963 Ø = 100. Cash balances is the sum of currency and demand deposits held by the enterprise sector at the end of the year.

<sup>c</sup> Money Supply growth rates calculated from data in appendix A.6.1.
trade credit. These two possibilities can only be tested by estimating demand curves for both money and trade credit in the enterprise sector and by searching for possible shifts in these curves which may have occurred in the 1966-68 period. Before carrying out empirical tests of this nature, it is useful to examine tables 7.1 and 7.2 further to get an idea of the cyclical behavior of the trade credit and money holdings of the enterprise sector.

The first problem encountered in analyzing cyclical changes in enterprise transactions balances is the development of an appropriate indicator to define different phases of the economic cycle. If the question we wish to ask concerns the sensitivity of the volume of trade credit and cash balances to changes in monetary policy, then the appropriate indicator is some measure of the restrictiveness of this policy as it varies over time. One such measure is the rate of growth of the money supply which was used in chapter 5 as the main indicator of monetary policy changes. Annual estimates of this growth rate are presented in table 7.2. The money growth rate series marks off the 1962-64 and the 1969-70 periods as years of substantial monetary ease and the years 1965 and 1967 as years of significant monetary restriction. The data are somewhat less conclusive about the intermediate years, 1961, 1966,
and 1971, when growth rates, while lower than those in preceding or succeeding years, were still quite high on an absolute scale. To evaluate the severity of monetary policy in these years it is necessary to consider some additional evidence. National Bank documents and regulations suggest that the overall impact of monetary policy in 1961, 1966, and 1971 was designed to be restrictive or dampening. In the two earlier years, this impact was achieved by enforcement of stricter credit guidelines and by the imposition of overall limitations on the volume of credit which the commercial banks could lend to their customers. In 1971, direct controls of this type were accompanied by more traditional measures, such as an increase in reserve requirements and a broadening of the deposit base for required reserves. In contrast, in 1968, the goal of the National Bank was one of monetary expansion and the policies to attain this goal took the form of an increase in the rediscount limit, a drop in required reserves, and the freeing of restricted deposits. Summarizing, then, it appears that the 1965-67 period in its entirety was one of monetary restrictiveness while the 1968-70 period was one of monetary ease. A shorter monetary contraction of a less severe nature occurred in 1961 and again in 1971. The 1961 contraction was much more severe in its effect because it was accompanied by a
variety of disturbances in business activity induced by the economic reform which occurred in that year.25

An examination of the behavior of the cash balances-transactions ratio and the accounts receivable-transactions ratio during the cycles of monetary policy identified in the discussion above support the following major conclusions:

1. In all three monetary contractions (1961, 1965-67, and 1971) accounts receivable increased more rapidly than did enterprise sales. As a result, both the accounts receivable-sales ratio and the ratio between total transactions balances and sales increased. Moreover, until 1968, the accounts receivable-sales ratio was significantly lower in years of expansionary monetary policy than it was in years of monetary contraction. Beginning in 1968, however, this ratio continued to increase from its 1967 high, despite a shift towards a noticeably more expansionary monetary policy.

2. In all three monetary contractions, cash balances increased less rapidly than did enterprise sales,26 and the ratio between sales and cash balances declined sharply from the levels which it reached in years of expansionary monetary policy. During the 1962-64 monetary expansion the cash-sales ratio increased to its pre 1960-61 level and remained more or less constant until the next
onslaught of monetary restrictiveness in 1965. In contrast, after a slight recovery in 1968, this ratio declined steadily throughout 1969 and 1970 despite the rapid growth of the money supply in those years.

The model of enterprise asset holding behavior described in the first part of this chapter can be employed to interpret the conclusions about the cyclical behavior of enterprise holdings of cash and accounts receivable. The model predicts that the imposition of a restrictive monetary policy which increases the shadow rate of interest on bank loans for each enterprise will result in a reduction of enterprise cash balances, as each firm attempts to economize on its now-more expensive holdings of cash. This effect represents a movement along a constant demand for money curve. Similarly, each firm can be expected to increase its demand for the now relatively cheaper trade credit as a substitute for bank credit. Whether an actual increase in the stock of trade credit occurs as a result of this increase in demand depends on whether lender firms are voluntarily induced or involuntarily forced to hold larger volumes of accounts receivable. The Yugoslav data presented in tables 7.1 and 7.2 indicate that lenders do increase their stock of accounts receivable and hence their crediting of customers in one of these ways. However, further study is necessary before
we can determine whether lender behavior of this type is a voluntary response to an increase in the rate of return on accounts receivable or an involuntary response to the defaulting of debtor firms on the repayment of credit granted in the past. Actually, of course, these two cases are not mutually exclusive, since lenders can always limit the extent to which their holdings of accounts receivable rise as a result of debtor defaults by postponing or curtailing the new credit which they grant. The very large increases in trade credit which have occurred in Yugoslavia during monetary contractions therefore suggest that the stock of accounts receivable has grown not only because debtors have defaulted on outstanding credit but because some creditors have found it profitable to extend new credit to their credit-worthy customers. Creditor willingness to maintain or increase their crediting of customers during a monetary contraction in turn suggests that some increase in the rate of return on accounts receivable has probably occurred during these periods. A likely consequence of such an increase is a movement out of cash by the enterprise sector as some firms substitute accounts receivable for cash balances. Thus, at least part of the observed reductions in cash balances or in the cash-sales ratio during periods of monetary contraction has probably been the result of enterprise behavior of this type. For some firms, of course, the reduction in
cash balances has probably been an unavoidable consequence of the need to find adequate means to support undesired additions to the stock of accounts receivable due to debtor defaults. For these firms actual cash balance behavior is not desired cash balance behavior but constrained cash balance behavior, where the constraint takes the form of a given increase in the stock of accounts receivable which must be financed.

**Trade Credit, Cash Balances and Monetary Policy:**

**The Empirical Results**

In this section I want to combine the model of asset holding behavior described in the first part of this chapter and the above discussion of the cyclical and secular changes in enterprise holdings of cash and accounts receivable to develop and estimate demand curves for cash and accounts receivable in the Yugoslav enterprise sector. The theory of enterprise asset behavior suggests equations of the following form:

\[ AR^* = f(r_{aR}, r_m, r_b, r_k, W) \]  \hspace{1cm} (7.12)

where \( f_1 > 0, f_2 < 0, f_3 < 0, f_4 < 0 \) and \( f_5 > 0 \);

\[ MB^* = g(r_{aR}, r_m, r_b, r_k, W) \]  \hspace{1cm} (7.13)

where \( g_1 < 0, g_2 > 0, g_3 < 0, g_4 < 0 \) and \( g_5 > 0 \); and where \( W \) is some
scale or wealth variable. Unfortunately, the data do not provide any direct measures of the rates of return on cash, accounts receivable, or real capital in Yugoslavia, so it is necessary to replace these variables by other variables which are closely related to them. A number of replacements of this type yield the following equations:

\[
\left( \frac{AR^*}{p} \right) = a_0 + a_1 \left( \frac{MT}{p} \right) + a_2 (I^e) + a_3 \left( \frac{\dot{p}}{p} \right)^e + a_4 \dot{M}^s
\]

\[+ a_5 (LR) + \varepsilon \]

(7.14)

\[
\left( \frac{MB^*}{p} \right) = b_0 + b_1 \left( \frac{MT}{p} \right) + b_2 \left( \frac{\dot{p}}{p} \right)^e + b_3 \dot{M}^s + \varepsilon
\]

(7.15)

The variables included in each equation, the rationale for their inclusion, and the expected signs of each of the coefficients are summarized in the following propositions.

1. \( \frac{MT}{p} \) is the real cash value of enterprise transactions, as measured by the deflated volume of total enterprise receipts. In the model of asset holding behavior both cash balances and accounts receivable were shown to be positively related to the volume of enterprise transactions. Therefore, by assumption both \( a_1 \) and \( b_1 \) are expected to be greater than zero.

2. \( I^e \) is a measure of the volume of unplanned
inventory accumulation anticipated by the firm. As noted in the portfolio model, one of the implicit rates of return on accounts receivable is the savings which the firm can earn by selling on credit to avoid financing undesired inventory holdings. Therefore, $a_2$ is expected to be greater than zero.

3. $(\dot{p}/p)^e$ is the expected rate of inflation which, according to the portfolio model, is one of the components of the real rate of return from holding either cash or accounts receivable. As $(\dot{p}/p)^e$ increases, the real rate of return on both of these assets declines; therefore, $a_3$ and $b_2$ are expected to be less than zero.

4. $M^S$ is the rate of growth of the money supply lagged one quarter. This variable is used as a proxy for the prevailing shadow rate of interest on bank loans, since these rates are not observable. By assumption, an increase in the bank loan interest rate represents an increase in the opportunity cost of holding accounts receivable and cash and should therefore lead to a reduction in both types of assets. Since an increase in the money supply growth rate means an easing of overall monetary conditions and consequently, a reduction in shadow interest rates, which in turn implies an increase in enterprise cash balances and accounts receivable, both $a_4$ and $b_3$ are expected to be greater than zero.
5. LR is the liquidity ratio measured as the ratio between enterprise holdings of liquid assets, including cash but excluding accounts receivable, and enterprise indebtedness to the monetary system. This ratio is used as a measure of an enterprise's ability to finance accounts receivable without jeopardizing its own liquidity. According to the portfolio model, the expected sign of the coefficient of the liquidity ratio is positive, indicating that the more liquid the firm, the higher the perceived rate of return on trade credit extension.

The use of observed data to estimate equations (7.14) and (7.15) implies the assumption that each enterprise is always able to immediately adjust its holdings of cash and accounts receivable to their desired levels. Such an assumption, while perhaps realistic for enterprise cash balances, is certainly over restrictive for accounts receivable, since individual enterprises often lack direct and immediate control over the stock of accounts receivable which they hold because of unforeseen debtor defaults on payment delays. Certainly, in Yugoslavia, where defaults and delays of this type have occurred on a wide scale, and where enterprises have frequently been forced to turn to the courts to settle their accounts, the assumption that the actual stock of accounts receivable always equals the desired stock is unrealistic. Moreover,
to the extent that an enterprise is forced to finance unplanned additions to its stock of accounts receivable by unplanned reductions in its stock of money, this assumption is unrealistic for cash balances as well. Therefore, some adjustment mechanisms must be postulated to reflect the fact that enterprises gradually adjust the actual stocks of their assets to their desired levels. 28

The adjustment mechanisms which I adopt lead to equations of the following form:

\[
\Delta \left( \frac{AR}{p} \right)_i t = a_0 + a_1 \left( \frac{MT}{p} \right)_i t - 1 + a_2 \left( I^e \right)_i t \\
+ a_3 \left( \frac{\dot{p}}{p} \right)_i^e t + a_4 (MS)_{t-1} + a_5 (LR)_i t \\
+ a_6 \left( \frac{AR}{p} \right)_i t - 1 + \varepsilon \tag{7.14'}
\]

\[
\ln \left( \frac{AR}{p} \right)_i t = a_0 + a_1 \ln \left( \frac{MT}{p} \right)_i t - 1 + a_2 \ln \left( I^e \right)_i t \\
+ a_3 \Delta \ln (MS)_t + a_4 \Delta \ln (p)_t + a_5 \ln (LR)_i t \\
+ a_6 \ln \left( \frac{AR}{p} \right)_i t - 1 + \varepsilon \tag{7.14''}
\]
\[ \Delta \left( \frac{MB}{P} \right)_t = b_0 + b_1 \left[ \left( \frac{MT}{P} \right)_i \right]_{t-1} + b_2 \left( \frac{\dot{p}}{p} \right)_t^e + b_3 \left( MS \right)_t \]

\[ + b_4 \left( \frac{MP}{P} \right)_{t-1} + \varepsilon \quad (7.15') \]

\[ \ln \left( \frac{MB}{P} \right)_t = b_0 + b_1 \ln \left[ \left( \frac{MT}{P} \right)_i \right]_{t-1} + b_2 \Delta \ln \left( p_t \right)^e \]

\[ + b_3 \Delta \ln \left( MS \right)_t + b_4 \ln \left( \frac{MB}{P} \right)_{t-1} + \varepsilon \quad (7.15'') \]

where \( \ln \) is the natural logarithm and \( \Delta \) is the period to period change. Equations (7.14') and (7.15') are so-called stock-flow adjustment models which postulate that the enterprise always varies its asset holdings to adjust for a constant percentage of the absolute difference between actual and desired levels of these holdings. In contrast, equations (7.14'') and (7.15'') are geometric adjustment models which postulate that the enterprise always varies its asset holdings to adjust for a constant proportion of the relative difference between the actual and desired levels, as measured by the ratio between actual and desired cash balances.

Table 7.3 contains the best results obtained from estimating equations (7.14)-(7.14'') and (7.15)-(7.15'') with aggregate data for the Yugoslav enterprise sector for the years 1961-1971. The data are described in detail.
in appendix A.7.1 of this chapter. However, a few preliminary notes about the data are necessary for the correct interpretation of the results. First, the data for cash balances and accounts receivable are end-of-month stock figures for June, September, and December of each year. This rather strange choice of time interval was dictated by Yugoslav accounting procedures which require full financial statements in each of these months. The trade credit figures are taken directly from these financial statements. Second, because the stock of accounts receivable relates to a flow of current and past business transactions, in the estimation of equations (7.14)-(7.14''), the stock of accounts receivable at a given point in time is made a function of the average of transactions occurring over the most recent three periods. In other words, \((MT)\) in equation (21) is replaced by a simple average of \(MT_t\), \(MT_{t-1}\), and \(MT_{t-2}\). Such an averaging procedure also removes part of the seasonality factor in the transactions figures. A similar averaging procedure was also applied to the cash balance figures and the transactions figures used in equations (7.15)-(7.15'') to remove the apparent seasonality of these figures. Third, the ratio between an index of final product inventories and an index of industrial production was used as a measure of \(I^e\), the expected rate of unplanned inventory accumulation. A better measure would be some estimate of the
divergence between actual and planned inventory accumulation. However, since both inventories and the ratio between inventories and industrial production exhibit an upward trend over time, it is difficult to get a measure of some average value of either of these variables which might serve as a proxy for planned or desired inventory investment. The implicit assumption underlying the inventory variable used is that the higher the current ratio between inventories and industrial production, the greater the expectations that unplanned final product inventory accumulation will occur in the future. Fourth, the expected rate of price inflation is measured as a weighted average of the observed rates of inflation in the retail price index during the past six periods, while the rate of growth of the money supply is measured by the overlapping four-quarter annual percentage rates of growth in the stock of money, lagged one period. Fifth, the liquidity ratio is measured as the ratio between the sum of total enterprise liquid assets, including cash, demand deposits, restricted deposits, and sight deposits, and the total outstanding stock of long-term and short-term bank loans held by the enterprise sector. Finally, the equations for accounts receivable are estimated using two series on the stock of trade credit; the first series, called AR', includes enterprise crediting of all domestic
and foreign customers whether they be in the enterprise, household, government or foreign sectors, while the second series, called AR^2, includes only inter-enterprise crediting. The second series is more appropriate to the model of asset behavior on which the equations are based, since in that model, enterprises were assumed to limit their crediting to customers within the enterprise sector. However, as the empirical results show, there is little difference in the results using either of the two series.

An examination of the equations in table 7.3 yields the following conclusions:

1. On the basis of the degree of explanatory power as measured by the adjusted R^2 values and on the basis of the degree of overall significance as measured by the F statistics, the geometric adjustment model performs best for the accounts receivable equation while the stock-flow adjustment model performs best for the cash balance equation. The significance of the lagged values of the dependent variable in either adjustment equation suggests that enterprises have been unable to immediately adjust their holdings of accounts receivable and cash to their desired levels. This conclusion is borne out by the fact that preliminary efforts to estimate equations (7.14) and (7.15) in their unlagged forms gave much poorer results than those presented in the table.

2. The expected rate of inflation has been
TABLE 7.3

THE DEMAND FOR ACCOUNTS RECEIVABLE AND CASH BALANCES IN THE YUGOSLAV ENTERPRISE SECTOR, 1961-1971

Dependent/Independent Variables
Variable
I. Accounts Receivable
1. Geometric adjustment model
\[
\ln \left( \frac{AR'}{P^t} \right) c \ln \left( \frac{MT}{P} \right)_t \ln (I^e)_t \Delta \ln MS_{t-1} \ln LR_t \ln \left( \frac{AR'}{P} \right)_{t-1}
\]
\[
.2922 \quad 1.0604 \quad .5903 \quad 2.3428 \quad -.62603 \quad .1147
\]
\[
(.00927)^a \quad (.1312) \quad (.5172) \quad (.1037) \quad (.0783)
\]
\[ R^2 = .972; \text{ D.W.} = 1.44 \]

2.  \
\[
\ln \left( \frac{AR^2}{P^t} \right) c \ln \left( \frac{MT}{P} \right)_t \ln (I^e)_t \Delta \ln MS_t \ln LR_t \ln \left( \frac{AR^2}{P} \right)_{t-1}
\]
\[
.5320 \quad .09416 \quad .5689 \quad 2.3373 \quad -.6409 \quad .1957
\]
\[
(.010077) \quad (.1408) \quad (.5509) \quad (.1287) \quad (.0943)
\]
\[ R^2 = .970; \text{ D.W.} = 1.63 \]

3. Stock-flow adjustment model
\[
\Delta \left( \frac{AR'}{P} \right) c \left( \frac{MT}{P} \right)_t \ln (I^e_t) \ln MS_{t-1} \ln LR_t \left( \frac{AR'}{P} \right)_{t-1}
\]
\[
-9415.6 \quad .1525 \quad 1524.7 \quad 237.99 \quad -138.85 \quad -.5565
\]
\[
(.0160) (529.8) -(53.65) (32.95) \quad (.0769)
\]
\[ R^2 = .847; \text{ D.W.} = 1.86 \]
TABLE 7.3--Continued

<table>
<thead>
<tr>
<th>4. $\Delta \left( \frac{AR^2}{p} \right)_t$</th>
<th>$c$</th>
<th>$\left( \frac{MT}{p} \right)_t$</th>
<th>$E_t$</th>
<th>$M_{St-1}$</th>
<th>$LR_t$</th>
<th>$\left( \frac{AR^2}{p} \right)_{t-1}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.7128.1</td>
<td>.1064</td>
<td>1178.6</td>
<td>188.9</td>
<td>-.104.3</td>
<td>-.4434</td>
<td></td>
</tr>
<tr>
<td>(.1147)</td>
<td></td>
<td>(377.6)</td>
<td>(39.0)</td>
<td>(26.2)</td>
<td>(.07600)</td>
<td></td>
</tr>
</tbody>
</table>

$R^2 = .819$  D.W. = 1.90

II. Cash Balances

5. Geometric adjustment model

<table>
<thead>
<tr>
<th>$\ln \left( \frac{MB}{p} \right)_t$</th>
<th>$c$</th>
<th>$\ln \left( \frac{MT}{p} \right)_t$</th>
<th>$\Delta \ln MS_{t-1}$</th>
<th>$\ln \left( \frac{MB}{p} \right)_{t-1}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>-.3759</td>
<td>.06132</td>
<td>1.0537</td>
<td>.3078</td>
<td></td>
</tr>
<tr>
<td>(.01372)</td>
<td></td>
<td>(.96101)</td>
<td>(.1315)</td>
<td></td>
</tr>
</tbody>
</table>

$R^2 = .50$  D.W. = 1.02

6. Stock-flow adjustment model

<table>
<thead>
<tr>
<th>$\left( \frac{\Delta MB}{p} \right)_t$</th>
<th>$c$</th>
<th>$\left( \frac{MT}{p} \right)_t$</th>
<th>$M_{St-1}$</th>
<th>$\left( \frac{MB}{p} \right)_{t-1}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>-438.4</td>
<td>.01960</td>
<td>11.6589</td>
<td>-.83059</td>
<td></td>
</tr>
<tr>
<td>(.00257)</td>
<td></td>
<td>(8.838)</td>
<td>(.1078)</td>
<td></td>
</tr>
</tbody>
</table>

$R^2 = .82$  D.W. = .586

**NOTE:** All variables in this table are defined in the text; data for the variables and their calculations presented in appendix A.7.1.

*aFigures in parenthesis are standard errors.*
dropped from all of the equations because in preliminary results this variable was always insignificant and frequently of the wrong sign. The exclusion of the price variable suggests that asset holding decisions have not been affected by expectations about the depreciation in asset value despite the fact that a rapid inflation has significantly reduced this value. This conclusion seems suspect and more empirical investigation is required in the future to try to get a proper measure of the effects of changes in the expected rate of inflation on enterprise asset holding behavior.

3. In all of the equations shown the rate of growth of the money supply, lagged one quarter, is significant and of positive sign. This result suggests that a restrictive monetary policy, in the form of a lower rate of growth of the money supply, which by assumption increases the shadow rate of interest on bank loans, reduces enterprise holdings of both cash and accounts receivable. On the basis of this result one can conclude that accounts receivable as an asset created by an uncontrolled financial intermediary does not increase when monetary policy is restrictive and, therefore, does not offset the effectiveness of monetary policy by causing a temporary movement out of cash and into this asset. However, this conclusion does not mean that the existence
of trade credit in the Yugoslav economy has no influence on the effectiveness of monetary policy, for as noted earlier, the existence of a substitute for money in enterprise financial balances has a direct effect on both the volume of cash balances held at any moment of time and on the elasticity of the demand for these balances. The elasticity effect works to reduce the effectiveness of a given dose of monetary policy.

4. In either version of the accounts receivable equation, the coefficient of the expected inventory accumulation variable is positive and highly significant, indicating, as expected, that enterprise holdings of accounts receivable increase whenever the expected rate of unplanned inventory accumulation increases. The importance of the inventory variable probably accounts for the apparent contradiction between the estimation results which indicate that monetary policy restrictions cause a reduction in enterprise holdings of accounts receivable and the discussion of the data in tables 7.1 and 7.2, which suggests that years of restrictive monetary policy bring on a large increase in these holdings. From the discussion in chapter 5, it is obvious that the immediate effect of a restrictive monetary policy in Yugoslavia is an increase in unplanned final product inventory accumulation. The growth of inventories in turn induces a growth
in the volume of trade credit in one of two ways: first, by increasing the rate of return on accounts receivable via changes in $s_i^e$ and second by reducing the ability of debtor firms to pay their bills as these firms are forced to use available bank finance, their own cash holdings and trade credit extended to them either voluntarily or involuntarily to finance their inventory holdings. This explanation of the link between monetary policy, inventory changes, and changes in the stock of trade credit is borne out by the fact that in every year of "restrictive monetary policy" as identified in table 7.2, the level of the inventory-industrial-production index is higher than it is in years of expansive monetary policy. Moreover, restrictive years are characterized by a much more rapid growth in inventories than are expansive years. These results suggest that delayed adjustments in price and output and variations in unplanned inventory accumulation play a crucial role in determining variations in enterprise trade credit and in causing the so-called illiquidity crises of the enterprise sector.

5. As expected, both holdings of cash and of accounts receivable are positively and significantly related to the level of enterprise sales. A comparison of the coefficients of the transactions variable in the cash and accounts receivable equations indicates that a
given increase in transactions calls forth a larger increase in accounts receivable than in cash, thus suggesting that over time the share of cash in the total transactions balances of the enterprise sector is declining. This conclusion is supported by the data presented in tables 7.1 and 7.2.

6. Contrary to the predictions of the asset model, the coefficient of the liquidity ratio in the accounts receivable equations while significant is negative in sign. The contradiction is probably explained in terms of a clear distinction between increases in the stock of accounts receivable which are voluntarily granted by lender firms and increases which are requested by illiquid borrowers who are forced to make new purchases on credit or to default on credit granted on past purchases and acquiescing lenders who grant credit under these circumstances either because the cost of stopping the growth of credit of this type is too high or because they hope to eventually receive full repayment of credit granted in the past. In short, the negative sign of the liquidity ratio probably reflects an increase in borrower-initiated efforts to obtain trade credit during periods when these borrowers are unable to make cash purchases due to their temporary illiquidity. In addition, the negative relationship between changes in the stock of trade credit
and variations in enterprise liquidity may reflect that fact when monetary policy is tightened, enterprises increase their trade credit by running down alternative liquid assets. Both Meltzer and Brechling and Lipsey have suggested that enterprise variations in liquidity finance additions to the stock of trade credit in this way. If the negative sign on the liquidity variable is due to this type of enterprise reaction, then it further strengthens the case for the sensitivity of trade credit variations to monetary policy.

Before going on to discuss differences in the speed and process of adjustment of cash balances and accounts receivable implied by the results presented in table 7.3, it is worthwhile to examine these results for indications of possible shifts in the equations during the time period under consideration. As far as the best accounts receivable equations are concerned, both the high degree of overall significance, and the value of the Durbin-Watson statistic indicate that these equations perform reasonably well over the entire period of estimation. In contrast, the poorer performance of the best cash balances equation and the very low Durbin-Watson statistic associated with this equation indicate that some shift in the characteristics of enterprise demand for cash may have occurred. Such a shift would be consistent with the data
presented in tables 7.1 and 7.2, and would explain both the declining value of the cash-sales ratio and the increasing value of the accounts-receivable-sales ratio after 1967.  

Table 7.4 presents the results obtained from estimating enterprise money demand curves for two sub-periods: 1961III-1966III and 1967-1971III. On the basis of a simple "F" test comparing the sum of squared residuals from the equation estimated for the whole period with the total of the sum of squared residuals from the corresponding equations estimated for the two sub-periods, the null hypothesis that a single equation fits the entire period is rejected. This result is expected since both the absolute values and the signs of the estimated coefficients differ substantially between the two subperiods. Thus, in the stock-flow money demand equations estimated for the 1961III-1966III period, the sign of the transactions variable is positive while in the 1967I-1971I versions of these equations, the sign is negative and insignificant at the .05 level of significance.

While the equations presented in table 7.4 provide an excellent explanation of variations in enterprise cash balances during the 1961-66 period they perform considerably less well for the 1966-71 period. In fact,
TABLE 7.4
THE DEMAND FOR CASH BALANCES IN THE YUGOSLAV ENTERPRISE SECTOR, 1961-1971

<table>
<thead>
<tr>
<th>Dependent/Independent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 1961III-1966III</td>
</tr>
<tr>
<td>1. Geometric adjustment model</td>
</tr>
<tr>
<td>( \ln\left(\frac{MB}{P}\right)<em>t ) ( c ) ( \ln\left(\frac{MT}{P}\right)<em>t ) ( \ln\Delta MS</em>{t-1} ) ( \ln\left(\frac{MB}{P}\right)</em>{t-1} )</td>
</tr>
<tr>
<td>(-2.91337) ( .10699 ) ( 1.44345 ) ( .098303 )</td>
</tr>
<tr>
<td>( (.0546) ) ( (.4446) ) ( (.0451) )</td>
</tr>
<tr>
<td>( R^2 = .976 ) ( D.W. = 1.275 )</td>
</tr>
<tr>
<td>2. Stock-flow adjustment model</td>
</tr>
<tr>
<td>( \Delta\left(\frac{MB}{P}\right)<em>t ) ( c ) ( \left(\frac{MT}{P}\right)<em>t ) ( \dot{MS}</em>{t-1} ) ( \left(\frac{MB}{P}\right)</em>{t-1} )</td>
</tr>
<tr>
<td>(-247.28) ( .0246 ) ( 7.974 ) ( -.96315 )</td>
</tr>
<tr>
<td>( (.0067) ) ( (2.9915) ) ( (.0282) )</td>
</tr>
<tr>
<td>( R^2 = .995 ) ( D.W. = 1.230 )</td>
</tr>
<tr>
<td>II. 1967I-1971III</td>
</tr>
<tr>
<td>3. Geometric adjustment model</td>
</tr>
<tr>
<td>( \ln\left(\frac{MB}{P}\right)<em>t ) ( c ) ( \ln\left(\frac{MT}{P}\right)<em>t ) ( \ln \Delta MS</em>{t-1} ) ( \ln\left(\frac{MB}{P}\right)</em>{t-1} )</td>
</tr>
<tr>
<td>( 6.3856 ) ( -.016607 ) ( 1.05378 ) ( .377958 )</td>
</tr>
<tr>
<td>( (.01372) ) ( (.961011) ) ( (.131503) )</td>
</tr>
<tr>
<td>( R^2 = .5029 ) ( D.W. = 1.020 )</td>
</tr>
</tbody>
</table>
4. Stock-flow adjustment model

<table>
<thead>
<tr>
<th>(\Delta(\frac{MB}{P})_t)</th>
<th>c</th>
<th>(\frac{MT}{P}_t)</th>
<th>(M_{S_t-1})</th>
<th>(\frac{MB}{P}_{t-1})</th>
</tr>
</thead>
<tbody>
<tr>
<td>2236.1</td>
<td>-.002974</td>
<td>4.9629</td>
<td></td>
<td>-.778593</td>
</tr>
<tr>
<td>(756.9)</td>
<td>(.001878)</td>
<td>(3.7364)</td>
<td></td>
<td>(.239508)</td>
</tr>
</tbody>
</table>

\(R^2 = .51\) \hspace{1cm} \text{D.W.} = 1.376
as already noted, the sign of the transactions variable in the equations estimated for this period is contrary to the sign predicted by the model on which the equations are based. Therefore, some alternative equation forms must be developed to try to explain variations in enterprise cash holdings after 1967. Rather than try to develop a whole new model of asset holding behavior to provide the theoretical rationale for a choice of variables for such equations, I relied on the original model and merely re-inserted the expected rate of inflation as an explanatory variable, under the assumption that as the rate of inflation continued over a long period of time, enterprises would develop a greater sensitivity to the depreciating value of their cash holdings. In addition, I also added changes in the stock of accounts receivable as an explanatory variable, under the assumption that a possible drop in the implicit rate of return on transactions and precautionary balances, caused by the type of institutional changes discussed at length in chapter 8, would work to favor greater holdings of accounts receivable relative to cash. If this is the case, then the flow out of cash into accounts receivable would mean that variations in accounts receivable would appear with a negative sign in the money demand equations.\textsuperscript{37}

The best results which I obtained for the 1966-71
subperiod using the expected rate of inflation and changes in the stock of accounts receivable as independent variables yielded an equation of the following form:

\[
\left( \frac{\Delta MB}{P} \right)_t = -86.697 + 0.01935 \left( \frac{MT}{P} \right)_t + (-0.5257) \left( \frac{MR}{P} \right)_{t-1} \\
- 66.3485 \left( \frac{P}{P} \right)_{t-1} - 0.02085 \left( \frac{\Delta AR}{P} \right)_t
\]

\[\bar{R}^2 = .85; \quad D.W. = 1.377 \quad (7.16)\]

In this equation the rate of growth of the money supply, as an indicator of monetary policy severity, has been dropped because with the inclusion of the expected rate of inflation, this variable became insignificant. All of the included variables in the equation have the sign predicted by the asset-holding model and all are significant at the .05 level of significance.

The empirical results presented in tables 7.3 and 7.4 can be used to make some comparative statements about the form and the speed of adjustment of enterprise holdings of cash and accounts receivable to their desired levels. Taking first the geometric adjustment variants of the accounts receivable equations, which provide the
best overall fit for the 1961-1971 period, the adjustment coefficients can be read off as one minus the coefficient of the lagged dependent variable. Thus, for AR', the adjustment coefficient is .8853, and for AR\(^2\), the adjustment coefficient is .804265. The average time lag between a change in the desired stock of trade credit and the adjustment of the actual stock to this desired level can then be estimated as \(\lambda / 1-\lambda\) where \(\lambda\) is the adjustment coefficient. Under this definition, the average lag of adjustment for AR\(^1\) is 7.7 periods, while the average lag for AR\(^2\) is 4.12 periods.\(^{38}\) The length of these lags suggests that enterprises are able to adjust their outstanding stock of accounts receivable to its desired level only over a long period of time ranging from one to years. The length of this lag undoubtedly reflects the importance of involuntary trade crediting of the type which has been associated with liquidity crises and large-scale payments defaults.\(^{39}\) In this regard it is interesting to note that enterprises can adjust their crediting of one another considerably faster than they can adjust their crediting of customers in other sectors. The greater time lag in the adjustment of total accounts receivable stems from the fact that important business customers in the government sector often delay repayment of credit extended to them and they are able to prolong these delays because
of their political and economic ties with the enterprises providing the credit.\footnote{40}

Examining both the stock-flow and geometric-adjustment variants of the cash balances equations for the 1961-66 period, we see that the stock-flow model provides a slightly better fit. Both models indicate that the adjustment coefficient, as measured by the coefficient of the lagged dependent variable in the stock-adjustment equation and by one minus this coefficient in the geometric-adjustment model, is nearly equal to one, thus indicating that enterprises were able to completely adjust actual cash balances to their desired levels in three to six months during the early part of the sixties. In fact, if we estimate the cash balances equation allowing for immediate adjustment the results obtained for the 1961-66 subperiod are:

\[
\left( \frac{MB}{P} \right)_{t} = \frac{-100.010}{118.52} + \frac{0.02453}{0.00069} \left( \frac{MT}{P} \right)_{t} + \frac{6.31676}{2.7808} \left( MS \right)_{t-1}
\]

\[R^2 = 0.99 \quad D.W. = 1.04 \quad (7.17)\]

These results are similar to the results obtained in the stock-flow model. In contrast, during the post-1966 period, the speed of adjustment of cash balances declined significantly, so that only 52% of the difference between actual and desired cash balances was made up within an
accounting period. The apparent inability of enterprises to adjust cash balances as quickly during this period as they did earlier probably reflects the effect of the 1969-1971 illiquidity crisis and the growth of involuntary trade crediting on actual cash holdings. As mentioned earlier, if an enterprise is faced with an unforeseen increase in the stock of accounts receivable, the only method available for financing this increase may be an undesired reduction in cash balances. To the extent that this has been the case, variations in actual cash balances reflect constraints on the ability of individual firms to reach target cash positions. The importance of such constraints is suggested by the slow speed of adjustment characterizing enterprise cash behavior in the post-1966 period.

Conclusions
This chapter has developed a simple model of enterprise asset behavior and has used the model to make some predictions about the relationship between changes in accounts receivable, cash balances and monetary policy. These predictions have been tested with Yugoslav data for the 1962-1972 period. The results indicate that the imposition of a restrictive monetary policy has tended to reduce enterprise holdings of cash and accounts receivable while increases in enterprise transactions have tended to
increase such holdings. The fact that monetary restrictions appear to reduce accounts receivable runs counter to statistical and anecdotal evidence which suggests that the stock of trade credit increases dramatically during periods of tight monetary policy in Yugoslavia. However, the analysis indicates that the expansion of trade credit during such periods may be better explained by changes in enterprise expectations about unplanned inventory accumulation.

The model of enterprise behavior developed in this chapter assumes that enterprises act to maximize the return on their asset holdings. Such a behavioral principle appears inconsistent with the development of illiquidity crises. As long as cash balances earn a positive rate of return form the security which they provide against illiquidity, enterprises can be expected to hold the cash reserves needed for the smooth flow of monetary transactions. Therefore, to explain the illiquidity crises, it is necessary to identify those factors which may make the rate of return on cash so low that illiquidity becomes profitable for the individual firm and for the enterprise sector. The next chapter discusses some of the legal and political factors which may explain this phenomenon in Yugoslavia.
Appendix A.7.1

Part 1. A Description of the Sources of Data and Construction of the Variables Used in the Regression Analysis

**Accounts Receivable** (AR⁰ and AR²)

The series on accounts receivable are derived from the end of year balance sheet account figures for the social sector collected by SDK. These figures are not readily available to either Yugoslav or western scholars but researchers at the Ekononski Institut in Ljubljana were allowed to use them to develop series on the stock of accounts receivable. The series include all credit granted by the enterprise sector in the economic sphere (u privredi) to both domestic and foreign purchasers. The series measure the total value of such credit at the end of June, September and December.

**Monetary Transactions** (MT)

Monetary transactions are measured as total receipts (naplacena realizacija) of economic organizations (privrednih organizacija). This series is described in appendix A.4.1. The data are taken from the Statisticki Bilten of SDK, table 14, various issues.

**Expected Inventory Accumulation** (Iₑ)

The expected inventory variable is measured as the ratio between an index of industrial production and an index of final products inventories (zalihe gotovih roba) in the industrial sectors. Both indexes were taken from worksheets provided by the Ekononski Institut, Ljubljana. Data source for these worksheets.

**Cash Balances** (MB)

Cash balances of the enterprise sector are measured as the total of enterprise funds in giro accounts (ziro racuni) and funds for collective consumption (fondovi zajednicke potrosnje). Data for these funds are taken from Statisticki Bilten of the SDK,
The Liquidity Ratio

The liquidity ratio is the ratio between total liquid assets of the enterprise sector and total commercial bank loans to the enterprise sector. Liquid assets are measured as the sum of enterprise cash balances (MB) plus reserve funds (rezervni fondovi obavezní deo), required reserves (obavezne rezerve) and amortization funds. Data are from table 17 of the SDK Statisticki Bilten. Commercial bank loans to the enterprise sector are the total of investment credits (investicioni krediti banaka) and short-term credits (kratkorocni krediti banaka). Both series are taken from worksheets provided by the National Bank. Total credits to the enterprise sector are also available in table 18 of the SDK Statisticki Bilten.

### Part 2. Data Spanned by the Regressions

<table>
<thead>
<tr>
<th>Year</th>
<th>RFMB</th>
<th>RAR</th>
<th>RAR</th>
<th>I</th>
<th>LR</th>
<th>RMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961III</td>
<td>1826.8</td>
<td>15402.1</td>
<td>12606.2</td>
<td>8.67</td>
<td>12.3</td>
<td>8746.4</td>
</tr>
<tr>
<td>1962I</td>
<td>2049.5</td>
<td>13292.1</td>
<td>10941.6</td>
<td>9.10</td>
<td>12.9</td>
<td>8631.7</td>
</tr>
<tr>
<td>II</td>
<td>2565.0</td>
<td>14653.6</td>
<td>10104.1</td>
<td>9.34</td>
<td>13.8</td>
<td>9654.6</td>
</tr>
<tr>
<td>III</td>
<td>2605.9</td>
<td>11493.1</td>
<td>9264.6</td>
<td>9.26</td>
<td>15.7</td>
<td>9476.2</td>
</tr>
<tr>
<td>1963I</td>
<td>2654.4</td>
<td>14836.9</td>
<td>11307.8</td>
<td>8.69</td>
<td>14.8</td>
<td>9901.0</td>
</tr>
<tr>
<td>II</td>
<td>2743.3</td>
<td>15722.1</td>
<td>11720.2</td>
<td>8.08</td>
<td>13.7</td>
<td>10556.7</td>
</tr>
<tr>
<td>III</td>
<td>2857.1</td>
<td>14161.9</td>
<td>12258.1</td>
<td>7.36</td>
<td>11.6</td>
<td>11277.1</td>
</tr>
<tr>
<td>1964I</td>
<td>2885.6</td>
<td>16606.4</td>
<td>12769.1</td>
<td>7.00</td>
<td>11.1</td>
<td>11570.9</td>
</tr>
<tr>
<td>II</td>
<td>2868.1</td>
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<td>RAR&lt;sup&gt;b&lt;/sup&gt;</td>
<td>RAR&lt;sup&gt;2b&lt;/sup&gt;</td>
<td>I&lt;sup&gt;e&lt;/sup&gt;</td>
<td>LR&lt;sup&gt;c&lt;/sup&gt;</td>
<td>RMT&lt;sup&gt;d&lt;/sup&gt;</td>
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<td>43895.9</td>
<td>8.38</td>
<td>4.3</td>
<td>17306.2</td>
</tr>
</tbody>
</table>

<sup>a</sup>Moving average of cash balances (MB) deflated by retail price index 1962 $\varnothing = 100$.

<sup>b</sup>RAR<sup>1</sup> is the series on accounts receivable in the enterprise sector, deflated by the retail price index, 1962 $\varnothing = 100$. RAR<sup>2</sup> is the series on accounts payable in the enterprise sector deflated by the same price index.

<sup>c</sup>LR is the ratio of real, seasonally adjusted liquid assets of the enterprise sector and real, seasonally adjusted bank credits to the enterprise sector.

<sup>d</sup>Moving average of monetary transactions (MT) deflated by retail price index, 1962 $\varnothing = 100$. 
1. Other types of financial assets, such as savings accounts and security holdings, can be added to the model presented here without changing the model's major propositions about enterprise asset-holding behavior. Because of the simple financial structure of the Yugoslav economy, such alternative assets play a limited role in enterprise asset portfolios. Moreover, time deposits and contributions to bank credit funds, which are the major asset alternatives, are frequently held solely as a means to purchase access to scarce bank credit. As such, these assets are to be viewed as part of the fixed costs incurred by an enterprise on loans from the banking system, rather than as financial assets chosen by the enterprise in response to current market rates of return.


3. AR may exceed AP if firms grant trade credit to customers in the household, government or foreign sectors. In the model discussed here only interfirm crediting is considered. Later, the model will be broadened to include firm crediting of other customers, since such crediting plays an important role in the flow of funds from the enterprise sector to the household and government sectors in the Yugoslav economy.

4. The actual balance sheet figures for the Yugoslav enterprise sector in 1971 are as follows:

**Unconsolidated Basis**

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>27878 (Cash and other liquid assets)</td>
<td>189415 (Bank Loans - short-term and long-term)</td>
</tr>
<tr>
<td>24402 (Savings accounts and contributions to bank credit funds)</td>
<td>135048 (Accounts Payable)</td>
</tr>
<tr>
<td>156196 (Accounts Receivable)</td>
<td>22995 (Foreign Loans)</td>
</tr>
<tr>
<td>6972 (Foreign Exchange)</td>
<td></td>
</tr>
<tr>
<td>132010 (Real Capital)</td>
<td></td>
</tr>
</tbody>
</table>
Consolidated Basis

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>27878 (Cash and other liquid assets)</td>
<td>189415 (Bank loans– short-term and long-term)</td>
</tr>
<tr>
<td>24402 (Savings accounts and contributions to bank credit funds)</td>
<td>16023 (Net foreign loans)</td>
</tr>
<tr>
<td>21148 (Net accounts receivable)</td>
<td></td>
</tr>
<tr>
<td>132010 (Real Capital)</td>
<td></td>
</tr>
</tbody>
</table>


In contrast to the model balance sheets, the actual balance sheets presented here include net accounts receivable and savings accounts as assets and net foreign loans as liabilities in the consolidated enterprise sector. As noted in footnote 2, the exclusion of savings accounts has no effect on the model's conclusions; a similar result applies to the exclusion of foreign loans as a liability in the model. The appearance of net receivables as an asset points to the role of trade credit as a means to direct funds from the enterprise sector to customers outside this sector in the Yugoslav economy. As noted in footnote 3, the model will be modified later to take account of this type of crediting.

5. The equilibrium conditions for the composition of the firm's asset and liability portfolio are derived from the following constrained maximization problem:

\[
\text{Max } V_i = r_m M^i + r_{ar} A^i + r_k K^i - r_b B^i - r_{ap} A^i
\]

s.t. \[ M^i + A^i + K^i - B^i - A^i = NW^i \] (balance constraint)

\[ B^i \leq B^i \] (rationing constraint)

The first order conditions for this maximization problem are:

\[
\frac{\partial V^i}{\partial M^i} = r_m - \lambda_1 = 0 \quad \frac{\partial V^i}{\partial A^i} = r_{ar} - \lambda_1 = 0
\]

\[
\frac{\partial V^i}{\partial B^i} = -i_b + \lambda_1 - \lambda_2 = 0 \quad \frac{\partial V^i}{\partial A^i} = -r_{ap} + \lambda_1 = 0
\]
\[ \frac{\partial v^i}{\partial k^i} = r_k^i - \lambda_1 = 0 \]

where \( r^i \) is the real rate of interest on bank loans, \( \lambda_1 \) is the Lagrangian multiplier for the balance constraint and \( \lambda_2 \) is the Lagrangian multiplier for the rationing constraint. The first order conditions yield the following equalities:

\[
\frac{r^i}{m^i} = r^i = \frac{r^i}{ar} = r^i_k = i^b + \frac{\lambda_2}{r^i} = \frac{r^i}{ap} = \lambda_1
\]

when bank rationing occurs, \( \lambda_2 > 0 \) and \( i^b + \lambda_2 \) is a measure of the shadow rate of interest on bank loans \( r^b \); when no rationing occurs, \( i^b = r^b \) for all firms.

6. Quite often the transactions cost of bank loan negotiation is not an explicit service charge on loan application or approval; rather, this cost is implicit in the form of required minimum cash balances to be held at the bank from which loans will be sought. These minimum balances serve primarily as a form of compensation to the bank in lieu of explicit service fees. As noted in chapter 6, the tradition of compensating balances linking enterprises and the banks, from which they borrow is quite prevalent in Yugoslavia.

7. The definition of the expected cost of illiquidity in equation (7.3) and the definition of the rate of return on cash balances in equation (7.4) are taken directly from Edward Whalen, "A Rationalization of the Precautionary Demand for Cash," Quarterly Journal of Economics LXXX (May 1966): 314-24. Whalen describes the relationship between the rate of return on precautionary balances and the volume and variability of monetary transactions in the following manner:

The variability and average volume of receipts and disbursements also influences the size of precautionary cash balances. For a given time period, a firm has an expected volume of receipts and disbursements. Expected disbursements minus expected receipts defines a probability distribution of expected net disbursements. The probability distribution of expected net disbursements is assumed to have a mean of zero and a standard deviation which is determined by the degree of uncertainty attached to the pattern or receipts and disbursements. As the average volume of receipts and
disbursements increases, the standard deviation of the distribution of expected net disbursements will tend to increase because possible discrepancies between receipts and disbursements increase. The exact nature of the relationship between the average volume of receipts and disbursements and the standard deviation of net disbursements depends on the type of probability distribution which is assumed. Whatever the cause, an increase in the standard deviation of the net disbursements distribution will require an increase in precautionary cash balances in order to maintain a given probability against insufficient cash-on-hand (p. 316).

8. These two components of default risk are identified by M. I. Nadiri in his article, "Determinants of Trade Credit in the U.S. Total Manufacturing Sector," *Econometrica* 37, no. 3 (1969): 411.


12. Ibid.

13. These conditions were most nearly fulfilled in certain nineteenth century economies where trade credit was discountable at banks and where it circulated like money among firms in the form of bankers' acceptances. Even under these circumstances trade credit remained an imperfect substitute for money because there was a limit to the volume of trade bills which a given firm could discount with the banking system.

14. This result is consistent with the general proposition noted in the text that the greater the availability of money substitutes, the more elastic the demand for money function.

16. Usually the distinction between a controlled and an uncontrolled financial intermediary is based on differences in the flexibility of the ratio between cash and the assets of the intermediary. Controlled financial intermediaries, such as commercial banks, are required by law to maintain a constant proportion between cash balances and the assets which they create. Consequently, these assets and cash are frequently complements rather than substitutes. In contrast, an uncontrolled intermediary can vary the composition of its portfolio to maximize its total rate of return under different monetary policies. See J. Tobin and W. Brainard, "Financial Institutions and Monetary Policy," American Economic Review, reprint, pp. 392-97.

17. If \( s^e \) increases, then the supply of trade credit may be expected to shift somewhat to the right offsetting the leftward shift which occurred as a result of the restrictive monetary policy. What distinguishes this case is the existence of a constraint in the firm's control over its real capital holdings: this constraint results in an equilibrium which is characterized by a constrained demand for money balances. The firm, if it could, would not choose to hold such a large stock of trade credit and such a small reserve of cash balances. But the constraint of unplanned final product inventory accumulation forces it to do so. This analysis holds only for the short run, because over time, the firm can adjust its inventories and real capital stock either by the appropriate price reductions or by cutting down on both its production and investment plans. The bank loans freed by either of these two
adjustments will then be used to build money balances back up to their unconstrained desired levels. Simultaneously, ARs can be expected to decline to the long run equilibrium point characterized by $s_1^e = 0$.


19. If delays in the repayment of outstanding trade bills are matched by slowdowns in the volume of new credit extended, then the stock of accounts receivable may remain constant or may increase somewhat less than it would have, if new credit sales remained at their original level.

20. Meltzer discusses the relationship between payment delays and the effective service charge borne by the borrower. See "Mercantile Credit and Size of Firms."

21. Lender firms may desire to reduce the volume of their accounts receivable but they may be reluctant to do so if such a reduction requires that they act against tardy debtors who are important business customers. In short, lenders may be willing to accept temporary postponements in repayment to protect important customer relationships which they have built up over long periods of time. Alternatively, in the case of potential bankruptcy of the debtor, the lenders may find it expedient to extend credit for a longer period of time in the hope of obtaining full repayment at some time in the future.

22. See Breckling and Lipsey, "Trade Credit and Monetary Policy," p. 626 for a further discussion of this case.


25. As part of the 1961 economic reform enterprises were forced to increase the share of working capital financed from their own savings. This measure, designed to instill greater financial discipline into the enterprise sector, significantly strengthened the restrictive impact of the monetary regulations undertaken at the macroeconomic level. See Horvat, "Yugoslav Economic Policy," p. 143.

26. In 1965 and 1966 enterprise cash balances actually declined by 5.6% and 12.8% respectively.

27. Since changes in the stock of accounts receivable may reflect both changes in the demand for accounts receivable and the supply of accounts receivable, the estimation of a simple demand equation, such as the one presented here, is subject to serious identification problems. The only reliable way to get consistent estimates of the parameters of the demand function is to use some simultaneous estimation technique. Further study of trade credit changes in Yugoslavia using such a technique is planned.

28. Nadiri estimates a demand curve for accounts receivable for the U.S. manufacturing sector of the form contained in equation (14). He notes that there are several reasons why discrepancies are likely to exist between desired and actual levels of cash balances: the firm cannot always estimate its sales accurately and with certainty; most firms do not accurately anticipate changes in monetary policy or in the rates of default and back debts on their trade credit; the discovery and collection of delinquent accounts take time and involve costs which may be distributed over time; the discrepancy may reflect disequilibrium in other assets of the firm, such as capital goods or inventories, for disequilibrium in one item of the balance sheet affects the adjustment of other accounts; or it may be due to aggregation since an individual firm may instantaneously adjust its trade credit position but the adjustment of the whole sector may not be that quick. See Nadiri, "Determinants of Trade Credit," pp. 413-14.

29. The fact that the regression observations are not
dated at equal intervals means that a special interpretation of the lag structures of the estimated equations is required. The interpretation is that the lag time at each point in time varies with the duration of the concomitant data interval. Thus, the longer the interval between data observations, the longer the lag time.

30. The AR^1 series is measured by the total stock of accounts receivable held by the enterprise sector while the AR^2 series is measured by the total stock of accounts payable held by the enterprise sector. Since the enterprise sector is a net creditor of the other sectors, and since the other sectors do not grant credit to the enterprise sector, it follows that the stock of accounts payable held by the enterprise sector is a measure of the stock of accounts receivable based on inter-enterprise crediting.

31. In his study of trade credit in the U.S. economy, Nadiri also finds that the sign of a monetary policy variable, defined as the rate of growth of the money supply, is positive in the equation explaining enterprise accounts receivable. He therefore concludes that variations in enterprise trade credit do not reduce the effectiveness of monetary policy in the U.S. economy.

32. For an examination of the institutional forces working to encourage lender behavior of this type, see chapter 8.

33. One of Meltzer's major conclusions is that when monetary policy is tightened the manufacturing firms reduce their cash and short-term securities to finance accounts receivable. Brechling and Lipsey reach a similar conclusion in their study of trade credit among a group of British firms during the period 1952-58. See Nadiri, "Determinants of Trade Credit," p. 418 for a discussion of these results.

34. The poor performance of the cash balances equation over the entire period and the apparent decline in the cash balances transactions ratio after 1967 may be explained by an accelerating rate of inflation but further study is required to test this hypothesis, since in preliminary equations, the expected rate of inflation variable was not a significant determinant of changes in cash balances.
35. Initially, I chose 1966III as the timing of a shift in the money demand curve because the data presented in Tables 7.1 and 7.2 indicate that such a shift may have occurred sometime during the 1967 to 1969 period. My intention was to test the timing of the shift by running other regressions for different time periods, but my first results were good enough--on the basis of the usual statistical criteria—to lead me to conclude that the shift in the money demand curve actually occurred sometime around 1966III. Therefore, I used this date to complete my study of shifts in the money demand function.

36. The necessary data for the F-test for the stock-flow adjustment equations are:

1961-66: sum of squared residuals = 213770;
         degrees of freedom = 12
1966-71: sum of squared residuals = 94023;
         degrees of freedom = 11
1961-71: sum of squared residuals = 8764310;
         degrees of freedom = 27.

The data yield the following F test statistic:

\[
\frac{(8764310 - (213770 + 94023))/4}{(213770 + 94023)/(12 + 11)} = 157.9
\]

which indicates that the null hypothesis that the coefficients are the same for both subperiods must be rejected. The necessary data for the F test for the geometric adjustment equation are:

1961-66: sum of squared residuals = .032184
1966-71: sum of squared residuals = .0073605
1961-71: sum of squared residuals = .778256

The F statistic is:

\[
\frac{(.778256 - (.032184 + .0073605))/4}{(.032184 + .0073605)/(12 + 11)} = 107.4
\]

37. A negative coefficient for changes in the stock of trade credit in the money demand equation might also be observed if enterprises were unable to regulate variations in their holdings of trade credit and were forced to compensate for unplanned changes in such holdings by offsetting changes in their cash balances. Such an explanation is certainly consistent
with the characteristics of the Yugoslav situation, particularly during periods of illiquidity. For more on these characteristics, see chapter 8.

38. As noted in footnote 36, the actual length of the lag depends on the interval between data observations. Thus, the lag will be longer for the period December-June, then for the periods June-September and September-December.

39. For an extended discussion of these phenomena, see chapter 8.

40. For more on the relationship between business crediting of government customers and the evolution of illiquidity crises in Yugoslavia, see chapter 8. By 1971, the volume of expired, unpaid bills held by the government sector was so great that SDK required a detailed statement of such debt from each government agency and a plan for payment of such debt in cash over a certain period of time. See V. Konvalinka, "Prvi ciklus obavezne multilateralne kompenzacije," Jugoslovensko Bankarstvo, no. 5 (May 1972), for a discussion of SDK's plan for clearing government debt of this type.
CHAPTER 8

ILLIQUIDITY CRISIS, MONETARY POLICY, AND INFLATION

Introduction

The empirical results discussed in chapter 7 indicate, as predicted, that the imposition of a restrictive monetary policy in Yugoslavia acts to reduce enterprise desired and actual holdings of cash. This, of course, does not necessarily mean that the mobilization of enterprise cash balances offsets the impact of monetary policy on expenditure flows since such flows may also decline, thereby leaving the velocity of enterprise cash balances constant. However, an examination of the data in table 7.2 reveals that transactions do not decline as much as cash balances during periods of tight monetary policy and that the velocity of enterprise cash does increase substantially during these periods. Besides these pronounced cyclical increases in velocity, the table also reveals a sustained increase in velocity since 1968. Both the cyclical and secular variations in velocity exhibited by the data coincide in time with the development of so-called "illiquidity" crises in Yugoslavia. Such crises are distinguished by rapid growth in the volume of

510
outstanding trade credit, caused largely by delays in the repayment of outstanding trade bills. The crises are characterized by the inability of a growing number of individual enterprises to meet their financial obligations on time, and by the gradual increase in the number of court cases involving defaults on expired trade bills.

Table 8.1 contains some relevant data showing the evolution of the liquidity crisis which developed in the 1969-71 period. The main trends of the crisis—rapid growth in the stock of trade credit, a growing volume of expired, unpaid, accounts receivable, a growing number of court decisions directing repayment of bills, and a growing number of days between the time when a credit was first extended and the time when it was finally repaid—were also apparent in the 1961 and 1967 crises. The timing of each of these crises can be roughly determined from an examination of the accounts-receivable-sales ratio at the end of June, September, and December of each year from 1961 to 1971. The data, presented in table 8.2, indicate that in the pre-1968 period, higher than average values in this ratio occurred from 1961III to 1962II, and again from 1966III to 1967III. Thereafter, this ratio tended to increase steadily from period to period until the end of 1971, indicating that during the illiquidity crisis described by the data in table 8.1, the stock of
### TABLE 8.1
CHARACTERISTICS OF THE 1969-71 LIQUIDITY CRISIS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of days between credit extension and repayment</td>
<td>39</td>
<td>38</td>
<td>43</td>
<td>50</td>
<td>58</td>
<td>64</td>
<td>75-99</td>
<td>124</td>
<td>173</td>
</tr>
</tbody>
</table>


### II. Enterprises whose demand deposits are blocked\(^a\) because of defaults on outstanding accounts payable (Croatia)

<table>
<thead>
<tr>
<th></th>
<th>Number of Enterprises</th>
<th>Workers</th>
<th>Workers in Blocked Enterprises as a Percentage of Total Work Force(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>229(^c)</td>
<td>123317(^c)</td>
<td>15.5%</td>
</tr>
<tr>
<td>June</td>
<td>254</td>
<td>149304</td>
<td>18.8</td>
</tr>
<tr>
<td>September</td>
<td>260</td>
<td>170153</td>
<td>21.4</td>
</tr>
<tr>
<td>December</td>
<td>329</td>
<td>184932</td>
<td>23.3</td>
</tr>
<tr>
<td>1971</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>391</td>
<td>199229</td>
<td>24.2</td>
</tr>
<tr>
<td>June</td>
<td>403</td>
<td>205986</td>
<td>25.0</td>
</tr>
</tbody>
</table>

\(^a\) SDK, the Social Accounting Service to which all enterprises in the social sector report, can block the use of certain enterprise funds until that enterprise has honored its payments on overdue bills. Such an action is taken when the enterprise is found guilty of default by court decision or when the enterprise is found in default according to one of the specialized payment procedures of SDK. Thus, not all enterprises failing to repay their bills have their accounts blocked. Consequently, the figures here underestimate the percentage of the labor force employed by enterprises in default on outstanding bills.

\(^b\) The total labor force employed by social sector enterprises in Croatia numbered 794136 in 1970 and 823372 in 1971 (annual averages).
TABLE 8.1—Continued

These figures are taken from I. Conkas, "Rezultati provedene prve obavezne multilateralne kompenzacije," Pođuzeće-Banka, #8, August 1972, p. 34.

III. Court decisions involving expired, unpaid bills, 1969-72

<table>
<thead>
<tr>
<th>Year</th>
<th>Court Decisions</th>
<th>Number of Outstanding Unexecuted Decisions (end of period)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Made Executed</td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>-</td>
<td>63.6</td>
</tr>
<tr>
<td>1970</td>
<td>699.5 609.5</td>
<td>118.7</td>
</tr>
<tr>
<td>1971</td>
<td>699.5 563.1</td>
<td>225.1</td>
</tr>
<tr>
<td>1971 Jan.-Sept.</td>
<td>56.5 45.9</td>
<td>169.1</td>
</tr>
<tr>
<td>1972 Jan.-Sept.</td>
<td>51.0 44.7</td>
<td>293.2</td>
</tr>
</tbody>
</table>

Value of debt involved in court decisions (millions of dinars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Court Decisions</th>
<th>Value of outstanding Unexecuted debt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Made Executed</td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>-</td>
<td>1372.6</td>
</tr>
<tr>
<td>1970</td>
<td>8950.6 7867.2</td>
<td>2456.0</td>
</tr>
<tr>
<td>1971</td>
<td>11133.6 8409.4</td>
<td>5180.3</td>
</tr>
<tr>
<td>1971 Jan.-Sept.</td>
<td>896.3 684.4</td>
<td>3413.3</td>
</tr>
<tr>
<td>1972 Jan.-Sept.</td>
<td>789.8 657.0</td>
<td>5961.9</td>
</tr>
</tbody>
</table>

SOURCE: SDK, Statisticka Informacija, Broj 714; unpublished document.

IV. Share of expired debt in total outstanding debt of enterprise sector, 1971.

1. Expired debt announced in 1972 compulsory multilateral compensation (March 1972) 70192a
2. Total outstanding accounts receivable of enterprise sector, December 1971 145528b
3. Expired debt/total accounts receivable 48.2%c
TABLE 8.1--Continued

\textsuperscript{a}Figure (thousands of dinars) from V. Konvalinka, "Prvi ciklus obavezne multilateralne kompenzacije," \textit{Jugoslovensko Bankarstvo}, \#5, May 1972.

\textsuperscript{b}Figure from unpublished SDK accounts for end of 1971; see appendix A.7.1.

\textsuperscript{c}The figures for expired debt are based on the total value of expired debt announced in the 1972 (March) multilateral compensation. (For more on this compensation see pp. 541-44 of this chapter.) Konvalinka estimates that this value of compensated debt covered about 70\% of the expired debt in the enterprise sector. However, the value also includes expired credits owed by banks, insurance companies and other agents outside the enterprise sector. Thus, comparing the total of such debt to total accounts receivable in the enterprise sector may overstate the share of expired debt in total debt. Since more than 80\% of expired debt was localized in the enterprise sector, the extent of the error in this direction is probably small.
### TABLE 8.2

ACCOUNTS RECEIVABLE AS A PERCENTAGE OF ENTERPRISE SALES, 1961-71
(end-of-month figures: June, September and December)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17.9%</td>
<td>17.6</td>
<td>21.8</td>
<td>22.1</td>
<td>23.4</td>
</tr>
<tr>
<td>1962</td>
<td>15.4</td>
<td>15.2</td>
<td>27.9</td>
<td>28.7</td>
<td>26.2</td>
</tr>
<tr>
<td>1963</td>
<td>15.0</td>
<td>14.9</td>
<td>27.7</td>
<td>28.7</td>
<td>27.8</td>
</tr>
<tr>
<td>1964</td>
<td>14.4</td>
<td>14.3</td>
<td>1970</td>
<td>31.1</td>
<td>31.3</td>
</tr>
<tr>
<td></td>
<td>12.4</td>
<td>12.8</td>
<td>12.4</td>
<td>13.3</td>
<td>29.0</td>
</tr>
<tr>
<td>1965</td>
<td>13.4</td>
<td>13.4</td>
<td>13.4</td>
<td>13.4</td>
<td>13.4</td>
</tr>
<tr>
<td>1966</td>
<td>14.3</td>
<td>14.4</td>
<td>15.4</td>
<td>15.4</td>
<td>15.4</td>
</tr>
<tr>
<td>1967</td>
<td>17.8</td>
<td>18.7</td>
<td>20.8</td>
<td>20.8</td>
<td>20.8</td>
</tr>
</tbody>
</table>

**SOURCE:** See discussion of data used in estimation of equations presented in table 7.3. Data are contained in appendix A.7.1. Sales figures are the average of enterprise receipts over the last three periods.
accounts receivable grew at a faster rate than the volume of enterprise sales.

As the above discussion reveals, increases in velocity and illiquidity crises have tended to occur simultaneously in the Yugoslav economy. In fact, it seems reasonable to hypothesize that the very reduction in enterprise cash balances relative to enterprise transactions which leads to the observed increases in velocity is also responsible for the growth of gross trade credit and the growing number of payments defaults which characterize these crises. Therefore, it is necessary to analyze why and how such velocity increases occur and how they are related to variations in enterprise holdings of other assets, such as trade credit and inventories, before a clear picture of the causes of these crises and their implications for effective control of inflation can be obtained.

**Inventory Adjustments, Cash Balances and Trade Credit**

As noted in chapter 5, Yugoslav enterprises usually react to a reduction in demand for their output caused by a policy-induced reduction in the level of aggregate demand, by maintaining production and selling prices at their planned levels and by holding the difference between total output and sold output as inventories. This response pattern is consistent with several institutional features of the environment within which Yugoslav enterprises operate:
the downward rigidity of employment due to constraints on enterprise lay-off policy; the existence of fixed monthly wages which make variations in labor hours unprofitable; the tradition of enterprise cost-pricing which reduces the sensitivity of prices to changes in demand; and the widespread belief that a fair selling price must cover the value of the product as measured by its costs, a belief which encourages local political bodies to intercede on the behalf of enterprises faced with the prospect of demand-necessitated price reductions. All of these factors serve to interfere with or delay the Marshallian price response and the Keynesian employment and quantity response typically called forth by reductions in aggregate demand. In place of these responses, the Yugoslav enterprise is essentially forced to create demand for its output by mobilizing its available cash and other assets or by using its available bank loans and accounts payable to finance unplanned inventory investment. Once these sources of finance run out, however, an ultimate change in quantity or price becomes the only possible form of adjustment to the reduction or slowdown in aggregate demand. Thus, if the monetary authorities can hold out against the pressures generated by the initial response of the enterprise sector, the adopted monetary policy will finally have a dampening effect on nominal income, although there is no way to
guarantee that this effect will be concentrated on inflation rather than on levels of production and employment.

The delay between the introduction of a restrictive monetary policy and its final impact on nominal income levels in Yugoslavia depends crucially on the ability of the enterprise sector to find the funds necessary to finance additional unplanned inventory investment. For the enterprise sector as a whole such funds are available from only three sources: reductions in enterprise cash balances and holdings of other liquid assets; increases in the volume of bank credit; and the use of loans and other credits earmarked for other expenditure purposes for the financing of inventories. To the extent that the third of these sources is tapped, final demand for the output of some enterprise producers will decline even further, thereby exacerbating the immediate impact of the monetary policy and leading to the more rapid adjustment of aggregate expenditure flows.\(^1\) Therefore, if the monetary authorities hold to their restrictive policy, thereby preventing or strictly limiting any increase in the loan capability of the commercial banks, the effect of their actions on enterprise output and prices will be delayed only as long as the enterprise sector has liquid assets which it willingly or unwillingly mobilizes to finance inventory accumulation. This conclusion validates
Clower's proposition that the multiplier can begin to operate only after spending units have run out of liquid assets with which they can finance planned levels of expenditure despite unexpected shortfalls in current receipts.²

The above scenario of enterprise adjustment to a reduction in aggregate demand provides one explanation for the apparent increase in the velocity of enterprise cash balances during periods of restrictive monetary policy in Yugoslavia. Essentially, this explanation reads as follows. Suppose an enterprise is suddenly faced with a reduction in demand and a sudden increase in the shadow rate of interest on bank loans. The interest rate increase alone reduces desired cash balances and induces a movement out of cash until the point at which the total implicit rate of return on cash equals the new interest rate. At the same time the enterprise is faced with the need to finance additions to its inventory holdings. Initially, the enterprise can satisfy this need with its excess or undesired cash balances. This process should be self-terminating as soon as cash balances have been run down far enough so that the rate of return on them equals the opportunity cost of holding them. Moreover, because one of the important components of this rate of return is the return from hedging against possible situations of
illiquidity, it follows that this process should end long before the enterprise sector reaches a liquidity crisis of the proportions observed in Yugoslavia in 1961, 1967, and 1969-71. In short, although an increase in the shadow rate of interest and a policy-induced reduction in aggregate demand can explain why cash balances may decline and why inventories may increase during a period of restrictive monetary policy, they cannot explain why illiquidity crises occur during such a period nor can they explain why the Yugoslav enterprise sector suffered from illiquidity during the 1969-71 period of permissive monetary growth. An explanation of these phenomena requires a fuller view of the factors encouraging or forcing enterprises to run down their cash holdings to a level at which they can no longer guarantee a steady flow of monetary expenditures.

The 1961 and the 1967 illiquidity crises resulted from the inability of individual firms within the enterprise sector to maintain equilibrium in their holdings of net trade credit (AR-AP) and inventories once the economy had been upset by a change in monetary policy. Disequilibrium in the holdings of these assets was in turn reflected in disequilibrium cash positions. In other words, the actual holdings of cash in some enterprises observed during these crises were at constrained rather than desired levels and the effective constraints took the form of
unplanned additions to inventories or net trade credit holdings.\textsuperscript{3} The effect of unplanned inventory accumulation on enterprise cash balances is easy to explain. Consider a firm which has built up its inventories in response to an unforeseen drop in demand and which can no longer find the funds necessary to finance further inventory growth at the prevailing interest rate. The profit-maximizing response in such a situation is a reduction in selling price or a slowdown in production to prevent further accretions to the inventory stock. However, the firm may be unable to immediately adjust either price or output by the amount required, mainly because of institutional constraints on its behavior and because it lacks the market information to do so.\textsuperscript{4} In the absence of required adjustments, inventories may continue to accumulate and the firm may be forced to finance inventory investment by reductions in its cash balances and other liquid assets. In addition, the firm may attempt to gain some temporary finance by defaulting on repayments of bills owed to its suppliers, so that on balance, its net trade credit position declines. This action will in turn pass on the portfolio disequilibrium from the firm to these suppliers who are then faced with unplanned growth in their net trade credit positions which they must cover by offsetting changes in their assets and liabilities. As long as
additional bank loans are not available at the prevailing interest rate, these changes are likely to take one of two forms: either a reduction in cash balances or a reduction in net trade credit via the postponement of repayment on outstanding accounts payable. At this point the process starts all over again, with the supplier firms now either reducing their cash positions below desired levels or defaulting on credit repayment. If the latter course is chosen, new firms will be brought into the circuit and will be forced to adjust to unplanned changes in their net trade credit positions. Of course, if all firms are related to one another in a complete sub-circuit, and if each firm can always cover unplanned increases in extended credit by defaulting on an equal amount of bill repayment, then no firm need run down its cash to finance unplanned additions to the stock of its trade credit. In this limiting case, then, the only cause of disequilibrium cash runoffs within each firm is unplanned inventory growth which forces the firm suffering from such growth to finance additions to its inventory stock by reductions in cash of the same amount.

In reality, even if each firm ultimately reacts to an unplanned increase in the credit it extends by raising the credit which it takes, this reaction takes time and during the intervening period, cash balances will be affected. Thus, say firm A finds itself pressed for
funds because of unplanned inventory investment and suppose it delays payment on bills owed to firm B to finance this growth. B may initially absorb the pressure by reducing its cash and after a time, by delaying payment to firm C, thus restoring its cash position at C's expense. After a lag, C may do the same thing by not paying some of its outstanding accounts payable. If C is a purchaser from A, then C may be able to restore its cash position at the expense of A, and all firms will ultimately end up with the same net trade credit position. At each point of the cycle, the total of the cash balances run off by A, B, and C must just match the total volume of unplanned inventory investment which firm A sought to finance in the first place. In other words, from the point of view of the enterprise sector as a whole, the cause of the reductions in cash is the growth of inventories; the trade credit flows operate only to determine which of the inter-related firms will face this reduction at each point in time.

This conclusion no longer holds if the enterprise sector grants credit to or receives credit from another sector. Once such intersectoral crediting is permitted, changes in the net trade credit position of the enterprise sector as a whole can itself become a source of variations in the cash position of that sector. Table 8.3 shows net
trade credit extended by the enterprise sector to both the household and government sectors as a percentage of total enterprise sales in Yugoslavia. The figures reveal that during 1960-61, and 1965, two periods of tight monetary policy and growing illiquidity, the net trade credit extended by the enterprise sector did increase. Moreover, during the 1969-71 period, the ratio between net trade credit extended by the enterprise sector and enterprise sales reached a new high, indicating that drains on enterprise liquidity may have been at least partly the result of unforeseen or uncontrollable growth in the net indebtedness of government and private purchasers to the enterprise sector during that period. In short, the data in table 8.3 support the hypothesis that one source of reductions in enterprise cash balances during periods of declining liquidity has been the growth in enterprise trade credit extended to non-enterprise customers.

The above discussion identifies some of the causes of the two phenomena most clearly associated with the 1961 and the 1967 illiquidity crises: namely, a sharp reduction in the cash-sales ratio for the enterprise sector, and a sharp increase in both the volume of inter-enterprise trade credit and in the accounts-receivable-sales ratio. The basic cause of these phenomena in both instances appears to be the efforts of individual spending units to
TABLE 8.3

NET TRADE CREDIT (AR-AP) EXTENDED BY THE ENTERPRISE SECTOR, 1958-71
(Annual figures; end-of-year positions)

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Trade Credit</th>
<th>Enterprise Transactions</th>
<th>Net Trade Credit as a Share of Enterprise Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1958</td>
<td>1428(^a)</td>
<td>57715</td>
<td>.025</td>
</tr>
<tr>
<td>1959</td>
<td>936</td>
<td>68021</td>
<td>.014</td>
</tr>
<tr>
<td>1960</td>
<td>2316</td>
<td>80200</td>
<td>.029</td>
</tr>
<tr>
<td>1961</td>
<td>2950</td>
<td>92939</td>
<td>.032</td>
</tr>
<tr>
<td>1962</td>
<td>2557</td>
<td>108806</td>
<td>.024</td>
</tr>
<tr>
<td>1963</td>
<td>3193</td>
<td>125107</td>
<td>.026</td>
</tr>
<tr>
<td>1964</td>
<td>3282</td>
<td>157459</td>
<td>.021</td>
</tr>
<tr>
<td>1965</td>
<td>6119</td>
<td>194658</td>
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<td>.045</td>
</tr>
<tr>
<td>1970</td>
<td>16039</td>
<td>403737</td>
<td>.040</td>
</tr>
<tr>
<td>1971</td>
<td>21148</td>
<td>531510</td>
<td>.040</td>
</tr>
</tbody>
</table>

\(^a\) thousand of dinars

maintain current expenditure levels despite unexpected reductions in both current receipts and in the availability of external finance caused by the imposition of a restrictive monetary policy. This response pattern is in turn explainable in terms of the rigidity of enterprise output levels and the inability of all buyers and sellers to immediately adjust prices and quantity to the level consistent with balanced budgets and balanced portfolio positions.

Although the 1969-71 illiquidity crisis shared the symptoms of its predecessors, it seems difficult to believe that it shared the causes outlined above. As a glance at table 7.2 reveals, the basic difference between the 1969-71 period and its forerunners was a difference in the goals and impact of monetary policy. The 1969-71 period, partly by plan and partly by chance, was characterized by rapid growth in the money supply and overall laxness in credit market conditions. In contrast, the 1961 and 1967 liquidity crises were either preceded or accompanied by sharp reductions in the rate of growth of the money supply. Partly as a result of these differences in monetary policy, the 1961 and 1967 crises were accompanied by reductions in the rate of growth of output, the rate of growth of prices and the level of capacity utilization. In contrast, the 1969-71 illiquidity crisis
a bankrupt enterprise falls under the protection of the competent local authorities who must honor the outstanding commitments of the enterprise creditors and who must pay the enterprise workers their minimum monthly salaries until the bankruptcy proceedings are terminated; both responsibilities represent a potentially significant drain on government resources; and second, workers laid off as a result of enterprise bankruptcy add to the local governments' continuing task of alleviating local unemployment and labor surplus problems, which, as indicated by the unemployment and labor migration figures presented in chapter 4, are significant to begin with. Moreover, by law the republican and communal governments are responsible for collecting the resources for and administering the functions of the labor employment offices which aid unemployed workers in finding employment. The financial and administrative costs of these services are high and an increase in unemployment caused by the bankruptcy of existing enterprises means an increase in these costs. Finally, the popularity of local political and party leaders depends largely on the extent to which they provide desired employment and job security. If bankruptcies interfere with either of these political desiderata, local leaders are likely to bear the toll in terms of a reduction in their popularity and support.
The political barriers to the use of the bankruptcy sanction in Yugoslavia reflect an unresolved contradiction in the basic premises of operation on which the Yugoslav economy is founded. The contradiction is based on two conflicting views of enterprise workers. The first view, which can be called the "pure-cooperative" view sees all members of an enterprise as collectively responsible for enterprise decisions and therefore collectively answerable for the financial consequences of these decisions. According to this view, enterprise members should share equally in the fruits of profitable operations and in the penalties of unprofitable operations, the ultimate penalty being loss of job and income due to enterprise bankruptcy. The second view, which can be called the "worker-manager" view sees all members of an enterprise, except the director and his managerial staff, as workers who have an inalienable right to a steady income and a steady job. According to this view, workers should not be made to bear the personal cost of enterprise actions, provided they each perform their own specific production task. This view naturally leads to the conclusion that only the managers whose specific task is the direction of enterprise activity should be penalized by the poor results of that activity.

The contradiction between the pure cooperative and
worker-manager views of the Yugoslav enterprise leads to a contradiction in the operation of the Yugoslav enterprise sector whereby enterprise members share in enterprise decisions-making and enterprise profits but are not required to directly share in the penalties and losses which may result from their decisions. This contradiction means that workers are essentially freed from the managerial risk associated with enterprise operations. Moreover, they are freed from the traditional risk of job insecurity and wage variability usually associated with workers in a capitalist system because they control both the hiring and firing and the wage policies of their enterprise. With enterprise members exempt from risk in this fashion, enterprise directors and more significantly, local, republican, and federal government bodies, become the ultimate risk-takers in the economic system, responsible for the consequences of economic decisions which they did not make but for which they are forced to account.

The removal of risk from the point at which economic decisions are made has important economic implications in many areas, such as investment planning, wage policy, inventory policy and the like, all of which ultimately impinge on the financial position of individual enterprises and on the appearance of illiquidity in the enterprise sector as a whole. However, for the purposes
of the discussion at hand it is sufficient to note that the contradiction between the worker-manager and pure cooperative view of the Yugoslav enterprise which leads to this situation acts as a major obstacle to the use of bankruptcy or any less severe sanctions against the members of an enterprise which acts in a financially irresponsible manner. As long as the political leaders take as an implicit part of their ideological orientation the belief that workers should not bear the financial consequences of their decisions, bankruptcy cannot be easily applied against the enterprises of which these workers are members. As a result, the Yugoslavs have tried to develop a variety of penalties for financial irresponsibility and unprofitability which are consistent with this belief, such as forcing illiquid enterprises to change management, placing such enterprises under state directorship, requiring insolvent enterprises to present local governments with a plan for "rehabilitation," and allowing the creditors of an insolvent enterprise to join together to choose the management and future business policy of that enterprise until at least a portion of its outstanding debt has been repaid. Each of these penalties tends to safeguard worker incomes and employment and thus to protect the work force from bearing the economic costs of its decisions.

Like the political and economic barriers to
bankruptcy, the existence of reserve funds which can be used by enterprises to cover temporary net disbursements has acted to encourage enterprise illiquidity and payments defaults. Under the system of the so-called "Joint Reserve Funds," each enterprise is required to contribute 5% of its net income, defined exclusively of personal incomes to workers and contractual and tax obligations, to communal and republican reserve funds.14 If net income defined in this way is zero or negative then the enterprise is exempt from the required contributions. The Joint Reserve Funds are administered by local and republican political organizations in accordance with local laws guiding the distribution of these funds. Basically, the funds are distributed as interest free loans to enterprises whose current operations show a financial loss. In the special system of Yugoslav accounting such a loss occurs whenever available current receipts are less than the total of (1) paid advances of personal incomes or minimum personal incomes, (2) contributions to the collective consumption funds for periodic payments to workers,15 and (3) contractual and legal obligations falling due during the accounting period.16 Funds borrowed by the enterprise must be repaid directly to the fund as soon as the enterprise loss has been eliminated.

The Joint Reserve Funds system acts as a compulsory
insurance fund for the enterprise sector. Each enterprise is assessed at the same rate despite the fact that unprofitable firms are more likely to use the funds than are profitable ones. Thus, the system acts to redistribute resources from more profitable to less profitable production units. Besides this allocative effect, the existence of the funds undoubtedly has an influence on both the propensity of debtor firms to postpone or delay repayment on existing debts and on the willingness of creditor firms to acquiesce to such delays. From the point of view of the debtor, the existence of the Joint Reserve Funds means that should its creditors take legal action to recoup payment, interest-free funds will be made available for such payment. From the point of view of the creditor, the existence of the Funds means that a shortfall in current receipts caused by an unexpected increase in net credit extension can be covered by interest-free grants. Particularly during periods characterized by an increase in the opportunity cost of holding cash, as represented by either an increase in bank lending rates or an increase in the expected rate of inflation, both the debtor and creditor firms may find it to their advantage to mobilize their contributions to the Joint Reserve Funds in this way, since these contributions represent minimum compulsory precautionary or reserve cash balances which
may no longer be profitable given the higher opportunity cost of holding them. Since in principle each firm can obtain from the Joint Reserve Funds whatever amount is needed to cover current losses, a problem may arise if the total demand of debtors and creditors for the use of these funds exceeds the total amount available. Again, this is more likely to be the case when alternative forms of credit are scarce or when increases in the expected rate of inflation make the opportunity cost of holding cash balances higher. As a matter of fact, during the 1969-71 illiquidity crisis, excess demand for the Joint Reserve Funds did occur, and on average only 70% of the total demand could be filled.\textsuperscript{17} In cases where the Joint Reserve Funds are insufficient, the law provides that budgetary funds of republican and communal governments will be made available to cover the minimum personal incomes of the workers; if they choose, the competent, governmental authorities can even decide to provide funds to cover higher personal incomes. Again, the basic thrust of the law clearly operates to protect the work force from bearing the penalties of unwise or financially irresponsible decisions.

A final factor which has acted to exacerbate illiquidity crises has been the system of bank and local government "guarantees." Guarantees, as defined in
chapter 6, are bank or government promises to honor enterprise debt repayment in the event that the enterprise itself cannot finance repayments as they fall due. The problem with this system is that it encourages enterprises to undertake spending commitments on which they are likely to default because they can always rely on the provision of outside funds. Of course, if the bank and local government "guaranteors" limited their guarantees to those firms most likely to pay their debts on time, then this problem would not arise. However, for political reasons it is often just the most unprofitable firms which are likely to be the recipients of guarantees since without such guarantees they might face ultimate bankruptcy.

Although the system of guarantees can explain why debtor enterprises may default on the repayment of trade credit and why creditor enterprises may be willing to accept such defaults, at least temporarily, it does not explain why the actual volume of net trade credit held by an individual firm should exceed the desired volume, since in theory, the creditor can always obtain payment of its credit from the banks and government bodies "guaranteeing" its customers. In practice, as noted in chapters 2 and 6, these guarantees often grant guarantees in excess of their financial capacity, and, when faced with actual requests for payment by creditors, they are forced to
default. In short, the system of guarantees acts not only to encourage firms to incur excessive debt but also to encourage the growth of actual defaults because the guaranteeing units themselves incur debt which they cannot finance. When the guarantors themselves default, net creditor firms may be faced with an undesired increase in trade credit extensions which can only be financed by reductions in cash reserves.

The above discussion indicates how political and ideological barriers against bankruptcy, the existence of the Joint Reserve Funds, and the system of bank and local government guarantees have acted to encourage enterprises to default on their outstanding debts whenever they find it necessary or profitable to do so. Likewise, the discussion indicates why creditors of these enterprises may temporarily acquiesce to such defaults, in the expectation of repayment from the Joint Reserve Funds or from bank and government guarantors, and why these same creditors may be forced to acquiesce even when repayment is not forthcoming because they are unable to successfully pursue bankruptcy proceedings against their debtors. These facts alone are sufficient to explain the severity of the 1961 and the 1967 illiquidity crises. The argument becomes even stronger once the problem of enterprises losses is brought into the picture. As the data and estimates
presented in chapters 1 and 2 indicate, approximately 10% of the entire Yugoslav enterprise sector runs at a loss even during periods of substantial monetary ease. This situation was certainly aggravated in both 1961 and 1967, by the economic reforms which adversely affected enterprise profitability through the widespread elimination or reduction of subsidies and through the administratively-induced increases in the prices of industrial raw materials. Now imagine what happens in such an economy when the monetary authorities adopt a restrictive monetary policy to control inflation. With banks calling in loans or refusing to renew expiring loans, enterprises depending on these loans for their survival are immediately placed in threat of bankruptcy.\textsuperscript{21} Since bankruptcy is by and large politically unacceptable, an alternative method for providing these firms with credit must be found. This method is a reduction in cash reserves within the enterprise sector as a whole and changes in the net trade credit positions of individual firms. Both phenomena act to re-allocate funds to bankrupt or insolvent firms. In other words, illiquidity, as characterized by a reduction in enterprise cash balances and an increase in gross trade credit, can be viewed as an alternative to bankruptcy which allows insolvent firms to refuse to pay their bills and obligations without leading to the actions necessary for a court
declaration of bankruptcy. Creditors are forced to acquiesce in this process simply because they have no defense. Of course, if they too are debtors, then the suspension of cash payments to them can be balanced at least partially by the suspension of cash payments to their creditors or by the suspension of new credit extensions to their credit-worthy customers. As the Yugoslav data indicate, the latter adjustment, when it occurred in 1961 and 1967, was of insufficient size to prevent rapid growth in the outstanding stock of gross trade credit.

As one surveys the above description of the evolution of the liquidity crises in Yugoslavia the question naturally arises as to what limits the process or what finally causes the process to reverse itself. Several factors can be identified which cause such a reversal. The first, and perhaps most important, is the disruption of the flow of goods and services among enterprises caused by the rapid growth of involuntary trade credit. As more and more firms default on outstanding bills, enterprises grow more wary of making new sales on credit and they may begin to demand cash payment on all transactions. The refusal of firms to grant new credit acts over time to reduce the rate of growth of the stock of accounts receivable; in the limit, if all firms refuse to issue new credit, the stock of accounts receivable will eventually stabilize at some
constant value. A second factor which may serve to reverse an illiquidity crisis is the slowdown in business activity caused by increased uncertainty over the timing of cash receipts. As each firm becomes less certain of cash inflows, it is likely to reduce both its expenditures and its production plans in an effort to build up its defensive cash position. The slowdown in inter-enterprise sales caused by these reductions may also act to slowdown the rate of growth of new trade credit extensions. Slowdowns in enterprise production and sales may also be attributable to the increasing expenditure of enterprise resources to settle outstanding accounts via the court system; the more money and time spent in this way, the less of each resource available for the planning and execution of enterprise sales and production. Finaly, as courts begin to take effective action to settle accounts, the number of days elapsing between the time when a trade bill first falls due and the time when it is finally paid will stabilize. As the effective period of credit extension stabilizes, so too will the stock of outstanding credit, provided no new credit is issued.

All of the above factors undoubtedly could have come into play to automatically stabilize the rate of growth of trade credit and the rate of growth of expired trade credit in Yugoslavia during each illiquidity crisis.
However, none of them could have solved the problems of what to do about the outstanding volume of defaults and of how to deal with individual insolvent or bankrupt enterprises once such a stabilization had occurred. If these problems were to be solved without recourse to the normal sanction of bankruptcy, then some direct policy action was necessary as a substitute for bankruptcy. In both 1962 and 1968, this action took the form of a non-compulsory clearing of accounts carried out by the Social Accounting Service, the federal organ responsible for overseeing enterprise finances, and the provision of credit to cover the net debt positions which remained after the clearing had been completed. In both years, policy intervention of this type was precipitated by a growing number of cases of enterprise inability to pay worker incomes because the cash necessary to cover wage bills was not available. The timing of these interventions thus supports the conclusion that belief in the inalienable right of workers to their incomes is a stronger foundation for economic and political policy than belief in the inalienable right of creditors to prompt repayment.

The exact nature of the policies adopted to alleviate the 1961 and 1967 illiquidity crises are revealed in table 8.4. In both cases the gross volume of trade credit was reduced by a multilateral clearing process which
TABLE 8.4

POLICIES TO DEAL WITH THE 1961 AND 1971 ILLIQUIDITY CRISIS

<table>
<thead>
<tr>
<th>1962</th>
<th>1968</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Multilateral clearing of all money debts, expired by a certain date and announced to SKD: Since the clearing was not compulsory, only debts which enterprises chose to announce were included.</td>
<td>2. Participants included enterprises in the social sector, government bodies and social-political funds.</td>
</tr>
<tr>
<td>2. Participants limited to enterprises in the social sector.</td>
<td></td>
</tr>
<tr>
<td>3. Net debtor balances covered by disposable assets of the participants and by credits from the banking system. The National Bank guaranteed the ability of the banks to grant the necessary credit.</td>
<td>3. Net debtor balances covered by disposable assets of the participants and by credits from the banking system. To guarantee that the banks could make the necessary credit available, net creditors were required to hold a certain percentage of their net credit balances at the banks and the banks were permitted to grant three-to-six month credits to cover net debt positions from these holdings.</td>
</tr>
</tbody>
</table>


permitted the balancing off of accounts receivable and accounts payable among groups of inter-related enterprise buyers and sellers. Under the clearing rules adopted, evidence of firm B's indebtedness to firm A could be used by firm A in payment of a debt it owed firm C, provided
firm C in turn was indebted to firm B for at least as
great an amount as firm B was indebted to firm A. In this
way the clearing process actually served to validate a kind
of de facto transferable trade credit system whereby each
firm within a subset of firms could use evidence of the
indebtedness of its customers to settle its own indebted-
ness with its suppliers. Such a system means that trade
credit acts as a close substitute for money within that
subset of firms. Thus, from the point of view of the
individual firm, the clearing rules adopted to deal with
the liquidity crises, acted to increase the desirability
of trade credit relative to cash, since these rules
increased the substitutability of trade credit for cash
on a limited range of enterprise transactions. The greater
substitutability of trade credit, as perceived by the
individual firm, probably had some effect on enterprise
willingness to extend new credit and to acquiesce to pay-
ment defaults on outstanding credit. Thus, ironically,
the clearing arrangements adopted to deal with the 1961
and 1967 illiquidity crises encouraged the appearance of
still a third, more severe crisis in the 1969-71 period.
The credit provisions accompanying the 1962 and 1968
clearing arrangements also worked in the same direction.
In both years firms which were net debtors after the
multilateral balancing of accounts had been completed
were granted bank credit in the amount necessary to cover their outstanding debt. In 1962, the credit was extended directly by the National Bank to the commercial banking system which in turn transferred the credit to debtor enterprises. In 1968, the commercial banks themselves were given the task of finding the resources to finance such credits. However, because 1968 was a year of expansive monetary policy, the commercial banks received some of the necessary resources from the National Bank rediscount window. In either case the extension of bank credits to cover net debtor positions worked to increase the desirability of the use of trade credit from the point of debtor and creditor firms. For the debtor firm, the provision of bank loans in both years validated the expectation that defaulting on outstanding commitments was an essentially costless method of obtaining additional bank credit. From the point of view of the creditor firm the provision of credit validated the expectation that any unplanned growth in net trade credit extension would ultimately be liquidated by an increase in bank loans of the same amount. This expectation reduced the incentive of the creditor firms to take the legal actions necessary to stop rapid growth in the volume of defaulted payments. Thus, it is not surprising to find that the bulk of expired, non-executed trade bills during the 1969-71
period were so-called "uncontested trade bills," that is, bills on which the creditor had taken no action to recover payment. Similarly, it is not surprising to find that the 1969-71 "packages of illiquidity measures," as the Yugoslav press called them, included various attempts to force creditors to restrict their lending activity to credit-worthy customers and to slowdown their new lending to firms which had defaulted on outstanding bills.

From the above discussion we may conclude that the very form of the 1962 and 1968 efforts to deal with the illiquidity crises set up the expectations and motivations on which the evolution of the 1969-71 illiquidity crisis was based. In addition, other policy innovations adopted in 1968 had a similar effect. The most important innovation of this type was the introduction of a new form of inter-enterprise credit contract, called an "akceptni nalog," which guaranteed the creditor the right to repayment from its debtor after a certain amount of time. If after this time had elapsed, the debtor itself could not repay the full value of the credit so extended, the creditor could present the contract to the Social Accounting Service which in turn could block the use of the debtor's demand deposits for all new transactions, with the exception of wage payments, until the debt was repaid. Moreover, after a certain amount of time the creditor could present
the contract to the debtor's bank which was required to rediscount it, thereby providing full repayment to the creditor. It is easy to see that the system of akceptni nalog worked as an insurance system to guarantee the cash value of accounts receivable as perceived by the creditor firms. Such an insurance system naturally increased the perceived substitutability of accounts receivable for cash. From the point of view of the debtor, of course, the system might be expected to deter excessive use of accounts payable as a way to obtain additional credit since defaults on accounts payable meant restrictions on enterprise freedom as represented by the blockage of funds held in demand deposits until such time as these defaults were eliminated.25 However, this restriction was only partial, since, as noted, workers were guaranteed wage payments despite the existence of expired debts.26 Moreover, the enterprise was free to carry out spending plans on the basis of several of its other assets, most importantly, savings accounts and time deposits, even when demand deposits were blocked.27 However, the most important factor operating to encourage the continued use of accounts receivable under the new system of akceptni nalog was undoubtedly the system of guarantees which allowed enterprises to pass on responsibility for their debt to banks and local governments which were required to cover the
value of the *akceptni nalог* which they agreed to "guarantee." The guarantee system itself was a concrete manifestation of the general premise on which would-be enterprise debtors based their activity. This premise was that the government and the banking system could always be counted upon as lenders of last resort to provide debtor enterprises with the credit they needed to continue production and sales operation. Naturally, such credit might become available only after a significant delay and after some substantial implicit costs, in the form of inconveniences stemming from restricted freedom in operations and court procedures, had been borne, but in the highly inflationary conditions characterizing the 1969-71 period, such costs were apparently small in comparison to the rate of return which the enterprise hoped to earn on the credit thus extended.

The effect of the policy measures adopted to mitigate or eliminate the problems of illiquidity in 1962 and 1968 is clearly seen in the demand for money function of the enterprise sector shown in equation (7.17). The form of this function reveals that sometime around the beginning of 1967, growth in the stock of accounts receivable resulted in a reduction in desired cash balances. The negative sign and significance of the accounts-receivable variable in this equation suggests the
hypothesis that the downward shift in the demand for
money function which occurred during the 1967-68 period
was the result of a perceived increase in the substitut-
ability of accounts receivable for cash, an increase which
motivated the enterprise sector to reduce its cash holdings
and to increase its holdings of accounts receivable. This
shift represents a switch from what Dimitri Dimitrijević,
a director of the National Bank, has called "involuntary"
illiquidity to what he has called "voluntary" illiquidity.28
Involuntary illiquidity in this sense is taken to mean un-
planned growth in both the gross value of outstanding
trade credit and the volume of defaults on such trade
credit, occasioned by an unexpected change in aggregate de-
mand conditions and shadow interest rates caused by an
unforeseen change in macroeconomic policy. As such, in-
voluntary illiquidity characterized both 1961 and 1967.
In contrast, voluntary illiquidity refers to planned growth
in trade credit and defaults caused by enterprise expec-
tations that such growth will eventually lead to growth
in the volume of bank credits extended to the enterprise
sector. Voluntary illiquidity, as it takes form in
equation (7.17), is the desired reduction in enterprise
cash holdings produced by growth in the stock of trade
credit. As argued above, the planned illiquidity phenomenon
which Dimitrijević identifies as characteristic of the
recent Yugoslav illiquidity crisis, is the predictable result of a large variety of policy measures all of which have acted to increase the substitutability of trade credit for cash within the enterprise sector.

It is interesting to hypothesize about how much an increase in the substitutability of accounts receivable can reduce the ratio between cash and enterprise transactions. In the limit if trade credit becomes a perfect substitute for money on inter-enterprise sales, then enterprises can eliminate all cash held both as precautionary and as transactions balances for these transactions. However, since the enterprise carries on an important class of transactions, namely wage payments, which cannot be made on a credit basis, it follows that there is probably some lower limit on the volume of cash holdings. For example, if cash balances are held in some proportion \( \gamma \) of the wage bill and if the wage bill is some fixed proportion \( \beta \) of total transactions, it follows that under perfect substitutability of accounts receivable for cash on inter-enterprise transactions, the minimum ratio between cash and total transactions is

\[
\frac{M}{MT} = M \left( \frac{WB}{\beta} \right) = (M/WB)\beta = \gamma \beta
\]

(8.1)

where \( WB \) is the wage bill; \( M \) is cash reserves and \( MT \) is
total enterprise transactions including wage payments. If the enterprise allows its cash balances to fall below this minimum then it may find itself temporarily unable to pay its workers because of lack of cash and lack of opportunities to borrow. According to recent evidence, some Yugoslav enterprises have found themselves in just such a position and workers have been forced to wait for their wages until the needed cash flows into enterprise accounts.\(^{29}\) As noted earlier such occurrences of illiquidity have frequently been the motivating force behind policy efforts to alleviate the illiquidity crises.

In reference to the relationship between the wage bill and cash balances discussed here, it is worthwhile to consider recent anecdotal evidence about enterprise efforts to pay workers in the form of claims on debtor companies in Yugoslavia. For example, Anton Cicin-Sein, an economist at the Ekonomski Institut in Zagreb, relates that an oil company for which he did some consulting work tried to cover part of its wage bill with claims on an automobile company indebted to it. Workers in the oil company were permitted the option of cash payments or payments in the form of a discount on the purchase of an automobile or automobile parts. Similarly, Cicin-Sein himself was paid partly in the form of coupons for the purchase of the oil company's products. In Ljubljana,
Professor Alexander Bajt, head of the Ekonomski Institut there, received a typewriter from a bookstore in payment for the sale of several copies of his publications. In fact, in the fall of 1972, a large number of wage payments in Ljubljana—including salaries at the University—were partly covered by coupons which granted the recipient the right to purchases in a large chain of retail stores. The wide circulation of these coupons suggests that the retail chain in question had been able to create an asset which circulated as a perfect substitute for cash on a large class of transactions within a limited geographic area.

All of the above anecdotes lead to the conclusion that Yugoslav enterprises are acting in such a way as to create a money substitute acceptable not only among enterprises but also between enterprises and economic agents in the rest of the economy. Because of the special characteristics of this substitute—characteristics which stem from the fact that inter-enterprise indebtedness claims do not represent general purchasing power but rather specific purchasing power within a given subcircuit of firms—the use of this substitute has meant the development of an elaborate system of inter-enterprise barter. This unique system of barter, like all other systems of barter, has probably meant a loss in efficiency and a reduction in the
volume of transactions below what they might have been if a generally acceptable medium of exchange had been used to carry out such transactions. In addition, the barter system has had a negative impact on resource allocation as well. Because the growth of trade credit in the 1969-71 period has been accompanied by a growth in the volume of payments defaults, it follows that at any point in time before the bank or government has been forced to intervene to cover the debt of defaulting enterprises, the allocation of credit within the enterprise sector has diverged from the allocation of credit as planned by government and bank lenders to that sector. It is not difficult to imagine that the reallocation of credit via defaults has worked to the advantage of the poorer, unprofitable firms whose cash positions were weak to begin with and to the disadvantage of the profitable enterprises who are forced to finance unplanned growth in net trade credit extensions by reductions in their cash holdings. The resulting reallocation of credit has itself worked to exacerbate the liquidity crisis as even the most profitable and liquid firms are gradually compelled to reduce their cash reserves.

Banks, Government Alliances and Illiquidity: The Unresolved Political Problem and Inflation

In the discussion above I have tried to examine the main features of the legal, political, and economic environment which account for the appearance and severity
of illiquidity crises in the Yugoslav economy. I have examined a number of legal and economic policies which have been adopted to cope with these crises and I have attempted to show how such policies have set up the conditions for their recurrence. In this section I want to indicate how these policies are rooted in some basic ideological contradictions and political conflicts and to illustrate how these unresolved contradictions and conflicts are ultimately responsible for the continuation of inflation in the Yugoslav economy.

The main ideological contradiction which comes into play in the development of inflationary pressures and illiquidity crises is the contradiction between two opposing views of enterprise management and workers, the pure-cooperative view which sees the workers of an enterprise as responsible for all aspects of enterprise activity and the worker-manager view which holds that workers must be protected from the risks of enterprise failure. As judged by its official pronouncements and policies, the Yugoslav political leadership exhibits a strange form of schizophrenia regarding these two views. On the one hand official acceptance of the position that workers are the rightful beneficiaries of the profits earned from the proper use of societal resources suggests that policy is made with the pure cooperative view in mind. On the other
hand, the apparent official belief that workers should not be so forced to bear the cost of the misguided or mistaken use of these resources indicates that policy is guided by the worker-manager view. The schizophrenia in official thinking is mirrored by a more important schizophrenia in official policy which leads workers to expect that they will share in enterprise profits without having to bear the cost of risk-taking for which these profits serve as reward. Quite naturally, this expectation leads workers within individual enterprises to adopt riskier business policies than they otherwise would if they were compelled to bear the economic costs should these policies prove unprofitable. Such an attitude has some predictable results frequently observed in the Yugoslav enterprise sector, such as frequent business losses, enterprise inability to pay back bank and government investment loans as they fall due, high capital-output ratios for individual investment projects and the like. More important for the issues examined here, however, is the influence of worker attitudes toward risk on the development of inflationary pressures. The major link here is the use of monetary policy by the state as a means to protect enterprises from the bankruptcy and insolvency which may occur as a result of a lack of sensitivity towards business risk. As noted in chapter 6 and again in this chapter, the state has
frequently resorted to monetary expansions to supply the bank loans needed to guarantee the survival of a losing enterprise or to cover the net indebtedness of an insolvent enterprise even when such expansions have run counter to the goal of macroeconomic stability. In order to understand why the state has chosen this course of action it is necessary to turn once again to the political conflicts which shape policy formation.

The most significant political factor influencing the course of economic activity and policy formation in the Yugoslav economy has been the inter-republican and inter-territorial struggle for scarce economic resources. This struggle in turn has led to the development of the type of local political alliances, described in chapter 6, which unite local political leaders and local banks to further the interests of the local business community at the expense of the economic interests of other economic agents, and, ultimately, at the expense of the economic interests of the state as a whole. It is easy to see how the local alliance system has fostered the use of expansive monetary policy as a tool to protect "permanently" bankrupt or "temporarily" insolvent enterprises. Most significantly, the system has acted as a barrier against alternative policies designed to penalize enterprises for financially irresponsible behavior or to phase out enterprises which
are incapable of profitable activity under even the most expansive conditions. The strength of these barriers is attested to by recent evidence about the large number of enterprises which have acted in flagrant violation of the illiquidity regulations adopted by the government during the 1969-72 period. According to Dimitrijević, approximately 50% of all enterprises stood in violation of one or more of these regulations in 1972. In all cases, the competent political body, generally the commune, which was responsible for enforcing the regulations, took no action against the enterprise violations. This response can only be understood in terms of the alliance system which made the local governments choose to protect local enterprises from the law rather than enforce the law for the good of the federation. In this light the severity of the 1969-71 liquidity crisis takes on new meaning, drawn from the fact that the crisis evolved during a period of rapidly deteriorating federal political control and rapidly increasing local political and economic power. Up until the end of 1971, when the political conflicts were at least temporarily resolved by the adoption of a new set of constitutional amendments enlarging the authority of the republican governments, the federal government, frequently stalemated by republican vetoes, often had no power to enforce its economic policies on local governments.
Because of the operation of the local political alliance system, the federal government has often had no alternative but to turn to monetary policy to alleviate the problems of business losses and insolvency as long as it wishes to avoid the politically undesirable and ideologically disfavored option of bankruptcy. The resulting use of the banking system to bail out insolvent enterprises and an insolvent enterprise sector has set up expectations which lead to the recurrence of insolvency. Quite predictably, as each enterprise has become more and more certain that its defiance of existing regulations and its failure to honor financial commitments will be rewarded by the credit which it needs to carry out its plans, the number of violations of the law and enterprise defaults has increased. This of course has made the task of monetary control all the more difficult because each enterprise has become less sensitive to variations in monetary policy and has increasingly taken on the attitude of continuing its planned expenditures despite such variations. In its efforts to do so, each enterprise has been forced to search for alternative finance in the form of cash balance reductions and additions to the credit taken from its suppliers. Consequently, the introduction of restrictive monetary policy has tended to bring on the illiquidity crisis within which lay the seeds for its reversal; moreover, because of
changes in enterprise expectations, each such crisis has tended to occur more quickly and to be more severe each time a restrictive monetary policy has been adopted. The most extreme consequence of the process described here is obvious: the total inability of the monetary authorities to take effective action to impose macroeconomic stability and the determination of the money supply at the level required by enterprise expenditure plans rather than at the level consistent with such stability. Recent evidence of the steady trend toward this extreme is seen in the special use of enterprise trade credit for all types of transactions in 1971 and 1972.

The analysis presented here has a simple conclusion: the main causes underlying the inflationary experience of the Yugoslav economy during the past ten years have been the unresolved political and ideological contradictions which influence the government's ability to formulate and execute the macroeconomic policy required for price stability. Contrary to popular belief or hypothesis, the results presented in chapters 3 and 4 reveal that the special price and wage setting practices associated with a system of workers' self-management have had little impact on this process. Rather, as the discussion in chapters 6 through 8 has pointed out, the important factor has been the deep-felt ethnic and regional rivalries which continue to
threaten the existence of Yugoslavia as a single political, economic and legal entity. Until these rivalries are reduced or until the ability of competing groups to further local economic interests through recourse to the monetary system is eliminated, the prospects for macro-economic stability are likely to remain poor. Therefore, I am led to conclude that the recent inflationary experience of the Yugoslav economy validates Henri Aujac's contention that inflation is ultimately the consequence of conflicts between different societal groups. Until such conflicts are resolved, inflation will continue to plague the Yugoslav economy.
Footnotes

1. Say the initial impact of the restrictive monetary policy is to cut investment demand in the enterprise sector. As long as this reduction in demand is not matched immediately by an equal decline in production or a drop in price some unintended inventory accumulation will occur. Producers may then have to channel some of their available borrowed funds into financing the unforeseen accumulation of inventories which leaves still less money for capital investment. Thus, investment demand may be reduced further, causing more unintended inventory accumulation which may draw off still more borrowed funds from capital investment. In this way the process of inventory accumulation acts to transmit the contractionary effect of monetary policy on planned expenditure flows. For more on this process, called the "credit contraction multiplier" by D. Tucker, see his article, "Credit Rationing, Interest Rate Lags and Monetary Policy Speed," Quarterly Journal of Economics, May 1968, pp. 54-84.

2. This proposition is examined at length by A. Leijonhufvud in Keynesian Economics and the Economics of Keynes (London: Oxford University Press, 1970), chapter 3.

3. Certainly this hypothesis is consistent with the enterprise demand for money curve characterizing the post-1966 period, (see table 7.4) when enterprises were unable to immediately adjust their actual cash balances to desired levels. On the other hand, this hypothesis appears inconsistent with the enterprise demand for money curve estimated for the 1961-66 period which shows almost immediate adjustment between actual and desired cash balances. However, the 1961 illiquidity crisis occurred in the first half of 1961, a period not covered in the estimation of the money demand functions. It seems reasonable to assume that enterprises were not able to constantly maintain their cash positions at desired levels during this period when monetary policy was quite severe relative to the standards of previous years and when the economic reform was interfering with enterprise predictions about sales and inventories.

4. The important institutional constraints are summarized on page 517 of this chapter.
5. As noted in footnote 40 of chapter 7, the government sector has frequently defaulted on outstanding bills to the enterprise sector to gain additional credit. By the end of 1971, the volume of bills defaulted in this manner had become so great that SDK was required to pass a new set of regulations forcing government organizations at all levels to devise plans for the repayment of bills within a certain period of time. These regulations improved the situation but in May 1972, the Federal Executive Council noted that "an important number of debtors in the non-economic sector" had still not presented a plan to pay their debts. Moreover, in the period from November 1971 to May 1972, the total debt of the non-economic sector to the enterprise sector jumped by 8,069 million dinars, an increase that was greater than the total volume of such debt at the time the SDK introduced the new regulations in the first place. Savezno Izvršno Vece, The Economic Situation in the First Half of 1972, unpublished government document.

6. The data for the indicators mentioned here are contained in table 5.5 and graph 2 of chapter 5.

7. The 1967 monetary contraction was particularly severe and the existing money supply actually declined by 2%. Few, if any, modern economies have witnessed extended periods of declining money supply.

8. For example, in 1967, thirteen cases of "composition with creditors" one form of bankruptcy in Yugoslavia and 86 cases of pure bankruptcy occurred. The majority of these cases involved small trading and artisan organizations and small agricultural supply and disposal cooperatives. According to the authors citing these figures, neither before nor after 1967 was the number of bankruptcies substantially larger. Thus, despite the fact that about 10% of Yugoslav social sector enterprises operate with losses for more than a year in succession, few of them are brought to bankruptcy proceedings, which is a recognized sanction for such behavior. See Gorupic and Paj, Self-Management in Yugoslav Undertakings, p. 183.

9. See H. Wachtel, Workers' Management in Yugoslavia, pp. 82-85 for a discussion of these dual responsibilities of the communal governments.

10. The basic contradiction between the "pure coop" and
"worker-manager" view of the Yugoslav enterprise is clearly apparent in the following quote from Horvat's *An Essay on Yugoslav Society*

A negative profit or loss calls for a similar approach. Within a definite interval it will be regarded as a market penalty for failing to provide the average quantity of "entrepreneurship." In this sense, the entrepreneurial function of the collective (enterprise) includes the assumption of risk as one of its components, as Knight reminds us somewhere. However, reducing the wage fund below a certain level would hardly appear to be socially permissible. Accordingly, the state or the commune will have to intervene and, in the same way, that it (can) take a superprofit by means of a tax, it will provide a subsidy for a super-loss. It may also happen that some enterprise is not operating profitably and that the collective was not subjectively responsible for this, so that a permanent subvention will be necessary, or even liquidation. In all these cases, the risk is borne by the owner of capital, the community; this reflects Schumpeter's example, in which the assumption of risk was excluded from the entrepreneurial function. (Italics mine.) See B. Horvat, *An Essay on Yugoslav Society*, p. 100.

11. A recent survey of workers in a number of Yugoslav enterprises suggests that the majority of enterprise members adhere to the belief that as long as they complete their specific job, they should receive their agreed upon income regardless of the overall profitability of enterprise operations. Moreover, they feel that the enterprise director and his staff are solely responsible for the enterprise's profit performance. According to this view, should the enterprise run with a loss, this is the group which should bear the consequences. For more on the attitudes of workers toward risk, see J. Zupanov, "The Producer and Risk," *Eastern European Economics*, Spring 1969, pp. 12-28.

12. For a full discussion of the circumstances under which an enterprise can be brought to bankruptcy proceedings or to one of the arrangements discussed here, see Gorupić and Paj, *Self-Management in Yugoslav Undertakings*, pp. 180-90.

13. A professor of law at the University of Ljubljana indicated in conversation that the principle of
Yugoslav bankruptcy law is that the enterprise and its members must be protected over the interests of creditors, if necessary. Many of the alternatives to actual bankruptcy such as "compulsory compromise" in which the creditors agree to plan for the "sanacije" (rehabilitation) of a debtor enterprise are clear outgrowths of this principle. Until changes in the bankruptcy laws occurred in the fall of 1972, the option of compulsory compromise and similar options meant that in most circumstances, nonpaid creditors who brought bankruptcy proceedings would be forced to help the endangered enterprise along with the competent communal government.

The priority accorded to the enterprise and its members by Yugoslav law is nowhere more evident than in the ranking of creditors for payment should an enterprise be declared bankrupt. In most capitalist economies, both government and non-government creditors of such an enterprise make first claim on remaining enterprise resources. In Yugoslavia, the first claim is the claim of workers for back salaries calculated at some minimum level set by the commune. Next in importance are a series of governmental claims in the form of overdue taxes. Only after these two claims are paid are the claims of business partners and other creditors honored.

14. According to the law on Joint Reserve Funds, the republic decides on the total percentage of net income to be placed in the funds subject to the 5% maximum limit. The commune can then levy an additional percentage in the amount of the difference between the maximum 5% and the percentage levied by the republic. The direction and disposal of the JRF's are under the auspices of the republican governments. See Dragomir Živancević, Žbirka propisa o sredstvima utvrđivanju i raspodeli dohotka i knjigovodstvu u radnim organizacijama (Beograd, 1972).

15. The collective consumption funds of the enterprise are used for two major purposes: to make periodic payments to workers in the form of vacation pay, children's allowances and the like; and to sponsor enterprise investment for workers, such as housing investment and investment in enterprise entertainment, cultural and educational facilities. In calculating net enterprise losses, only the first type of payment is included as a disbursement to be covered out of current income.
16. This is the official definition of loss according to enterprise law. See Zivancević, Zbirka propisa.

17. This estimate is taken from Spasoje Medenica, "Gubici u poslovanju privrednih organizacija," Reforma, no. 142 (December 1971), pp. 3-14; p. 13.

18. According to the Yugoslav Capital Market Study, enterprises rely on the expectation that "the social-political communities (governments) will protect them in cases of the application and implementation of sanctions foreseen in the case of violation of policy rules as regards liquidity . . . " This quote is cited in Acharya, Decentralization in Yugoslavia, p. 36.

19. For a discussion of how the guarantee system works in principle and in fact see V. Posinovec, "Garancije banaka i radnih organizacija i njihovo izvrsavanje u unutrasnjem platnom prometu," Poduzeće-Banka, July 1971. See also F. Belak, Drustveno-Gospodarska osnove sustava financiranja drustvenih potreba u samoupravnom socijalizmu (Ph.D. dissertation, University of Zagreb, 1971). Belak notes that a number of local governments can only cover as little as 6% to 10% of the amount of payments required from outstanding guarantees (p. 238).

20. As mentioned in footnote 12 because of the priority of claims in the Yugoslav laws, creditors may fail to profit at all from the successful pursuit of bankruptcy proceedings. Moreover, even if a creditor takes a debtor to court, court decisions in favor of the creditor may not be carried out.

21. One source of the difficulties imposed on the economy by a monetary contraction stems from the fact that a large percentage of short-term bank loans are renewed from period to period and are used by the enterprise sector in lieu of long-term credits to finance long-term expenditure programs. If a monetary slowdown means that banks are unable to renew their short-term loans, enterprises depending on loan renewal for such programs may quickly find themselves unable to meet expenditures incurred in these programs. This situation was so severe by 1971 that the National Bank agreed to a plan whereby it converted the greater part of short-term credit already granted it to the banking system to long-term credit repayable over 25 years at the prevailing rate of
discount. The business banks were in turn required to convert a specific part of their short-term credits to enterprises to long-term credits, the minimum amount converted equaling the amount of credit converted by the National Bank. (This description of the conversion process is based on a discussion with D. Dimitrijević in November 1972.)

22. The importance of court fees and expenses incurred by enterprises settling overdue accounts through the court system is suggested by the following figures:

<table>
<thead>
<tr>
<th>Value of Accounts in Court Decisions</th>
<th>Cost of Court Conflicts Involving Overdue Accounts</th>
<th>(2)/(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970 8950.6</td>
<td>766.2</td>
<td>8.6%</td>
</tr>
<tr>
<td>1971 11133.6</td>
<td>861.1</td>
<td>7.7%</td>
</tr>
<tr>
<td>1971 Jan-Sept. 896.3</td>
<td>69.2</td>
<td>7.7%</td>
</tr>
<tr>
<td>1972 Jan-Sept. 789.8</td>
<td>62.7</td>
<td>7.9%</td>
</tr>
</tbody>
</table>


23. In addition, as suggested by table 8.4, the commercial banks were helped by a special provision of the clearing arrangements which required net creditors to hold special bank accounts in the amount of their net credit position. These accounts were to serve as the basis for the extension of bank credits to net debtors. In this way the creditors were forced to bear some of the cost involved in financing their repayment. However, since the creditors received interest on these accounts, the actual cost incurred in this way was relatively small.

24. For example, of the total debts announced in the compulsory multilateral clearing of accounts in Croatia in 1971, 70.4% were uncontested. See I. Conkas, "Rezultati provedene." Of the total debts announced for the same clearing on the national level, 81% were uncontested. See V. Konvalinka, "Prvi ciklus."
25. For a more complete description of the process of blocking enterprise accounts, see footnote a to table 8.1.

26. In the original proposals presented in 1971 to deal with the illiquidity crisis, it was suggested that enterprises with blocked demand deposits and expired debt be allowed to pay only minimum incomes to their workers. However, this proposal was so politically unacceptable that it was postponed until January 1973. In addition, plans for carrying out this proposal were accompanied by an additional plan to impose a freeze on personal incomes outside the enterprise sector so that incomes paid to workers in defaulting enterprises would not lose their position relative to incomes received in other economic activities.

27. In 1971 and 1972, in an apparent effort to remove this weakness from the policy of blocking funds, the SDK issued rules requiring the use of other enterprise assets to cover expired bills. In addition, a new set of regulations prevented enterprises with outstanding, expired debt to increase their holdings of savings accounts.

28. Dimitrijević used these terms in a paper entitled "Osnovni putevi resavanja nelikvidnosti privrednih organizacija," which he delivered to the Savez Ekonomista Srbije, in Nis, 1971.

29. The most notorious case of enterprise inability to pay workers on time occurred in a large electronics works factory located in Nis in 1972. This factory, a prize development project of the Serbian government, received much publicity in the Yugoslav press when its workers' council voted to remove the director and his entire staff because of temporary delays in the payment of wages. Other less outstanding examples of the same phenomenon have been cited frequently in the Yugoslav press. See D. I. Rusinow, A Note on Yugoslavia, 1972, AUFS, Reports 19, no. 3 (Europe Series): 11.

30. In 1970 and 1971, in some Yugoslav enterprises up to 65% of total outstanding accounts payable and accounts receivable were regularized only through the periodic compulsory compensation carried out by SDK. In some enterprises, the regular payment of bills on time did not exceed 20% of total payments. See Safit

31. Dimitrijević made this estimate in conversation with the IBRD mission to Yugoslavia in the autumn of 1972.

32. For example, in 1969 and 1970, all enterprises running losses for more than one year were required to submit a "sanacion" or rehabilitation program to the communal governments. If an enterprise failed to comply with this regulation, the competent commune was directed to take action leading to the bankruptcy of the enterprise or to one of the legal alternatives to bankruptcy. Of the total number of enterprises required to submit sanacion programs in 1969, only 13% did so; in 1970, the corresponding figure was 55%. Apparently the communal governments made no effort to penalize the violating enterprises. See Medenica, "Gubici," pp. 11-12.

33. For an extended discussion of the immobilization of the federal government as a result of republican conflicts during the 1969-71 period, see D. I. Rusinow, A Note on Yugoslavia, 1972, pp. 3-5.

BIOGRAPHICAL NOTE

Laura D'Andrea Tyson graduated summa cum laude from Smith College (Northampton, Massachusetts) in June 1969, and began her graduate studies at MIT the following September. She served intermittently as a consultant for W. R. Grace & Co. (New York, New York) from 1969 to 1971, and she worked as a research assistant to the Board of Governors of the Federal Reserve System during the summer of 1970. From March 1972, through July 1974, she worked as a consultant for the International Bank for Reconstruction and Development. She is currently an assistant professor of economics at Princeton University.