PRIVATE FINANCE OF TRANSPORTATION INFRASTRUCTURE

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Submitted to the Department of Urban Studies and Planning
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The problem of public sector fiscal constraints has provoked policy makers in many countries to search for alternatives to traditional public finance. One of the alternatives currently under exploration and growing in application is privatization. Privatization involves the use of private sector financial and other resources in the provision of infrastructure and other goods and services traditionally provided by the government. In this thesis, the focus is restricted to the use of private financial resources for investments in transportation infrastructure.

Despite recent growth in its application, the privatization concept is not yet thoroughly understood. In particular, there remains an incomplete understanding of those characteristics of public finance policy contexts most conducive to its application. In this thesis, we conclude that among the most important characteristics are distributional objectives and underlying distributional principles. On the basis of a comparison of the recent use of private funds to finance investments in transportation infrastructure in the United States and Sweden, we conclude that to the extent that the distributional objectives implicit in public finance policy cause it to be oriented towards the benefit principle of distributional equity, private financial resources are likely to be allocated to infrastructure projects; and, alternatively, to the extent that the distributional objectives of public finance policy cause it to be oriented towards the ability-to-pay principle, private funds are less likely to be allocated to infrastructure needs. The comparison also serves as the basis of the following conclusions. Private financial resources are more likely to be allocated to infrastructure needs to the extent that (1) government fiscal constraints are severe and structural, (2) the public sector is able to provide administrative and other support to privatization efforts, and (3) there is legislative support for the privatization concept and its applications.

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TABLE OF CONTENTS

CHAPTER 4

CHAPTER 5

LIST OF DIAGRAMS

CHAPTER 1

INTRODUCTION

In many countries, governments are finding it increasingly difficult to generate financial resources commensurate with the requirements of public works infrastructure systems. Public works infrastructure systems constitute the physical framework required to support most economic activity. They are, generally, characterized by high fixed costs, strong links to economic development, long service life, inter-system interactions, and public ownership. In the United States, the composition of public works infrastructure, as defined in the Public Works Improvement Act of 1984, includes: highways, streets, bridges, sidewalks; lighting; mass resource recovery facilities; airports and airway facilities; water supply and distribution systems; wastewater collection, treatment and related facilities; docks, dams; ports and waterways; space facilities; transportation and other rail facilities and equipment; communication facilities, power production facilities, and other facilities critical for national economic development (National Council of Public Works Improvement (NCPWI), 1986, pp. 2, 76). The precise factors underlying government difficulties in generating the requisite funds vary, but generally include the high and

rising costs of public good and service provision[1], public deficit reduction efforts, political opposition, and legislative obstacles to public fund-raising efforts.

In the United States, the difficulty that governments face in generating sufficient financial resources for infrastructure is suggested in recent trends in state and local government public works spending. Over the last two decades, state and local governments have steadily reduced public works expenditures. According to an NCPWI report (1986, pp. 48-49, 52), as a percentage of total state and local government expenditures, public works construction, operation, and maintenance expenditures have declined from 13.5 percent in the early to-mid-1960s to 6.6 percent in 1984; moreover, as a percentage of gross national product (GNP), state and local public works expenditures have declined from 3.7 percent in 1961 to 2.7 percent in 1984. The trends suggested in these figures are of particular significance and concern considering that state and local government expenditures have accounted for approximately 70 percent of total public expenditures on public works facilities over the last two decades (NCPWI, 1986, p. 52).

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[1]Much of the high cost of infrastructure provision in the United States, for instance, is attributable to the high cost of rehabilitation and maintenance as a result of factors such as (1) the "historical rhythm" of infrastructure production, which has created the need to replace and rehabilitate almost simultaneously much U.S. infrastructure; (2) political pressures to use public funds for conspicuous and popular items, to improve public budget balances, and to minimize tax increases; (3) the lack of institutional arrangements suitable to the needs of infrastructure maintenance and rehabilitation; (4) the high costs of labor and other inputs into infrastructure rehabilitation; and (5) the lack of sufficient innovation in the area of technology for major infrastructure rehabilitation efforts. (Gakenheimer, 1985.)

The results of other research also indicate that state and local government expenditures on public works have experienced significant declines. According to Peterson (1983, pp. 6, 9; and 1984, pp. 110-116), between 1968 and 1983, state and local government public-works capital expenditures declined in real terms, and net capital expenditures declined faster than gross capital spending, suggesting a rapid accumulation and depreciation of older public-works capital. Consequently, asserted Peterson, the rate of net addition to the state and local public works capital approached zero by the early 1980s. Peterson extrapolated the data and suggested that by the mid-1980s, there would be a net disinvestment in the nation's capital stock as inherited public works assets were exploited at progressively faster rates. Federal government spending trends reflect the same patterns. Physical capital investment fell from 24.3 percent of federal government expenditures in 1960 to 11 percent in 1990 and is expected to decline further to 10.7 percent in 1991 (Aschauer, 1990).

The financial difficulties faced by U.S governments in their efforts to provide public works infrastructure is illustrative of the experiences of a large and growing number of countries. In many industrialized countries, where infrastructure systems are either coming to or past the age of substantial and costly reconstruction and renovation, and in many less-developed counties where frequently the rudimentary infrastructure foundations are still incomplete, fiscal constraints are hampering efforts to establish and maintain efficient public-works systems. Thus, the problem analyzed in this thesis--

financial constraints on public expenditures on infrastructure systems--is one of broad concern.

Financial constraints on public-works expenditures are significant because of the implications for economic growth and development. Analysts commonly accept that public-works infrastructure provides many of the facilities and services essential for the achievement and maintenance of national and international competitiveness and strength required to foster national economic growth and development (Polenske and Currea, 1985, pp. 55-63; NCPWI, 1988, pp. 34-36; Humplick, et al., 1990, p. 2). Private sector productivity, for instance, depends heavily on an adequate and well-maintained stock of public-sector capital. If infrastructure systems do not keep pace with private-sector capital needs, private investment, productivity, and growth fall, and the rate of return to private capital declines. Part of the reduction in U.S. international competitiveness has been attributed to falling investment and deterioration of the quality of U.S. infrastructure systems (Aschauer, 1990). Although the precise nature of the relationship between infrastructure, growth, and development has yet to be clearly and definitively established, analysts, nevertheless, generally acknowledge that by serving as the physical foundation for the efficient undertaking of all directly productive economic activity, and by contributing to and supporting capital formation processes, infrastructure is an essential input into economic growth and development processes (Pagano and Moore, 1985, pp. 6-8). Hence, any obstacle to its formation and maintenance, such as

fiscal constraints, holds significance and merits attention.

Our objective in this study is to contribute to a better understanding of the concept of privatization within the context of infrastructure financing. In particular, we identify factors influential in the determination of when and to what extent the concept is applied in those contexts in which governments are constrained in their ability to generate the financial resources required for the provision of infrastructure. To achieve this objective, we conduct a comparative analysis of the use of private funds for infrastructure projects in the United States and Sweden--countries in which public finance policies are characterized by very different degrees in the use of private funds.

The Privatization Alternative

Traditionally, most infrastructure in most countries has been financed publicly. The market's failure to allocate the financial and other resources required for the production of infrastructure services and facilities provides the chief justification for this policy. In recent years, an alternative policy solution to the market's failure to allocate efficiently the financial and other resources required for the provision of infrastructure has emerged. It is referred to as privatization. Broadly speaking, privatization is defined as private sector involvement in the financing, design, construction, maintenance, operation, and/or ownership of traditionally "public" facilities, goods, and services (Goldman and Mokuvos, 1984, xiv, 9-27; Sculley and Cole, 1985, p. 85; Weiss, 1987, p. xviii;). In this study, we restrict our

discussion of privatization to its financing element, i.e., private financing of infrastructure, by which we refer to financing that is based on the benefit principle. This is financing, in which the costs of facilities and services are allocated among their users in proportion to the benefits that the users receive from their use.

In the pure case of private financing, there is no cross-subsidization of infrastructure costs; facilities and services are paid for exclusively by their beneficiaries in proportion to the benefits received, and there is no sharing of facility costs with nonbeneficiaries. Thus, for new infrastructure that provides exclusive benefits to a particular population, private financing means that total facility costs are paid for exclusively by the beneficiary population. For existing infrastructure that is improved or expanded to serve new needs, private financing means that the associated costs are incurred by the population that creates the need for the improvement or expansion. When the excess capacity of infrastructure facilities is used to meet new needs, private financing means that the population that uses the excess capacity bears the associated costs. Although such a pure case rarely, if ever, exists in practice, for purposes of identifying the arguments, we counterpose this pure private financing case with a pure public funded one.

Private finance differs from public finance in the sense that under the latter there is cross-subsidization or sharing of costs both between beneficiaries and nonbeneficiaries and among different levels of beneficiaries. When infrastructure is publicly financed, the facilities

and services are paid for, either partially or fully, by individuals other than those who benefit from them. In this context, any infrastructure financing arrangement in which users and nonusers are assessed costs and/or in which the same rate structure is used for different categories of users--marginal and established, large and small--is a form of public finance. Thus, taxes, user fees and, other uniformly applied service charges that make no distinction between users and nonusers and between different categories of users and the costs associated with their use, are forms of public financing. Because of the cross-subsidy effect of public finance, it is, typically, used to achieve redistributional objectives.

Moreover, when we speak of private finance, we are not referring to the capital structure of the financing entity. We are not concerned with whether or not the entity is a private company--financed with the equity capital provided by numerous private individual investors. What concerns us is how the entity allocates the costs of the goods and services it provides. For this study, then, we are not concerned with the fact that the International Telegraph and Telephone Company (ITT) is a privately held company, financed with private equity capital (rather than the proceeds of municipal debt issues); what is important is that because it subsidizes the local use of telephone services with the proceeds of charges that exceed the costs of long-distance telephone use, it has, in effect, instituted a form of public finance.

Furthermore, whenever we speak of finance, we will be referring to the source of funds used to pay capital investment costs, that is,

how such funds are raised. This is in contrast to financing that refers to the final incidence of capital costs, or who actually pays in the end. Thus, when bonds are issued to pay for infrastructure, the revenues generated from their sale constitute the form of financing we will cover, and the payments made by taxpayers and others to retire the bonds constitutes another form of financing. We will use the term financing to refer to how capital is raised.

Theoretically, private funds can be used to finance virtually every type of infrastructure facility and service; in the United States, there are examples of the privatization of most types of infrastructure. For practical purposes, however, we limit this study to private financing of transportation infrastructure--facilities and heavy capital equipment that comprise those systems, such as, roads, bridges, airports, railroads, mass transit, waterways, ports and docks, used to move people and to deliver goods and services.

In addition to practical considerations, a second justification for this delimitation of the scope of the study is the relative size of transportation infrastructure in public-works budgets: it tends to be comparatively large. In the United States, for instance, depending on the source and period of reference, expenditures on transportation infrastructure have accounted for two-thirds to three-fourths of total public works spending (U.S. Congressional Reports, 1984 and 1985; Associated General Contractors, 1983; and Choate and Walter, 1981). In 1984, approximately 69 percent of all U.S. Federal, state, and local public-works expenditures were on airports, highways, waterways, ports,

lock and mass transit facilities (NCPWI, 1986, p. 52). Humplick et al. (1990, p. 3) estimate that 18 percent of the U.S. gross national product is spent on transportation infrastructure; and 10 percent of the U.S. workforce is employed in transport-related industry. They illustrate the importance of transportation facilities in the U.S. economy further by pointing out that the U.S. highway system, for instance, is the single largest category of public-works assets, and that the capital stock of the nation's aviation and public transit facilities has experienced rapid growth in recent years (Humplick, et al., 1990, p. 3).

A third rationale for limiting the focus of the study to transportation infrastructure is the importance of such facilities to economic growth and development processes. The importance of transportation infrastructure in development and growth processes has been documented by many authors (USDOT, 1989,; Humplick, et al., 1990, p. 2; Lakshmanan and Elhance, 1985). Lakshmanan and Elhance, for instance, show that inadequate transportation systems hinder the supply and demand mechanisms that underlie growth and development processes. In agricultural regions, poor transportation systems can result in delays and high costs that can, in turn, result in damage to perishable farm output and, thereby, discourage increases in agricultural production. Industrial production is also vulnerable to the quality of transportation systems. Inadequate transportation complicates efforts to access production inputs and get outputs to market. It may also encourage the inefficient accumulation of inventory that is sometimes necessary to counteract the effects of slow, unreliable, and costly

transport systems. (An accumulation of inventory is inefficient to the extent it adds more to overhead or fixed costs than it does to revenues.) Furthermore, communities that are isolated because of poor transportation facilities are frequently unable to partake in the communication necessary to acquire data regarding market opportunities, production techniques, and other information required to maximize efficient development and growth.

Transport facilities provide the physical linkages required to maximize distribution and production efficiencies--to conduct trade and other economic activities among local, regional, national, and international centers of production activity, and among raw material sources, intermediate production points and final production points. By providing these linkages, transportation infrastructure reduces the costs and improves the efficiency of production, distribution, and capital formation processes, and, thereby, facilitates economic development and growth. Consequently, to the extent that transportation facilities are inadequate, production and distribution efficiency, capital formation, and consequently economic development and growth are sacrificed.

Theoretical Arguments

The conclusions we have obtained in this study evolve out of the juxtaposition and comparison of two very different theoretical responses to the empirically observed problem of the market's failure to allocate efficiently the resources required for the provision of infrastructure--

the theory of market failure and the theory of property rights. According to the theory of market failure, market inefficiency in the provision of infrastructure is best overcome through a policy of government intervention. Thus, the government is called upon to regulate, and, in many instances, completely undertake the provision of those services and facilities that markets fail to allocate efficiently the required resources. The theory of market failure is a broadly accepted and well-established intellectual basis for infrastructure provision policy; thus, for many years, in most countries, infrastructure has been mainly financed by the government.

Alternatively, according to the theory of property rights, market inefficiency in the provision of infrastructure is best overcome through a policy of (re)structuring the rights of ownership to the required resources so that they are privately held. The theory provides the intellectual basis for privatization policy, and of particular relevance within the context of this thesis, it serves as the intellectual basis of a policy for the private financing of infrastructure. According to the theory of property rights, market provision of infrastructure can be improved to the extent that the ownership rights to the financial resources required for its provision are privately held.

During the course of this discussion, we make several observations. We observe, for instance, that the theories of market failure and property rights are used to analyze the same empirically-observed problem--the market's failure to allocate productive resources efficiently; and that they are used to seek the same objective--

economically efficient resource allocations. We observe, further, that although the analysts who apply the theories are trying to solve the same problem and seek the same objective, they prescribe totally different policy solutions. The market failure theorists prescribe a policy of extensive government intervention into those economic activities that markets fail to perform efficiently; and the property rights theorists prescribe a policy of (re)structuring the ownership rights to those resources that markets allocate inefficiently, thereby, encouraging market efficiency.

Most important, we observe that the two policy prescriptions are consistent with conflicting principles of distributional equity. The policy prescribed under the theory of market failure is consistent with the ability-to-pay principle, and the policy prescribed under the property rights theory is consistent with the benefit principle. Also, the decision to implement one policy or the other or some combination of the two depends on the distributional objectives and underlying principles of the implementing body. Finally, we observe that implicit in both theories and their policy prescriptions is a neglect of many other important factors--i.e., economic, administrative, legislative, institutional, and political, to name a few--that shape public finance policy, in general, and infrastructure finance policy, in particular. To develop and attempt to implement infrastructure provision policy without consideration of some of these economic, institutional, political, administrative, and other influential factors reduces the utility of the policy.

Part of our objective in this study is to add to the general level of understanding of these factors by identifying those factors that underlie the differences in the use of private resources in U.S. and Swedish infrastructure provision policy. Our principal finding is, for instance, that whether and to what extent a government implements one policy solution or the other or some combination of the two to correct the market's failure to allocate of resources required for the provision of infrastructure will depend, largely, but not exclusively, on the distributional objectives and underlying principles implicit in public finance policy of the implementing body. We assert, in particular, that in those public finance policy contexts more oriented toward the application of the benefit principle of distributional equity--that is, the costs of government-provided services and facilities are allocated among their beneficiaries in proportion to the benefits they reap from government output--private funds are more likely to be used to finance infrastructure. Alternatively, in those public finance policy contexts more oriented toward application of the ability-to-pay principle--the costs of government-provided output are allocated among consumers on the basis of their abilities-to-pay (or size of income)--private funds are less likely to be used to finance infrastructure. In these contexts, the policy prescribed under the theory of market failure--public finance--is more likely to be applied.

We establish the validity of this proposition in subsequent chapters through an analysis and comparison of privatization in the United States and in Sweden. We show that in the United States where

the benefit principle has recently emerged as an influence within the context of public finance policy, private funds are more frequently used to finance infrastructure than in Sweden, where the ability-to-pay principle has exerted a relatively strong influence on public finance policy. In the appendix, we provide details on how we collected the data used to support this proposition. In addition to the identification of the role of distributional objectives and principles in the determination of whether and to what extent private funds are used to finance infrastructure, we also identify other subsidiary factors--economic, administrative, and legislative--that influence the use of private funds for infrastructure.

We also intend that this study contribute to a better cross-cultural understanding of the recent orientation in national public finance policy, and its effect on infrastructure provision policy. U.S. readers, for instance, might be interested to note that, in Sweden, where the objective of the redistribution of income to achieve vertical income equality has, in recent years, been one of high priority, Swedish public finance policy has been characterized by a strong commitment to the ability-to-pay principle of distributional equity, which perhaps provides part of the explanation for why Swedish infrastructure finance policy incorporates limited amount of private participation. U.S. readers might also be interested in how private funds have been made available for Swedish public works projects.

Conversely, Swedish readers might be interested to note that in the United States, a public finance policy objective of increasing

influence is the intergenerational allocation of infrastructure costs on the basis of benefits received; consequently, U.S. public finance policy is increasingly guided by the benefit principle of distributional equity, which perhaps partially explains why U.S. infrastructure provision policy incorporates relatively more private financing than Swedish policy. Swedish readers might also gain from the thesis through the description provided of some of the techniques by which private funds have been tapped for infrastructure projects in the United States.

Structure of the Study

In Chapter 2, we present two theoretical arguments pertaining to the market's failure to allocate resources for the provision of infrastructure efficiently--the theories of market failure and property rights. We will argue that although the theories provide us with a framework for the analysis of the problem of inefficient market provision (in this case, the financing) of infrastructure, their utility as the basis of policy formation is limited, because they do not reflect the role of various economic, administrative, legislative, institutional, political, and other factors that invariably influence policy choice. Also, we suggest that among the neglected factors are the distributional objectives and underlying principles of public finance policy, and that the decision to implement one policy solution, or the other, or some combination of the two will depend on those objectives and principles in addition to numerous other variables. We conclude the chapter with the proposition that the extent to which

private funds are used to finance infrastructure is largely a function of the degree to which national public finance policy is influenced by the benefit, rather than the ability-to-pay principle of distributional equity.

In Chapters 3 and 4, we use the U.S and Swedish experiences with privately funded infrastructure to support our argument that this type of funding is more likely to occur in those public finance policy contexts characterized by a relatively strong commitment to the benefit principle and less likely to occur in those contexts characterized by a relatively strong commitment to the ability-to-pay principle.[2] In Chapter 3, we provide conceptual and empirical descriptions of three basic techniques used to allocate private funds to infrastructure capital investments in the United States--special assessment financing, exactions, and development fees. In Chapter 4, we provide a conceptual and empirical description of a technique by which private funds have been made available for the capital investment costs of infrastructure in Sweden.

One of the results of our comparison of the use of private funds for infrastructure in the United States and Sweden is the finding that, in recent years, private funds appear to have been used more often to finance infrastructure in the United States than in Sweden. We will use this observation to support our argument, presented initially in Chapter 2 and developed further in Chapter 5, that the use of private funds for infrastructure projects correlates with the extent to which public

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[2]In Appendix 1, we describe the way in which we collected the data.

finance policy is influenced by the benefit principle of distributional equity, and that private funds are less likely to be used to finance infrastructure to the extent that public finance policy is influenced by the ability-to-pay principle. We will also cite briefly some of the other factors that we have found, on the basis of our understanding of recent privatization efforts in the United States and Sweden, that shape the policy approach to the market's failure to allocate efficiently the resources required for the provision of infrastructure, and, in particular, that determine the extent to which private financial resources are allocated to infrastructure projects.

CHAPTER 2

A THEORETICAL CONTEXT FOR INFRASTRUCTURE FINANCE

In most countries, the majority of transportation infrastructure is publicly financed. Historically, the chief theoretical justification for this practice has been the market's failure to allocate efficiently the financial resources required for infrastructure provision. According to this perspective, private markets allocate too few financial resources to the production of transportation infrastructure. There is, however, a relatively recent theoretical perspective in which the position is taken that markets can, indeed, allocate the financial resources required for the production of transportation infrastructure as long as the ownership rights to the resources are privately held.

In this chapter, we juxtapose the two perspectives--the theory of market failure and the theory of property rights. The theories have not been used to study the specific issue of financing transportation infrastructure. Analysts have used them to investigate the more general issue of market failure and within that context the provision (of which finance is a an element) of infrastructure (of which transportation facilities and services are a part). We will show that although the theories are used to study the same empirically observed problem--market inefficiencies--and seek the same objective--economically efficient resource allocation, they prescribe very different corrective policies. According to the theory of market failure, market inefficiencies are best overcome through government intervention into--regulation and, in some cases, complete undertaking of--those social and economic

activities that markets perform poorly. Within the context of infrastructure finance, the theory implies that efficient provision of infrastructure is best achieved when the facilities are publicly financed. This is the policy approach traditionally adopted in the provision of infrastructure in most nations. Alternatively, the theory of property rights prescribes a policy of (re)structuring the ownership rights to resources so that they are privately held, thereby, creating the behavioral incentives that encourage market efficiency. Within the context of infrastructure finance, this theory implies that efficient provision of infrastructure is best achieved when the ownership rights to the financial resources invested are privately held. This is the policy approach increasingly adopted by governments facing constraints on their abilities to generate public financial resources required for the provision of infrastructure. In the following discussion, we will present the basic arguments of the two theories and their policy prescriptions.

Theory of Market Failure

The theory of market failure is a prominent intellectual response to the empirically observed inefficiencies of market functions, and it serves as the chief theoretical justification for the extensive government intervention in the provision of infrastructure.[3] According to the neoclassical theory of perfectly competitive markets, given a set

[3]The material presented in this section is based primarily on our synthesis of the discussions of market failure in Boadway (1979), Samuelson (1969), Brown and Jackson (1980), and Tresch (1981).

of specific antecedent assumptions, markets produce Pareto-efficient resource allocations.[4] There are two categories of such assumptions--market assumptions and technical assumptions (Tresch, 1981, p. 7). Market assumptions are necessary to assure that markets are perfectly competitive--that all market transactors are price takers. They include (1) large numbers of buyers and sellers, (2) no product differentiation, (3) complete buyer and seller access to all market information, (4) freedom of market entry and exit, and (5) rational, utility (profit) maximizing individuals (firms).

The technical assumptions are necessary to assure that consumption and production functions are "well behaved"--that competitive markets are technically capable of producing Pareto-optimal resource allocations. They include (1) convex preferences, (2) convex consumption possibilities, (3) continuous preferences, (4) autonomously determined individual utility (on the basis of own consumption and factor supplies), (5) autonomously determined firm production possibilities (on the basis of own inputs and outputs), and (6) convex aggregate production possibilities. The assumptions that preferences and consumption possibilities are convex and that preferences are continuous satisfy the efficiency condition that individual utility functions exhibit diminishing returns. The assumptions that individual utility and firm production possibilities are autonomously determined

[4]An allocation of resources is Pareto efficient if there exists no alternative allocation that improves the welfare of one economic agent without simultaneously reducing that of another.

satisfy the efficiency condition that there be no consumption or production externalities. The assumption that production possibilities are convex satisfies the efficiency condition that there be constant or increasing opportunity costs or that firm production functions exhibit constant or decreasing returns to scale. It precludes increasing returns to scale (or decreasing opportunity costs) in production.

In reality, market and technical assumptions are frequently invalid, and markets, therefore, frequently fail to allocate resources efficiently. Francis Bator (1961, p. 100) found that roughly 97 percent of all U.S. federal government expenditures could be justified on the basis of market failure resulting from the violations of just three technical assumptions--convex aggregate production possibilities, autonomously determined individual utility, and autonomously determined firm production possibilities. In other words, increasing returns-to-scale production and the emergence of consumption or production or both types of externalities constitute chief causes of market failure and, thereby, provide the principle theoretical justification for almost all U. S. federal government expenditures. In the sections that follow, we describe the relationships between increasing returns to scale and externalities, on the one hand, and market failure on the other.

Increasing Returns-to-Scale

Markets that fail to allocate resources required in production processes efficiently are characterized by increasing returns-to-scale, which, in turn, are, typically, exhibited in production processes that are characterized by indivisibilities. The cost structures of such

production processes are such that start-up costs are high and marginal production costs are comparatively low so as the scale of production increases, per unit production costs decrease, and per unit returns increase. Increases in returns-to-scale can be significant enough to enable a single production unit to accommodate all of the market demand for its product type. Thus, increasing returns-to-scale is a manifestation of the violation of the technical assumption that aggregate production possibilities are convex.

Thus, one reason why increasing returns-to-scale production generates market failure is that its most efficient industrial structure--monopolistic or oligopolistic--is not the industrial structure required for market efficiency--competitive. Under conditions of increasing returns-to-scale, because per unit production costs decrease as output expands, large firms can produce more output at lower costs--that is, be more efficient--than small firms. Therefore, efficient increasing returns-to-scale production requires that all of the output required to satisfy market demand for a specific product type be produced by a single or a few production units rather than many small competitive units.[5]

Another reason why increasing returns-to-scale production generates market failure is that, in their quest to maximize profits, market producers price the output from such production processes

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[5]The superior efficiency of large production units in production processes characterized by increasing returns-to-scale is derived from their ability to produce further along their continuously declining average cost curves than smaller production units can. This means they can produce more output at lower average costs.

inefficiently. The efficient pricing rule dictates that marginal revenue be equated to marginal production costs. Under increasing returns-to-scale production, because marginal production costs decline as output expands, marginal costs must, by definition, be less than average costs. The efficient price--one that is equal to marginal costs--must, therefore, be less than average costs; consequently, losses are incurred. Rather than price their output efficiently and incur the inevitable losses, market producers price their output inefficiently--at that point on their average revenue curves that corresponds vertically to the intersection of the marginal revenue and marginal cost curves. Consequently, their pricing rule results in higher prices than the efficient pricing rule. In addition to inefficiently high prices, market producers produce inefficiently low levels of output because they determine output also on the basis of that point on their average revenue curves that corresponds vertically to the intersection of the marginal revenue and marginal cost curves. The resulting output is lower than the efficient level of output which is determined precisely at the point at which marginal revenue and marginal cost equate.

Given how market producers behave, according to the market failure theory, if society is to enjoy the efficiency benefits that can be derived from increasing returns-to-scale production, i.e., low prices and ample output, the government, and not private markets, should allocate the required resources.

Externalities

The presence of consumption and production externalities constitutes another important source of market failure. Externalities are unpriced effects--benefits and costs--that emanate from and are external to market activities. They emerge when it is technically, financially, legally, and/or politically infeasible (or impossible) to establish unambiguously defined, allocated, and enforced property rights to all market effects. Externalities are effects that cannot be internalized through the existing market structure. One consequence of the emergence of externalities is that the consumption or production, or both types of activities conducted by some economic agents enters and frequently alters the consumption and/or production activities of other economic agents. Thus, the existence of externalities is a manifestation of the violation of the technical market efficiency assumptions that individual utility and firm production possibilities are autonomously determined.

In our investigation of the issue, we found that most analyses of externalities focus on divergences between social and private costs and benefits. In our view, such a focus constitutes a relatively superficial approach to the analysis as externalities. At the most profound level, externalities are a function of property rights structures. We maintain, therefore, that externalities are more appropriately understood within the context of the structure of property rights underlying market exchanges. Our discussion of externalities

will, therefore, focus on property rights structures rather than divergences between social and private costs and benefits.

Property rights are the rights to the use, income, and transfer (sale) of property (resources).[6] There are three idealized property rights structures--private, communal, and state. Each structure grants property owners the exclusive right to the use of their property, to the income it generates, and to the voluntary transfer of ownership. Thus, private property rights grant property owners exclusive rights to the use, income, and transfer of their privately owned property; communal property rights grant community members exclusive rights to the use, income, and transfer of communally owned property; and state property rights grant the state exclusive rights to the use, income, and transfer of state property.[7]

Each property-rights structure creates behavioral incentives that have different implications for market efficiency. In general, private property rights create incentives that encourage market efficiency, and communal and state property rights create incentives that discourage market efficiency. Communal property rights are particularly problematic with regard to market efficiency, because the owners of such

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[6]This discussion is based primarily on Coase (1960), Demsetz (1967), and Alchian and Demsetz (1973).

[7]Communal property rights are often confused with state property rights. There is a difference, however, that is a function of the degree to which the exclusivity of state property rights are enforced. When they are not strictly enforced, as in the case of state owned parks, the property rights are more communal than state. In such cases, no individual can be excluded from the use of the property (except through prior and continuing use). If the exclusivity of state property rights is strictly enforced, as in the case of military installations, the property rights are, in fact, state.

rights have little incentive to consider all of the effects emanating from the decisions they make regarding the allocation (or use) of their property. This is because when property is communally owned, it is often infeasible or impossible for individual owners (community members) to internalize (bear) all of the effects emanating from their property allocation decisions. Because the property is communally owned, the effects are shared with other community members. Consequently, individual community members have little incentive to measure accurately all of the costs and benefits of their property-allocation decisions and to incorporate such costs and benefits into their decision-making processes so as to ensure the maximum efficient use of their property.

The incentives and consequent efficiency results of private property- rights structures are precisely the opposite of those that arise under communal property-rights structures. Markets can be characterized as arenas in which property rights are exchanged. Markets' property allocations are most efficient when the rights to the property exchanged therein are held privately. The more precisely defined, allocated, and strictly enforced property rights are (the more private they are), the more completely property owners internalize the consequences of property-allocation decisions and the higher the correlation between the property owner's welfare and the effects emanating from such decisions. Under these circumstances, property owners have considerable incentive to analyze all property-allocation decisions in terms of their possible effects, to capitalize fully those effects into the present transfer (market exchange) value of their

property, and to ensure that the effects maximize that value. As a consequence of these behavioral incentives, private property tends to be allocated efficiently.

Frequently, reality falls short of the theoretical ideal. High market transaction costs[8] often preclude the establishment of unambiguously defined, well-allocated, and strictly enforced private property rights. To the extent that this is the case, property owners do not have exclusive rights to the use, income, or transfer of their property, and they cannot fully internalize the effects of their property-allocation decisions. Incomplete internalization of effects and the consequent emergence of externalities obscures the relationship between the welfare of property owners and property-allocation decisions. Consequently, property owners have little incentive to consider all of the effects of such decisions and, therefore, cannot fully capitalize all such effects into the market value of their property and cannot ensure that their property is allocated to its value maximizing or most efficient use.

In the public-finance literature, the classic externality is the public good. Public goods are illustrative of a particular category of externalities--consumption externalities. They are frequently referred to as jointly consumed goods--goods the consumption of which is nonexclusive; that is, no one can be excluded from their consumption. Their nonexclusivity results from the financial, technical, legal,

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[8]Market transactions costs are the costs of acquiring information, negotiating, policing, and enforcing contracts required for market exchanges.

and/or political impossibility or infeasibility of establishing unambiguous, well-defined, allocated, and enforced property rights to their consumption; private property rights cannot be established for nonexclusive or public goods. Thus, if a public good is made available for the consumption of one individual, it is necessarily available for everyone's consumption.

The nonexclusivity of public goods gives rise to the free rider and consumption preference revelation problems, which, ultimately, generate market failure. Unlike private goods--goods for which the rights of consumption are exclusive--the consumption of nonexclusive goods is not contingent upon payment. Therefore, some individuals take free rides: they consume the nonexclusive good without paying its producers a price that reflects their (the free riding consumers) true marginal valuation of consumption of the good. This they do with the knowledge that, in spite of their submarginal payments, they cannot be easily excluded from consumption of the good and on the expectation that their consumption will be financed (in part or in full) out of payments made by others. If a nonexclusive good falls prey to many free riders--individuals who fail to reveal correctly the marginal valuation of their consumption--the price mechanism transmits faulty consumer preferences to market producers, who then may make erroneous resource allocation decisions. Relative to true consumer preferences and all of the benefits that consumers derive from the consumption of nonexclusive goods, market producers, therefore, allocate too few resources toward

their production.[9] Because there is no reasonably effective means of excluding individuals from the consumption of nonexclusive goods and, therefore, of charging a profit-maximizing price, market producers have no incentive to allocate the efficient level of resources toward the production of public goods. The lack of an effective voluntary procedure or mechanism for consumer preference revelation is the chief source of the market's failure to allocate efficiently the resources for the production of public goods.[10] It is also the chief justification for their provision by the government rather than private markets.

Frequently, the consumption of public goods is also (but not necessarily) characterized by nonrivalry. Consumption of a good is nonrival when its marginal cost of consumption is zero; that is, when the marginal consumer adds nothing to the good's variable costs of production.[11] Efficiency dictates that price be equated to marginal cost. When consumption is nonrival and marginal production costs are zero, the efficient price is also zero; to charge a price greater than zero is inefficient because welfare can be enhanced through incremental increases in consumption at no extra costs. Therefore, to price nonrival consumption goods, and, thereby, exclude some individuals from

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[9]In the absence of nonexclusivity or consumption externalities, true consumer preferences and the consumption benefits that consumers derive from public goods would be reflected in payments that equal their true marginal valuation of such goods.

[10]When exclusion is possible, prices serve this purpose.

[11]Indivisibilities result in zero marginal production costs. When the production of a good is characterized by large capital investment costs and negligible marginal production or service delivery costs, the marginal cost of production in effect, may be zero.

consumption when the social welfare can be enhanced through addition consumption at no extra cost is inefficient.[12] Profit-maximizing market producers do not charge zero prices; market prices are always greater than zero. Furthermore, by charging prices for nonrival goods, market producers effectively exclude some consumers from their consumption and, thereby, reduce effective demand for the goods. The low effective demand induces market producers to allocate fewer resources toward the production of nonrival goods than would be the case if all welfare-enhancing consumption was allowed; consequently, markets produce an inefficiently low amount of nonrival goods. The inefficiencies that arise from the pricing of nonrival consumption goods is another reason why many public goods are provided by the government rather than private markets.

Increasing Returns-to-Scale, Externalities, and Transportation Infrastructure Finance Policy

Many forms of transportation infrastructure are characterized by increasing returns-to-scale and/or production and consumption externalities; therefore, the provision--finance, design, construction, operation, and maintenance--of such facilities is almost always undertaken by governments rather than the private sector. The production of most transportation infrastructure--airports, public

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[12]The inefficiency implicit in market pricing of nonrival goods is intuitively evident when we consider that if the marginal consumer imparts no effect on the consumption of other consumers (i.e., there are no opportunity costs associated with incremental increases in consumption), restricting welfare-enhancing consumption through positive pricing (or any other rationing device) is economically inefficient.

transit, roadways, and harbor facilities--is indivisible. Their production processes exhibit increasing returns-to-scale, and, consequently, they are most efficiently produced by monopolistic and/or oligopolistic production units. This is because small competitive market production units are technically incapable of maximum efficiency in the production of most transportation infrastructure. Furthermore, if consumers are to enjoy the efficiency benefits of marginal cost pricing of increasing-returns-to-scale production (lowest prices and highest output), the provision, including finance, of transportation infrastructure should not be left to market producers who cannot withstand the inevitable losses. The inefficiently high prices and low output of market provision of goods and services characterized by increasing returns-to-scale production serves as a principle justification for government, rather than private market, financing of most transportation facilities and services.

Another justification for government financing of most transportation infrastructure is that many of such facilities exhibit public-good qualities; frequently, they emit consumption externalities. Highways and harbor facilities are good examples of the difficulty and expense of erecting exclusionary devices that would be required to restrict the consumption of some transport facilities. Furthermore, many transport facilities are nonrival in consumption so that exclusion, even if possible, would be inefficient (because social and economic welfare can be enhanced through additional consumption at no extra cost). Because market efficiency requires exclusion (to enable the

functioning of the price mechanism), market producers are not the most efficient providers of transportation infrastructure; because they cannot or should not exclude individuals from consumption of nonrival goods and services, they allocate an inefficiently low amount of financial and other resources required for the provision of such output.

In recent years, the fiscal realities faced by many governments have exposed important weaknesses in the policy of government intervention into market activities that is prescribed under the theory of market failure. In particular, it is clear that such a policy is increasingly subject to severe financial constraints; frequently, governments do not have the financial resources required to implement such a policy. Thus, the practical utility of the theory and its policy recommendation has eroded in recent years. In response, the policy of privatization--the use of private financial and other resources in the design, construction, operation, and maintenance of infrastructure and other traditionally public output--has emerged. Its intellectual basis is the theory of property rights which is described in the discussion that follows.

Theory of Property Rights

Dissatisfaction with the neoclassical theory of markets has provoked its revision by numerous analysts seeking to improve its ability to explain and to predict empirically-observed market activities.[13] One general line of revision is based on an extension of

[13]The information provided in this section is based largely on Coase (1960), Demsetz (1967), Alchian and Demsetz (1973), and DeAlessi (1983).

the utility-maximizing hypothesis to all individual choices under constraints--institutional, natural, and state of the art. One of the perspectives in this general line of revision is the theory of property rights; analysts use it to study what is considered to be an important institutional constraint to market efficiency--the underlying structure of property rights.

According to this perspective, different structures of property rights create different economic behavioral incentives, which, in turn, result in different resource allocations and efficiency effects. Market efficiency requires (in addition to the well-established market and technical assumptions) unambiguously defined, allocated, and strictly enforced private property rights and zero transactions costs (the cost of transacting in, exchanging, or restructuring property rights). Private property rights are necessary to ensure that all of the effects emanating from property allocation decisions are internalized by property owners who, consequently, for the sake of personal welfare, are encouraged to ensure that all such decisions are property-value maximizing--that property is used in the most efficient manner. Zero transactions costs are necessary to facilitate any restructuring, reallocation, exchange or transfer of property rights that might be necessary to ensure that they are privately held. According to the theory, to the extent that private property rights are attenuated (e.g., by government regulation), replaced by some other institutional arrangement (e.g., public or communal ownership), or are for some other reason ambiguously defined, poorly allocated, or weakly enforced, and to

the extent that positive transactions costs obstruct corrective restructuring, some of the effects emanating from property-allocation decisions may not be internalized by property owners, and their incentives to ensure the efficiency of such decisions may be reduced. Under these circumstances, property is likely to be allocated inefficiently.

Pioneers in the development of the property-rights theory, such as Demsetz and Alchian, provided us with some of the earliest insights into its empirical significance. For instance, they used the theory to improve our understanding of the structure and economic behavior of the private business enterprise. In a 1967 article, entitled "Toward a Theory of Property Rights," Demsetz used the theory to analyze the structure and economic behavior of publicly held corporations.[14] The article is particularly instructive as to the concept of property rights, the role of property rights in social systems, and some of the catalytic forces underlying their emergence. The most important contribution to emerge out of the analysis is his setting forth of some basic principles relevant to the evolution or "coalescence" of property rights and to the determination of ownership structures (pp. 354-359).

Demsetz begins his analysis with the assertion that communal structures of property rights result in inefficient resource allocations. He uses land as an example. Communal property rights to land do not concentrate the benefits and costs emanating from land-

[14]Corporations that are financed through the public's purchases of stock and equity.

allocation decisions; such costs and benefits are not internalized by individual land owners, but rather by the community as a whole.[15] Thus, any individual land-owner's (individual community member's) allocation decisions necessarily create externalities--external effects that are not incorporated into his or her allocation decisions and that reduce his or her incentives to use communal property efficiently. Individual land owners will tend, for instance, to overutilize the land and to use it in others ways that appear to maximize their individual welfare.[16] As a consequence of all such individual actions, the overall efficiency of the land and benefits derived out of its use are reduced.

Theoretically, the problem of inefficient use of communally owned land may be overcome through a voluntary restriction of communal property rights--a mutual agreement among land owners not to overutilize the land and to use it in the most efficient manner. There are, however, practical limitations to the utility of this solution. A voluntary restriction of communal property rights requires every community member to restrict, at will, their use of the land. The costs of negotiating and policing (market transactions costs) such restrictions would be high. Moreover, the larger the community, the greater the transactions costs because the incentives and opportunities to breach the agreed-upon restrictions would be greater.

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[15]The costs associated with individual land-owner's allocation decisions are not borne by him or her alone, but by the entire community; and the benefits derived from individual land-owner's allocation decisions are not reaped by him or her alone, but by the entire community.

[16]In fact, if each individual operates in this fashion everyone's welfare is reduced relative to its potential.

Another solution to the problem of inefficient use of communally owned land would be to parcel the land into privately owned plots; that is, to restructure property rights to the land so that individual land owners are forced to internalize more of the effects emanating from their land-allocation decisions and are, thereby, encouraged to make use of their land in the most efficient manner. Any remaining externalities--the effects that any one individual property owner might have on another--may be internalized through less costly transactions among those individuals.[17]

Two market options are available to private property owners seeking to transact the internalization of externalities; they are contractual agreements among land owners and land buyouts (i.e., the coalescence or bundling of property rights). Both options essentially involve the restructuring of property rights. The decision to select one option or the other is made on the basis of their relative expenses, which is a function of scale economies and market transactions costs. If there are constant returns to scale in land operations (i.e., returns are constant irrespective of the size of land parcels), and if the transactions costs of internalizing externalities is low, then it is a matter of indifference which option is selected. To the extent, however, that transactions costs are high (i.e., the costs of transacting in the property rights to external effects through existing

[17]Externalities that accompany private land ownership do not affect all land owners, and, in general, it will be necessary for only a few owners to transact the internalization of such external effects. The cost of such transactions will generally be less than the costs of transactions among many communal property owners.

market structures is high), then the externalities are more likely to be internalized through an outright purchase of the land. For a given level of transactions costs, to the extent there are diseconomies of scale in land operations, contractual agreements will be used to internalize externalities; to the extent that there are economies of scale in land operations, outright purchases will be used to internalize externalities. The basic principle established by Demsetz is that in selecting a method by which the rights to property are restructured so that externalities can be internalized, contract costs must be compared to the costs associated with scale of operation. The rights to property will tend to coalesce, or be owned, in sizes that minimize the sum of these costs.

In an analysis of the structure of property rights, Demsetz applies this principle to publicly held corporations. He bases his analysis on two assumptions: (1) that there are significant economies of scale in the operation of large corporations, and (2) the acquisition of equity capital is less costly when acquired from many small contributors. In his analysis, he explains why the property rights to publicly held corporate assets are structured as they are--to ensure the complete internalization of externalities and, thereby, ensure the most efficient allocation of corporate assets.

The purchasers of corporate equity essentially own the property rights to corporate assets. As the owners of the assets, they are technically entitled to participate in all decisions regarding the assets' use. If, however, they were, in fact, to participate in all

such decisions, the costs of operating the corporation would quickly exceed the benefits of large-scale operation. In order to avoid (inefficiently) high operating costs, the owners of corporate assets make the first of three legal modifications to the structure of the property rights to the assets. A small (relative to the number of equity owners) corporate management control team is appointed by the equity owners to be the assets' de facto owners. This modification, in effect, reduces the corporate operations costs relative to what they would be if all equity owners were to participate in decisions regarding the allocation of the corporate assets. This coalescence of property rights is analogous, in effect, to the coalescing of communal property rights around privately owned lots. It reduces the emergence of externalities (external effects that emerge from the actions and decisions of individual equity owners, which, together, increase corporate operating costs), and it reduces the transactions costs of internalizing any externalities that remain (contractual agreements need only be reached among a small team, with the result that negotiations and policing costs are lower).

This structure of property rights, itself, poses externality problems. For instance, should the corporation fail (in the United States) partnership law requires each shareholder (those who own equity in the corporation) to honor corporate debts up to the limit of his/her financial ability. Thus, the activities and decisions of the de facto managerial owners can have significant economic effects on corporate shareholders. Left unchanged, under managerial de facto ownership

structure, corporate managers do not internalize the effects of their decisions; they do not bear all the costs of bad management decisions; and they do not reap all the economic benefits of good management decisions. Consequently, they have little incentive to avoid costly corporate asset management decisions and to make beneficial decisions. Furthermore, investors' fear of the liabilities that they might be forced to bear as a result of bad management decisions induces them to require a higher return (commensurate with their perceived risk) on their equity capital, thus, increasing the costs of raising corporate capital. To avoid the externality effect of managerial de facto ownership and the consequent increases in corporate capital costs, the owners of corporate assets make a second legal modification to the structure of property rights to corporate assets; they establish limited liability. Limited liability restricts the corporate liability of shareholders. It also forces management to internalize some of the effects of its asset allocation decisions.

A third legal modification in the structure of corporate property rights that further reduces externality effects of management decisions on shareholders is the establishment of the right of shareholders to transfer their corporate interests without having to obtain permission from other shareholders and without having to dissolve the corporation. This modification makes it easier for individual shareholders to relinquish ownership in a corporation in which management preferences, actions, and decisions are inconsistent with their own. It helps, too, to maintain harmony between management and shareholders.

Demsetz's analysis of the property rights of public corporations yields two important points. First, because costly externalities tend to emerge from other property rights structures (notably communal), property rights tend to coalesce in small bundles--private groups or individuals. Second, the way in which the property rights coalesce into these bundles depends on the relative costs of the methods by which externalities can be internalized in markets--contracts and buyouts.

In a 1973 article, Alchian and Demsetz expand upon Demsetz's earlier analysis of the property rights of public corporations and contributed more to our understanding of the effects of property rights on market efficiency. Demsetz established in his earlier work that different structures of property rights have different efficiency effects. Private property rights encourage market efficiency, and any attenuation of those rights--the establishment of communal rights or government regulation--reduces the efficiency with which resources are allocated. In addition to the type of rights structure, Alchian and Demsetz assert that who is the owner of the rights also has important market efficiency implications. For instance, because public and private owners of property rights respond to different incentives--the former responds more favorably to political incentives and the latter more favorably to market incentives--they are motivated to use their property in different ways. Consequently, the efficiency with which publicly and privately owned property is allocated is different. From the perspective of market efficiency, to the extent that market transactions costs are zero (so that efficiency-enhancing, property-

rights restructuring can take place), private owners tend to allocate property more efficiently than the public owners.

There are circumstances in which externalities emerge that can only be internalized under the existing property-rights structures at prohibitively high transactions costs. In such instances, internalization requires the restructuring of property rights--a change in the type of rights or the identity of the right's owners--so that the transactions costs of internalizing the externalities is reduced, and the property can be put to its most efficient use.

Alchian and Demsetz use this property-rights/transactions-costs paradigm to explain some significant historical property-rights adjustment processes, such as the "privatization" of American Indian hunting lands, European and North American radio broadcast signals, and the English land enclosures (pp. 19-26). In each case, technological or other types of changes altered the value of what had, theretofore, been communally owned property and caused the emergence of externalities that could only be internalized under the existing (communal) property-rights structure at very high transactions costs. In each case, an adjustment in the structure of property rights was necessary to lower the market transactions' costs of internalizing the externalities. As a result, markets were able to allocate the property more efficiently.

The property-rights/transactions-costs paradigm has also been used to provide insight into numerous other phenomenon including the capital structure of large corporations, the choice and evolution of different forms of business enterprises (why do corporations exist and

what is the logic of their internal structures), the factors that influence the size and complexity of the modern corporation (why are firms in different industries characterized by different sizes and business organizations) (DeAlessi, 1983). Finally (and most relevant to this thesis), the property-rights/transactions-costs paradigm has been used to provide greater insights into bureaucratic decision making and behavior (DeAlessi, 1983; Hanke, 1984).

We have already established that when private property rights are unambiguously defined, allocated, and enforced, and there are no transactions costs associated with rights restructuring, markets allocate property efficiently; and that, alternatively, to the extent that private property rights are attenuated or replaced by some other institutional arrangement, markets allocate resources inefficiently. When, for instance, property is publicly owned, meaning that rights to its use and income are not exclusive, its owners cannot internalize all of the costs and benefits resulting from decisions regarding its allocation; that is, externalities emerge. Furthermore, publicly owned property is not transferable. It is not readily marketable and cannot be easily traded through markets. For instance, it is not possible to trade one's rights of ownership in a public park or national defense (except by moving out of the jurisdiction in which the park is located or out of the country). Thus, for public property, the transactions costs of market exchanges in the property rights are often prohibitively high. The lack of exclusive rights to the use and income of public property and the inability to transfer those rights provides little

incentive to the owners of public property to analyze property allocation decisions in terms of their effects on property values and to capitalize those effects into property values to ensure the maximum use value of the property. The owners of public property, essentially, have a limited incentive to ensure that their property is used efficiently; consequently, they take little interest in monitoring the actions and decisions of those, i.e., public bureaucrats, who actually allocate or determine the use of public property.

Public bureaucrats allocate property, the ownership rights to which belong to some amorphous and obscure body called the public--a body that often does not monitor their property managers very carefully. Because public bureaucrats have no private or personal rights of ownership to the public property they manage, they do not internalize the costs associated with bad management decisions, nor do they internalize the benefits resulting from good management decisions. They, therefore, have little incentive to make allocation decisions that maximize the efficient use of the property. Combined with the fact that, frequently, the owners of public property (taxpayers) do not monitor bureaucratic decisions and actions, bureaucrats might be encouraged to shirk their public property management responsibilities and to engage in various forms of opportunistic behavior--to allocate public property in ways that maximize their utility and welfare at the expense of the utility and welfare of the public property owner. They are likely, for instance, to seek job-related perquisites, which increase production or service provision costs. They are less likely to

introduce cost-reducing innovations or input combinations, to be responsive to consumer demands, to use less capital-intensive production techniques or, in general, to make any efficiency-enhancing changes that might threaten their jobs or management control over public resources. Because bureaucrats manage property that they do not own and because they are not effectively monitored by the property owners, they allocate such property inefficiently relative to their private counterparts who manage private property and who are, therefore, monitored closely by the property owners. (DeAlessi, 1983, pp. 64-81)

Hanke (1984) has used the property rights/transactions costs analysis of bureaucratic behavior and decision making as the theoretical basis for a public policy of privatization of infrastructure and other traditionally publicly provided services and facilities. In a 1984 report submitted to the United States Agency for International Development, Hanke argues that because resources tend to be allocated more efficiently under private property rights structures, the efficiency with which public works infrastructure is provided could be improved to the extent that the ownership rights to the resources required for the provision of such facilities and services are restructured so that they are privately held. According to Hanke,

> ...the nature of the rights to the use of resources, to the income they generate and to the transferability of those resources to others has an effect on the way the resources are used. Property rights arrangements...are not neutral. The system of property rights that accompany different organizational arrangements determines through actual or imputed prices, how the costs and benefits resulting from individual decisions will be allocated to decisions makers and others (1984, p.9).

Thus, under a structure of unambiguously defined, well-allocated, and strictly enforced private property rights, property owners internalize all effects emanating from property-allocation decisions and discern clearly the relationship between their welfare and property allocation. They, therefore, have a considerable incentive to engage in those activities that ensure the most efficient use of their property--to monitor and analyze property allocation decisions, to capitalize all ensuing effects into property values, and to ensure that the effects maximize those values. Any attenuation of private property-rights structures, such as those caused by high market transactions costs that preclude exclusive internalization of property-allocation effects and reduce the transferability of ownership rights, obscures the relationship between owner welfare and property usage, and reduces the behavioral incentives to ensure efficient property allocation. There is less incentive to monitor property-allocation decisions and to ensure that they are efficient and value maximizing; consequently, property is allocated less efficiently.

This inefficiency problem Hanke claims is best overcome through a restructuring of behavioral incentives that comes with a restructuring of property rights. Specifically, by restructuring rights so that the market transactions costs of internalizing property-allocation effects and of transferring property-ownership rights is reduced (thereby making such activities possible), property owners are provided with greater incentives to engage in those activities--monitoring and capitalizing

all effects into asset values--that ensure efficient property allocations.

Hanke cites empirical evidence from over 30 categories of "so-called" public infrastructure and services, including ports, streets, and urban transit, that suggests that private supply (the establishment of private property rights to infrastructure inputs) is more cost effective (i.e, efficient) than public supply (pp. 26-78). He asserts that, in addition to the theoretical support provided by the property-rights/transactions-costs paradigm, this evidence provides strong empirical support for a policy of infrastructure privatization. According to Hanke

> ...If our objective is to attain economic efficiency...we should not rely on market socialist reforms...without changing property rights arrangements and thereby the incentives faced by the public sector managers and employees, we cannot expect their behavior to approach that which would be consistent with maximizing the present value of the public enterprise's assets. If we desire to improve efficiency...we must adopt privatization policies. In particular, we (should) focus our attention on those privatization possibilities that concern the supply of so-called public infrastructure and services...(p. 13-14).

In traditional public finance literature, the presence of externalities is a principle theoretical justification for public provision of many types of infrastructure. Hanke diminishes the significance of this "alleged problem" by establishing a distinction between public and private supply and finance. Infrastructure may be privately or publicly supplied; furthermore, that supply, whether private or public, may be publicly or privately financed. Thus, any good or service, including those that create externalities, may be

privately supplied and publicly financed. Such an arrangement affords the superior efficiencies of private supply without the supplier having to bear the financial losses typically associated with the efficient provision of externality-emitting output. It enables consumers to reap a dual set of, otherwise, mutually exclusive benefits--the cost and other production efficiencies available as a result of private supply, and the optimal pricing and output available as a result of public finance. On the basis of this argument, Hanke advocates an infrastructure provision policy that combines private supply and public finance as the most efficient means of providing infrastructure. This policy has important and useful implications for the problem of public sector fiscal constraints on infrastructure provision processes. To the extent that private suppliers can be more efficient than public suppliers, the cost of such a policy to the public sector is lower than the cost of traditional policy, and, thereby, helps to relieve the problem of fiscally constrained infrastructure provision.

Hanke also takes issue with the traditional theoretical argument that increasing returns-to-scale is a justification for public provision of infrastructure. On the basis of work completed by Demsetz in 1968, Hanke argues that even in the case of natural monopolies, efficient resource allocations can be achieved, for instance, through competitive bidding for the private (exclusive and transferable) property rights to regional franchises. Competitive bidding can help to reduce the inefficiencies--high prices and low output--that can arise in natural monopolies; and the establishment of private property rights to the

inputs can help to reduce the inefficiencies that arise under public rights structures. Combined, they allow the consumers of infrastructure to enjoy the cost and output benefits of increasing returns-to-scale production.

We note that among property-rights analysts, Hanke originally represented an extreme. In their applications of the theory, few analysts have used it as the intellectual basis for a policy of the privatization of infrastructure and other facilities and services that have traditionally been provided by the public sector. Nevertheless, Hanke's application of the property rights theory is important because it does serves a principle theoretical basis for privatization policy.

Property Rights and Transportation Infrastructure Finance Policy

The theory of property rights has emerged in recent years as the intellectual basis of an alternative policy response to the failure of markets to allocate the resources required for the provision of transportation infrastructure efficiently. Accordingly, market efficiency requires that the ownership rights to the requisite resources be privately held. Analysts argue that the economic behavioral incentives created under private property-rights structures encourage the efficient allocation of the financial and other resources. Thus, if the financial resources required for the provision of transportation infrastructure are to be allocated efficiently, the property rights to them must be privately held. According to this perspective, the investment of private funds helps to ensure efficient market provision

of transportation infrastructure. Like the market failure theory, this perspective has weaknesses resulting from its implicit neglect of some of the realities of infrastructure provision, such as the political, legislative, social, etc. barriers to the establishment of private property rights to certain resources.

Critique

In the preceding discussion, we have shown that the theories of market failure and property rights are used by analysts to study the same empirically observed problem--the inefficiency with which markets allocate some resources--and to seek the same objective--an economically efficient allocation of productive resources. We have also shown that they serve as the intellectual basis of opposing policy approaches to the problem of economically inefficient market allocation of financial and other resources required in the provision of infrastructure. The theory of market failure serves as the basis of a policy of government finance of the provision of transportation infrastructure, and the theory of property rights provides the justification for a policy of private finance (establishing private property rights to the financial resources) of the provision of transportation infrastructure.

One point that does not clearly emerge from the theoretical discussion is that the decision to implement a policy solution to the problem of market failure is not made in a vacuum. The decision will always be influenced by the public finance policy context is which it is made; consequently, the decision to finance infrastructure publicly or privately, or some combination of both, will be influenced by various

economic, political, legislative, administrative, and institutional factors. For instance, one of our major conclusions is that the extent to which private (rather than public) funds are allocated to infrastructure projects will depend, in large part, on the distributional objectives and underlying principles of the public finance policy of the implementing body. This is because the theories of market failure and property rights and their respective policy resolutions are consistent with two very different distributional principles--the ability-to-pay and the benefit principle.

Under the benefit principle, individuals contribute to the costs of infrastructure on the basis of the benefits they receive from use of the facilities and services. Because they pay only for that infrastructure from which they benefit, and individual payments are tied directly to individual consumption, there are no cross-subsidy or income redistributional effects associated with the application of the benefit principle. Equity, in this context, is defined as paying for what you get. The benefit principle is the distributional principle underlying the use of private funds for infrastructure. Recall that we have defined private financing as financing through which costs are allocated on the basis of benefits received, or financing in which there are no cross-subsidy effects. Thus, private financing is not likely to be used in those public finance policy contexts oriented toward redistribution.

Under the ability-to-pay principle, individuals contribute to the costs of infrastructure on the basis of their ability-to-pay, which is, typically, defined in terms of income. The higher an individual's

income, the more that individual contributes to the cost of infrastructure; and the lower an individual's income, the less that individual contributes. The ability-to-pay principle is commonly used to achieve redistributional objectives. To the extent that higher-income individuals contribute more to the costs of infrastructure that is available to everyone, some of their income is, in effect, redistributed to lower-income groups. To the extent that the ability-to-pay principle and redistributional objectives strongly influence public-finance policy, the policy approach to market failure in the provision of infrastructure is likely to be that prescribed under the theory of market failure--government regulation and provision. In this context, infrastructure is more likely to be publicly financed. It is not likely to be privately financed because the underlying distributional principle--benefit principle--and its distributional effects are inconsistent with redistributional objectives. Thus, within the context of infrastructure finance, the policy prescribed under the theory of property rights--market provision upon establishment of private rights of ownership to financial resources--is most likely to be applied in those public finance policy contexts strongly influenced by the benefit principle of distributional equity, and not in those contexts strongly influenced by the ability-to-pay principle and redistributional objectives.

Distributional objectives and principles are not the only factors likely to influence which policy approach is adopted in infrastructure finance policy. On the basis of a comparative analysis of the use of

private funds for infrastructure in the United States and Sweden, we will support our argument that distributional objectives and underlying principles of public finance policy are important determining factors, and we will identify some other factors that shape the policy approach, as well.

CHAPTER 3

PRIVATE FINANCING OF TRANSPORTATION INFRASTRUCTURE IN THE UNITED STATES

Our aim in this chapter is to illustrate how private funds have been used to finance transportation infrastructure in the United States in recent years.[18] Ideally, we would couch such a discussion in the general institutional framework for providing infrastructure in the United States. That framework is, however, extremely heterogeneous, and little work has been done to systematize and document it. Moreover, to do so would constitute a thesis in itself. We have, therefore, opted to begin the discussion, instead, with a brief description of the general orientation of transportation infrastructure finance policy in the United States, as documented by federal and state government authorities and advisors of transportation policy. We will also briefly document some of the techniques by which private funds have been used to finance transportation services and facilities. In the second section of the chapter, we discuss three of the techniques--special-assessment financing, exactions, and development fees. Each has been used to allocate infrastructure costs on the basis of the benefit principle--strictly among beneficiaries. Finally, we conclude the chapter with an analysis of these techniques to assess the extent to which they do, in fact, constitute private finance and to identify some of the salient

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[18]A study of the role of the private sector in the provision of infrastructure can be approached from any number of perspectives. For an interesting study of shopping malls, see Frieden and Sagalyn (1989).

characteristics of their distributional effects, and economic, administrative, and legislative contexts.

The general orientation of U.S. transportation infrastructure finance policy has been documented in reports by government agencies and professional associations, including the United States Department of Transportation (USDOT, 1989), the American Association of State and Highway Transportation Officials (AASHTO, 1988, 1989) and the Advisory Committee of Highway Policy (1988). Policy statements and recommendations contained, therein, clearly reflect a trend toward greater private sector involvement in all aspects, including the finance of infrastructure provision.[19] In the 1988 AASHTO report, for instance, privatization, is included among the recommended "alternative responses" by which present and projected capital investment needs of the nations' transportation infrastructure systems can be financed (p. 44). AASHTO proposed that more contracting out of highway and transit maintenance and/or service operations, and, where possible, private ownership of such facilities and their operations could reduce existing fiscal constraints on highway and transit investments by shifting the costs from the public to the private sector.

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[19]Aschauer (1990) argues, conversely, that because of the importance of infrastructure to private capital accumulation, productivity, growth, and ultimately, national economic productivity, growth, and international competitiveness, government must increase its commitment to the provision of infrastructure. The recent downward trends in public expenditures on infrastructure has "...acted as a fiscal drag on economic activity." He partially attributes the "falling rate of profit" in the United States to inadequate public investment in public works facilities, including ports, highways, and airports. Aschauer calls, therefore, for a reorientation in public spending priorities ("restructuring of our fiscal priorities") with a greater emphasis on public works capital.

In a 1989 AASHTO report, private-sector participation is proposed as a means of lowering the public costs associated with the provision of each type of transportation infrastructure--aviation, highways, public transit, railroads, and water transport. Emphasis is placed on the increased use of "nontraditional" or private sources of finance (pp. 3-6). With regard to air transport facilities, for instance,

> AASHTO believes that a federal-state role that also provides an appropriate role for local and private participation, if properly coordinated to establish responsibility, will produce adequate funding sources to ensure needed system capacity (p. E-8).

With regard to rail transport facilities and service, AASHTO proposes that they remain under the private ownership structures that have been established in recent years as a result of structural changes that have occurred in the rail industry (p. 4-2), and that "Whenever possible, private investments should be used to help finance these facilities" (p. 4-7).

A 1989 USDOT report which focuses on the most important issues and concerns that shape the framework for the development of a national transportation policy, reflects the evolution towards greater private sector participation in the provision of transportation. The following issues are raised, for instance.

> How should the financing responsibility be allocated among federal, state, and local government, and the private sector? How should public costs be allocated among users? And to what extent could innovative financing techniques, including developer fees, contribute? How can government policies encourage the introduction of privately-funded, low-density service to rural areas? Are there any impediments imposed on private carriers by government regulation or policies that contribute to excess costs or otherwise hinder viable (private) service? Do tax or other policies encourage (private sector) abandonment of

> rural transportation operations that might otherwise prove beneficial or cost-effective? How can we encourage entrepreneurs to form short lines where needed rail lines might otherwise be abandoned? (p. 29)

The report concludes,

> Among the factors to be considered (in the formation of infrastructure finance policy is)...the extent to which the private sector can bear the costs of transportation improvements. (p. 33)

In addition to statements made and issues raised in documents authored by government authorities and advisors on U.S. transportation policy, the trend toward greater private sector participation in the financing of transportation infrastructure is also reflected in recent innovations in financing sources and methods (United States Department of Transportation [USDOT], 10/1983; 1/1984). For instance, private companies have increased their participation in financing of transport facilities and services. Private companies are now designing, constructing, operating, maintaining, and most significantly, owning roads and bridges, which they are allowed to finance through the assessment of toll fees (Allen, 1989, pp. 158-159). Contracting out various aspects of the transportation provision process is not new. Activities, such as road and bridge construction, have been contracted out to private firms for many years, but in recent years the use of private contractors has been expanded to activities such as road and bridge maintenance and repairs (Bendick, 1984, p. 153; Allen, 1989, pp. 139-152) and transit operations (USDOT, 1984, pp. R-1 through R-3; Conant and Easton, 1987, pp. 43). There are numerous other ways in which the financial resources of private companies have been tapped for

transportation expenditures, including leases and sales of public real estate and air development rights (Paris, 1983; Vogt and Cole, 1983, pp.2, 22; Henton and Waldhorn, 1983, pp. 192-194; Schnidman and Roberts, 1985, pp.163-186; Rice Center, 1985, pp. 189-197), and donations (USDOT, 1982, pp. O-1). It has also been suggested that the privatization of the financing of transportation infrastructure could be accomplished through public assumption of financing principles, guidelines, etc. that dictate private corporate finance policy (Humplick, Livneh, and Moavenzadeh, 1990, p. 30).

In addition to the increased use of private corporate financial resources, increased private participation in the financing of transportation is also reflected in recent changes in the distributional principles underlying public finance policy. Increasingly, private individual users of transport infrastructure are having to pay the full economic cost of the services and facilities from which they benefit. Beneficiary financing--developer exactions, development (impact, user, and other) fees, and special-assessment financing--through which infrastructure costs are allocated exclusively and proportionately among beneficiaries has increased in the United States. Our focus in this study is limited to financing according to the benefit principle, rather than financing defined in terms of the capital structure of the financing entity; therefore, the discussion in this chapter is limited to financing techniques by which costs are

allocated on the basis of the distribution of benefits--developer exactions, development fees, and special-assessment financing.[20]

Developer Exactions

Developer exactions (exactions) are "in-kind" contributions to infrastructure systems--facilities that private developers finance, construct, and dedicate (donate) to local government. They are viewed as a means by which private developers finance infrastructure from which they benefit; they are intended to ensure that private developers finance facilities required to serve their development projects, that new development imparts a minimal impact on existing infrastructure systems, and that the costs of infrastructure improvements required to serve areas of new growth and development do not impart an excessive financial burden on the users of established users of the costs of facilities required to serve new infrastructure systems. The consensus on the definition of exactions is weak. In some contexts, the term refers to all developer contributions to infrastructure--in-kind and monetary; in other instances, it refers to all contributions that are negotiated or imposed as a condition of development. In this context, they refer to in-kind contributions (physical facilities) that are negotiated or imposed as a condition of development.

Exactions are closely linked to land-use control and development regulatory processes. Generally, they are determined on the basis of

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[20]Unless otherwise indicated, the information presented in this chapter is based on discussions in Porter and Peiser (1984), Snyder and Stegman (1986), and Porter, Lin, and Peiser (1987).

environmental impact assessments that are undertaken when a new development project is proposed. They may be negotiated or imposed as a condition of development approvals--i.e, building permits and rezoning authorizations--sought by private developers. Although they may be required at any point in the development process, they are, typically, requested at the time of subdivision and annexation approval--those points at which cities exercise the greatest control over development activity.

Traditionally, exactions are determined in accordance with well-established, formally legislated standards that are clearly described in local ordinances or in informal guidelines used by planning and public works staff. Such exactions have been limited to highly localized facilities, such as on-site and site-access facilities. In recent years, however, exactions have evolved to include general facilities--large-scale, off-site facilities that confer benefits over very large populations. Such exactions are usually "negotiated" on a case-by-case basis, in accordance with the needs, capabilities, limitations, etc. of the developer and public authorities involved. There is a reluctance to formalize negotiated exactions because of questions regarding their legality, and the public sector's desire to keep the exactions' negotiations process open and flexible.[21] Consequently, there are few generally recognized guidelines in the use of negotiated exactions. One

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[21]Because exactions must be reasonably related to the infrastructure needs created by their contributor, there are questions regarding the legality of exactions of facilities that confer general benefits. The concern is that such exactions constitute a prohibited use of contract, or conditional, zoning.

such guideline is that those local governments that have been granted, by the state through zoning and subdivision enabling legislation, the power to regulate land use and control development implicitly have the authority to require exactions. In many states, enabling legislation explicitly authorizes exactions of certain infrastructure necessary to protect public health and safety. In other states, enabling legislation grants only general powers to restrict land use in order to protect public health and safety, and implicitly the power to require exactions.

The principle legal standard for legitimate use of negotiated exactions is "reasonableness under due process". Accordingly, negotiated exactions of infrastructure is legal as long as they bear a "reasonable" relationship to the infrastructure needs created by their contributor. (American Law Institute, 1985, p. 484) In recent years, the specific criteria for determining reasonable relationships and, thereby, the legitimate use of exactions is the concept of rational nexus. Under rational nexus, exactions are legal as long as they reflect the benefits received by their contributor. Accordingly, infrastructure users, including private developers, can be charged the full cost of facilities that serve their projects exclusively and a pro rata share of the costs of facilities that serve their projects and other development. Courts in all states, therefore, have upheld exactions of local facilities; they have been less consistent in upholding exactions of facilities that confer general benefits. Essentially, under rational nexus, exactions may be required of all beneficiaries of infrastructure in proportion to the level of benefits

they receive from the facilities, be they on-site or off-site, large-scale or small-scale, or whether they confer special or general benefits. What is important to emphasize about rational nexus is that its strict application implies no cost-sharing or cross-subsidy of infrastructure costs. We illustrate the use of developer exactions in the following four examples.

First, in the city of Simi Valley, California, the developers of Wood Ranch--a 3,900-unit residential complex located on 3,000 acres of land--have been required to provide $2.5 million worth of exactions as a condition of development approvals. Under the terms specified in a "development agreement", the developers must provide the following: a 4.5 mile section of an eight-lane highway, a school, fire station, dam, 40 acres of improved park land, a central communications system and patrol vehicle for the police department, and funds for improvements in the city hall. By committing to the exactions, the developers gained greater assurance that their project will be executed with minimal delays and other impediments that could arise in the development-approval process. The commitment also provided them with a certain amount of vested rights to complete their project without fear of changes in policies and regulations. (Porter and Peiser, 1984, p. 10)

The second example is located in Fairfax County, Virginia, where as a condition for requested changes in zoning regulations (from residential to commercial) that would enable the construction of the Fairview Park office community, two private developers--Cadillac Fairview, Ltd. and Costain--were required to design and construct a $20

million cloverleaf interchange at the nearby intersection of an interstate and state highway. The exaction was deemed necessary in order to accommodate the anticipated increases in traffic generated by the proposed development project. Additional exactions included all of the project's on-site infrastructure. (Cadillac-Fairview, 1984; USDOT, 1984, p. B-2 through B-3)

In a third example, also located in Fairfax County, Tyson Developers sought changes in zoning regulations for a proposed construction of a $100 million office complex. The changes were granted subject to the developers finance and construction of a $3 million 4-lane bridge deemed necessary by the local government authorities to relieve the traffic congestion expected to be generated by their development (USDOT, 1984, p. B-2).

The final example, located in New York City, involves a private development group--Lincoln West Associates--that requested the rezoning of a piece of Manhattan real estate to enable their construction of residential/commercial complex, which they would own and operate. Analysts who conducted an environmental impact study found that the proposed project would increase traffic through a nearby subway station to a level exceeding its current capacity. In exchange for the requested rezoning approvals, the developers were required to provide a $100 million "amenity package" of exactions of which $31.5 million went toward the renovation of the subway station. The developer's contribution constituted half of the expected renovation cost. (USDOT, 1984, pp. B-2 through B-2).

Negotiated exactions have been subject to a number of serious criticisms that have led to their decreased use in recent years. One of the most damaging criticisms is that they are too closely related to the very specific needs of new development and not responsive enough to the needs of general development processes. This is particularly true of exactions of general facilities. Dictated by the needs of new development, such facilities are not located in those areas or provided at those times best suited to the needs of general development. Furthermore, as local governments increasingly seek to hold private developers responsible for infrastructure that for financial and legal reasons clearly cannot be dedicated, such as very large-scale, off-site facilities that confer general benefits over very large populations, exactions have become difficult to require. Legal, financial, practical, and political obstacles to the use of exactions have led to an increasing use in development fees, instead.

Development Fees

Development fees are monetary contributions to the costs of infrastructure that, like exactions, private developers are required to make to the provision of infrastructure from which they benefit to ensure new development imparts minimal effect on existing infrastructure systems and to minimize the financial burden of infrastructure improvements needed to serve new development on existing facility users. Like exactions, they are linked to land-use control and development regulation processes, generally through environmental impact assessments. They can be collected at any point during the development

process--rezoning requests, subdivision approval, request for special or conditional use permits, or initial use of infrastructure facilities. In contrast to exactions, development fees can be used more easily to finance facilities required for general development processes. Not only are they useful in tapping private funds for facilities that confer premium or special benefits to meet the particular needs of development in peculiar locations or of peculiar character or both, but they are useful in tapping private funds for facilities that confer general benefits. Furthermore, unlike negotiated exactions, development fees are institutionalized and subject to limited negotiation. As a rule, they cannot be used to correct existing deficiencies in infrastructure systems; general revenues must be used to upgrade deficiencies.

There are many types of development fees including impact fees, infrastructure fees, system development charges, capital facility fees, building occupancy taxes, and connection fees. They vary considerably in terms of, for instance, the stage in the development process at which they are collected, the types of facilities they are used to finance, the methods by which they are designed, calculated, collected, and coordinated with land-use and capital-budgeting processes, and their underlying legislation. Development fees can, for instance, be enacted as taxes or regulations. Whether they are enacted as one or the other determines their underlying power and, therefore, the legal limitations and restrictions on their use.[22] In most states, development fees are

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[22]When development fees are adopted as taxes, they are used to allocate costs uniformly, not on the basis of benefits received; therefore, development fees do not constitute a form of private financing when enacted as taxes. Appendix 3 contains a brief discussion of development fees as taxes.

adopted as regulations, in which case, like exactions, they constitute a legitimate use of the established regulatory powers granted in state-enabling legislation authorizing local government to control land use and development. A few state legislatures have determined that the general regulatory powers implicit in local government land-use controls and development regulations are not adequate to legitimize the use of development fees. In these states, explicit enabling legislation has been adopted.

To be legitimate as regulations, development fees must comply with rational nexus. Accordingly, fees adopted as regulations (1) must be used to the exclusive benefit of those who pay them (the use of fee revenue must be limited to financing infrastructure that benefits those who pay the fees); (2) must be set so that each beneficiary pays only for that share of infrastructure from which s/he benefits; and (3) must be separated from general government revenues and earmarked for dispersal. Thus, exclusive beneficiaries of infrastructure may be required to pay fees sufficient to finance entire facility costs, and if a facility serves more than one beneficiary, the local government can require each beneficiary to pay fees that reflect the proportion of benefits received from use of the facility. Consequently, recent use of development fees, like exactions, has limited cross-subsidy effects; users of infrastructure pay for the benefits they receive. Other guidelines for the application of development fees include the requirement that they be based on reasonable planning and spending programs and be coordinated with comprehensive plans and capital facility plans.

The chief difficulty with development fees is their dependence on the development process and their consequent revenue uncertainty. This facilitates fee enforcement; when fees are not paid, the rights to develop, build, or occupy a structure can be denied. The problem, however, is that to the extent that development does not occur, fees are not collected. This can be particularly problematic when facilities are built prior to the time at which they are needed and on the expectation that fees, collected as the development occurs, can be used to service the debt or, otherwise, pay facility costs.

The establishment of fees systems for large transportation projects is very complicated because of the difficulty in measuring usage and because, frequently, much of the need for such facilities, such as highway and arterial roads, is generated in areas beyond the boundaries of the fee-administering jurisdiction. Generally, the process of instituting fee systems for roads involves the following: (1) the determination of the geographic area over which the fees are to be imposed; (2) the determination of the anticipated traffic impact of various land uses within the area, and the costs of any consequently anticipated road improvements; and (3) the distribution of the costs among different land uses on the basis of their respective contributions to the need for improvements (Snyder and Stegman, 1983, p. 81).

In Broward County, Florida, a traffic impact model is used to determine highway fees for large development projects. The process begins with an adequacy review of the regional transport network and local and major road access. A transportation allocation plan (TRIPS)

is used to allocate auto journeys originating and ending in development projects to destinations and origins (respectively) in the county road network. The requisite service levels for each link in the network and the costs of any necessary upgrading (to the desired Institute of Transportation Engineers [ITE] standard) are calculated. If a proposed project does not reduce road service levels (perhaps because of preexisting excess capacity) below the established minimum ITE standard, its developer is not required to pay fees. If a project is expected to reduce road service level below standard, its developer must pay fees sufficient to elevate service to the desired standard. Fees are determined separately for each new development project and are based on actual road conditions at the time the project is proposed. Essentially, this procedure allocates road costs on the basis of case-by-case determination of road requirements occasioned by the location and/or character of proposed development projects.

The fee revenues are earmarked for specific facility improvements in specific areas, preceded by planning, reasonably related to services received by their payer, and are intended to constitute a fair share of service costs. They are adjusted annually according to the price deflator for the gross national product for the previous twelve months. Road impact fees for residential development have ranged from $40 to $832 per residential unit, $5000 to 25,000 per acre of commercial property, and from $400 to $2,000 per acre for industrial development. Rather than pay the fees, some developers construct the required facilities themselves, the expense of which is credited against their

fee liability. The Broward County system has been criticized for its unfair treatment of developers; those that use excess road capacity pay no fees, and the marginal developers whose projects cause road needs to exceed existing capacity pay fees to cover not only the costs of capacity required to serve their projects, but implicitly, the costs of earlier developers' use of excess facility capacity.[23]

In Palm Beach, Florida, a very different approach is taken in the administration of road fees. Unlike the Broward County system, which is based on case-by-case analysis of roads requirements of each proposed development project, the Palm Beach system is based entirely on county averages of road needs, trip lengths, and construction costs. No account is taken of differences occasioned by the location or character of development. Road fees for new residential development, for instance, are based on the number of housing units in the development. The fee per housing unit is based on (1) the average number of trips per day originating and ending at a housing unit in the county; (2) one-half the average length of auto trips in the county;[24] (3) the lane-miles of roads needed to handle the half-trip, based on the average daily

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[23]The chief problem with the Broward County road fee system is that it allows new development to use excess road capacity without paying for it. This constitutes an unpaid opportunity cost. Furthermore, making the marginal development project--the project whose road needs depress service levels below the desired minimum--be solely financially responsible for making the improvements necessary to bring roads back up to standard is unfair. Because earlier development also contributes to the reduction in service levels, strict application of the benefit principle calls for such a development to bear some of the financial responsibility, as well, for elevating them.

[24]The other half is allocated to the developer of the destination project.

capacity of a two-lane road at ITE service level C (the county's minimum service level standard); and (4) the average cost of building a lane-mile of road. The product of these variables is adjusted for intergovernmental highway aid, and the resulting fee is applied uniformly to all new residential housing units in the county, irrespective of the county-wide cost differences in meeting highway needs. The Palm Beach system has been criticized for excessive uniformity and poor land use and planning.

In the Broward County and Palm Beach cases, development fees are administered on a county-wide basis. The chief justification for this is the large amount of intercity travel and the consequent need to finance roadways with funds from outside city limits.

In some cities, development fees are administered through a system of small zones into which the city is divided. This allows infrastructure cost differences to be identified and allocated more in line with the incidence of benefits. The key characteristic of a zonally based development fee system is the division of the geographic area over which the fees are to be imposed (typically a city) into service zones. This enables fees to vary with infrastructure costs in different parts of the city, and it also makes it easier to satisfy the legal requirement that fees be used to the exclusive benefit of those who pay them. There is no consensus on precisely how large the zones should be, but it is generally acknowledged that they should be correlated with the size of the geographic area over which the benefits from the infrastructure being financed are conferred. Therefore, large

zones should be used for highways and arterial roads; small zones should be used for collector roads.

When cities use zonally based fee systems, city planning officials, typically, make projections of future development and estimate the number of vehicle trips likely to be generated. Transportation models are used to assign the trips to parts of the road system and to identify the improvements necessary to bring those parts of the system that are depressed by the needs of new development up to the desired service level standard. Finally, the costs of the necessary improvements are allocated among anticipated development within the zone. The entire process is conducted for each zone so that the resulting fee system reflects the different roadway needs and costs in different parts of the city. Because this system of development fees allocates road costs among all new development (rather than just the marginal development), it does not suffer from the opportunity cost problem that characterizes the Broward County system. Because it is based on land-use planning data and projections of actual road needs and costs (rather than county averages), it does not suffer from the problem of indiscriminate and extreme uniformity that characterizes the Palm Beach system.

In the city of Fresno, California a zonal fee system is used to finance all on-site and off-site infrastructure improvements inside the city's growth management boundary--a boundary extending from zero to four miles outside of the city core inside of which has been designated the preferred location for future development. New development pays for

infrastructure inside the boundary (either directly or indirectly) through an elaborate zonally based differential fee system. For each proposed development project, the city's planning officials conduct a service delivery review to determine the adequacy of infrastructure systems and to determine what facility improvements will be needed. Fee revenues are used to finance, among other facilities, roads, bridges, overpasses, railroad crossings, traffic signals.

Fresno is divided into urban growth-management zones for each type of fee-financed facility. The number of zones and their boundaries vary with the facility. Fees for each type of facilities vary with the zone and with the land use within each zone. Only new development pays fees; existing development pays no fees even if it benefits from fee-financed improvements. Thus, new development is financially responsible for the costs of all infrastructure improvements required to serve it, even if the facilities also benefit established development. In each zone, a base fee, based on improvement costs per acre of undeveloped land, is calculated for each type of facility. The first developers in a zone pay 2.5 times the base rate. When the total improvement costs are collected, the fees are reduced to the base rate. The fee revenue collected from subsequent developers is used to reimburse the early developers who paid the accelerated rates. Fees are usually collected at the time of subdivision mapping. They are statutorily fixed--established by ordinance as part of the city's growth management system--and subject to limited negotiation.

Proponents of the use of developer exactions and development fees assert that they constitute convenient methods of solving the urgent fiscal, economic, political, and practical realities of infrastructure provision processes in the United States (Snyder and Stegman, 1986, pp. 6). Critics, on the other hand, call them unfair. According to Weitz (1984, p.12), exactions and development fees are unfair because they result in a double payment problem for the users of new and/or improved infrastructure; such users pay the same taxes as users of established facilities and, therefore, are entitled to the same facilities without having to pay extra fees. They have also been called unfair because of their effects on real estate prices. In the Simi Valley, California, Wood Ranch residential complex, for example, developer exactions were estimated to have contributed $6000 to the average price of a housing unit. Exactions and development fees have also been criticized as constituting government shirking of its social and economic responsibilities; what begins as an incremental response to fiscal problems, it has been argued, that can too easily evolve into an entire financial system (Snyder and Stegman, 1986, pp.6).

Other serious criticisms of the recent use of exactions and development fees are directed, specifically, at the legal principle of rational nexus. Criticisms of rational nexus include (1) because there is no sharing of costs under rational nexus, it constitutes an extreme interpretation of the benefit principle of distributional equity, (2) the earmarking it necessitates reduces local government flexibility in its ability to respond to infrastructure needs, (3) it implicitly places

the benefit principle of equity above other distributional principles, such as the ability-to-pay and other considerations, such as an equitable distribution of resources (income) across populations.

These and other problems with exactions and development fees have imposed limitations on their use. They are not very commonly used; they are used more frequently at the local level and less frequently at the state level. Moreover, their use is not standardized. Many factors influence their application, such as, project size, public image, location, and type, the communities and private developers (commercial or manufacturing) involved. The examples provided in the preceding discussion were meant to be illustrative, not wholly representative, of their use. In the following section, we present another form of private finance for infrastructure--special-assessment financing.

Special-Assessment Financing

Special-assessment financing is based on the principle that there should be no sharing of the costs of infrastructure that confers special benefits--benefits that are local or premium. Technically, the legal definition of special benefits are benefits that increase property values. The practical difficulty of making this definition operational (almost all infrastructure improvements increase property values) has led the courts to develop two other more applicable criteria for determination of when infrastructure confers special benefits and is, therefore, eligible for special-assessment financing. Accordingly, special benefits are benefits that are (1) localized and accrue to only a few properties, and that (2) accrue to some properties at higher

levels than to the general public. Thus, localized benefits and premium service levels serve as the chief criterion for determination of legitimate use of special-assessment financing. Those who incur such benefits, and not the general public, should be required to pay the associated costs. The basic idea is that "...the general public should not be required to pay for the special benefits for the few, and the few specially benefited should not be subsidized by the general public" (Kirlin, 1983, p. 18).

The institutional arrangement through which special-assessment financing is accomplished is the special-assessment district, which is, traditionally, a dependent, limited-purpose governmental entity that must rely on other governmental bodies for its financial management and is used to service the debt administration. Its physical boundaries are established to coincide with the geographic area over which the special benefits emanating from a particular infrastructure facility or service are conferred. Owners of properties located therein are assessed up to the full costs of the infrastructure, each in proportion to the level of benefits received.

Typically, the investment costs of the infrastructure are financed out of the proceeds of a public bond issue by the governmental body responsible for district financial management and administration. Assessments may be collected from district property owners on a onetime or periodic basis. They must be earmarked, they serve as security for the bonds, and they are used to service the district's debt. Special-assessment districts have been used to finance the construction,

maintenance, and operation of all sorts of transportation facilities including highways, streets, bridges, tunnels, air transport facilities, water facilities (harbors, ferries, canals, terminals), and transit facilities, services, vehicles and other equipment.

In downtown Denver, Colorado, specially built vehicles provide shuttle services along a 14-block "transit mall" lined with retail, office, and residential development. Investment and maintenance of the mall is financed through a "Transit Mall Maintenance District." District property owners are assessed the mall's investment and maintenance costs. The assessment formula is based on the assumption that the mall has increased (benefited) district property values by an average of seven percent and that the benefits decrease proportionately with distance from the mall. To allocate the costs of the benefits, the district has been divided into four zones, each of which has been allocated a portion of the property value increase. The first zone, which includes properties located within 100 feet of the mall, has been allocated fifty percent of the total benefit; properties located within the second 100 feet have been allocated twenty-five percent of the total benefit; the third 100-foot zone has been allocated fifteen percent of the total benefit; and the fourth 100-foot zone has been apportioned ten percent of the total benefit. The assessment formula is intended to allocate among district property owners the costs of the special benefits they reap as a result of the transit mall (USDOT, 1982, pp. A-1 through A-2).

The legal definition of special benefits imposes severe limitations on the use of special assessments to finance infrastructure. Legally, only facilities that confer localized (or premium) benefits can be financed; facilities that confer general benefits or benefits over entire communities, cities or regions cannot, in general, be financed through the traditional special-assessment arrangements. Thus, traditional special-assessment financing is of limited use for financing the needs of general or large-scale, off-site facilities. In recent years, there has been some increased latitude in the law governing the use of special-assessment financing so that, relative to its' historical use, it can be used to finance a broader range of infrastructure services and facilities.

For instance, traditionally, infrastructure's special benefits have been measured and allocated among district properties on the basis of the front-footage of property abutting the facility, the proportion of property acreage adjacent to the facility, or the proportion of square footage of building space located in the vicinity of the facility. Thus, only properties that abut, are adjacent to, or are in the vicinity of the facility have, historically, been designated beneficiaries and assessed facility costs.

In recent years, however, the traditional benefit measurement-cost allocation procedures have given way to new procedures that reflect an increasing legal tolerance for their discretionary use as long as the resulting assessments are "reasonably related" to the special benefits conferred upon the assessed properties. Moreover, there has been

greater legal tolerance for the assessment of property that does not abut, or is not adjacent to, or in the vicinity of the facility for which a district has been established to finance; more and more, property that receives only indirect benefits from infrastructure may be assessed a portion of its costs. Despite changes such as these, special-assessment financing remains of limited use in allocating private funds to infrastructure projects. Nevertheless, they remain of limited use in tapping private funds for infrastructure.

Attempts to broaden the utility of assessment financing to include facilities that confer general benefits has led to the creation of two other institutional arrangements--combined use of the traditional special-assessment district and developer exactions and independent special districts--which circumvent the legal restrictions on traditional special-assessments financing and which are used to allocate the costs of general facilities proportionately among their beneficiaries.

Traditional Special-Assessment Districts and Developer Exactions

The combined use of the traditional special-assessment district and developer exactions has enabled a broader use of assessment financing than has occurred historically. As exactions have involved over the years from facilities and services that "directly and exclusively" benefit their contributor (on-site and other highly localized facilities), to include facilities that only indirectly benefit their contributor and/or confer benefits to a general population

(large-scale, off-site facilities), developers have sought ways to reduce exactions' costs. One of the ways in which they have been able to do this is through the establishment of special-assessment districts. Facilities financed through special-assessment districts are eligible for tax-exempt financing, and developers have increasingly initiated district establishment in order to gain access to cheaper funds to finance the exactions required of them. Once formed, the district (or the governmental body responsible for its financial administration) issues tax-exempt debt and lends the proceeds to the developer (at interest rates lower than those offered in private money markets) who invests the funds in exactions. District debt is retired through assessments collected from district property owners. The expense of district establishment has meant that their use as a means of defraying exactions' costs tends to be limited to large development projects that create the need for large-scale, off-site, general facilities.

The special-assessment districts that have been used to lower the cost of exactions range from the traditional, financially and administratively dependent, limited-scope district to nearly the independent district that retain management control, maintenance, and capital financing responsibilities for several types of infrastructure after construction and dedication. There are special-improvement districts, general-improvement districts, limited-improvement districts, maintenance districts, recreational-facility districts, community-facility districts, building-authority districts, and redevelopment

districts, and parking districts. Their names reflect variables such as financing functions, legislative frameworks, and regional location.

With this broadened application of special-assessment finance, five new benefit-assessment and cost-allocation procedures have evolved: acreage fees, land-value charges, property taxes, development fees and connection charges. Under acreage-fee procedures, property owners are assessed costs on the basis of the amount of acreage they own in the district. Land-value charges are assessments made on the basis of annual changes in district property land values. Under the property-tax procedures, assessments are made on the basis of annual changes in the value of real property. Development fees and connection charges are used to allocate costs among district properties as development occurs and benefits from (connects to) preexisting infrastructure with built-in excess capacity. The procedures reflect the growing need to assess infrastructure costs from district properties that benefit from, but that do not abut, or are not adjacent to or in the vicinity of the district-financed facilities. The traditional methods--front-footage, square acreage, and square footage procedures--are, more accurately, measures of the costs of facility provision and have increasingly given way to the new procedures, which better reflect the distribution of benefits from infrastructure.

One example of the combined use of exactions and special-assessment districts is the Briargate development located near Colorado Springs, Colorado. The developers of Briargate--a 9,100-acre, mixed-use development--negotiated an annexation agreement that required them to

dedicate a multimillion dollar highway interchange, arterial road improvements, all roads and utilities within the development, as well as 250 acres for school sites and up to 10 more acres for two fire stations and one police station. The facilities valued at between $60 and 65 million were financed through a special-assessment district called a "building authority". Colorado building authorities are authorized by state statute upon city approval. They have no taxing power, but can levy development fees and other user charges to pay for infrastructure. The proceeds from tax-exempt revenue bonds guaranteed by the assessments were used to finance the exactions. Once completed, the facilities were placed under public ownership and control. (Snyder and Stegman, 1986, p. 65.)

Because from a strictly legal perspective, special-assessment financing is limited to facilities that confer special benefits, and because there is some question regarding the legality of exactions of facilities that confer general benefits, the combined use of special-assessment districts and exactions is legally questionable. In many instances, it is not clear if the arrangement would be upheld in court. Nevertheless, it tends to go unchallenged because it enables developers (the likely litigants) to lower the costs of exactions required to support their development activities. In general, as long as the costs of providing the exactions through special- assessment districts is less than the costs of project cancellations, delays or litigation, the use of special-assessment districts to finance exactions of general infrastructure facilities will likely remain unchallenged. Independent

special districts, described in the following section, are another institutional arrangement by which the legal limitations on the use of the traditional special-assessment district have been circumvented in recent years.

Independent Special Districts

Independent special districts constitute another institutional arrangement by which legal limitations restricting traditional special-assessment financing to infrastructure that confers special benefits are circumvented, thus enabling the use of assessment revenues to finance facilities that confer general benefits. Their chief distinguishing feature is their autonomy. Financially autonomous, they are, typically, authorized to manage their own capital and operating budgets, levy taxes, calculate and collect assessments, and issue and service debt, and they are not subject to statutory limits on local government debt. They are also generally administratively autonomous. Established on the basis of state, regional, or local government approval, they are self-governing by an appointed or popularly elected body that represents infrastructure users in up to several general-purpose--i.e., city and county--government jurisdictions. Furthermore, independent special districts often retain management and operational control over the facilities for which they are established to finance. Finally, independent special districts are politically and institutionally autonomous; they are distinct and separate from general-purpose government.

A second distinguishing characteristic of independent special districts is that because they are not subordinate to other levels of government, they are not legally restricted to financing infrastructure that confers special benefits. So they are frequently used to finance facilities that confer general benefits, e.g., airports, highways, mass transit, and water transport facilities.

A third distinguishing characteristic is that the costs of facilities that they are established to finance are generally allocated among district properties uniformly, irrespective of the incidence of benefits. Taxes, fees, user charges, and other methods that distribute costs uniformly are the sources of independent special district revenues. Thus, in general, independent special districts have not been used to finance infrastructure privately. Traditionally, they are just another institutional arrangement by which infrastructure is publicly financed.

In recent years, however, some independent special districts have assumed features that typically characterize the traditional special-assessment district. District boundaries are established so as to isolate geographically the beneficiaries of infrastructure and to assess them facility costs in accordance to the benefits they receive. Because independent special districts are not restricted from financing infrastructure that confers general benefits, their modified use has enabled such facilities to be financed with private funds.

According to Porter, Lin, and Peiser (1987, p. 25), in New Jersey, counties may establish Transportation Development Districts

(TDDs) to finance transportation needs of high-growth areas. They allow county assessment of fees on private development to help pay for highways and mass transit improvements made necessary by new development. Counties seeking the establishment of TDDs must submit an application to the state commissioner of transportation. The application must include proposed boundaries, evidence of growth conditions, description of transportation needs and available resources, certification of up-to-date master plan, and proof that the proposed district will conform to that and state transportation plans. Subsequently, a planning session, which includes state, county, municipal government agencies, and interested private parties, is conducted to prepare a draft TDD proposal. The proposal is to include, among other things, goals for transport facilities in the county(ies) and a program of the projects to be financed through the district. Following a public hearing, the affected county(ies) adopt, by ordinance or resolution, the district transportation improvement plan which is, then, submitted to the state commissioner for final approval. A development fee ordinance may also be enacted to assess impact fees, establish the TDD trust fund (from which all district expenditures must be expropriated), and establish a date before which developments are exempt from fees. The annual development fee can take the form of vehicle trip fee, square footage of development fee, employee fee, or a parking space fee. Essentially, the TDD is a tax-assessing district through which revenue bonds are issued to finance transportation projects. Fee revenues are used to retire the revenue bonds used to

finance the improvements. TDDs are dependent on the counties that create them. Each TDD funded project is subject to agreement among all affected state, county, and other parties.

Special-assessment financing has important advantages over traditional public finance, including price and consumption efficiencies, and the insulation of infrastructure finance decisions from the capital-budgeting process. It also, however, has been subject to criticisms that have precluded its more expansive use to finance infrastructure, including lack of political accountability to constituency populations, lack of effective coordination among districts and between districts and other governmental bodies, and the problems of assessment, formal determination of responsibility, and allocation of responsibility of district administration.

Analysis

In this final section of the chapter, we analyze exactions, development fees, and special-assessment financing, in terms of the extent to which they constitute private finance, and we identify some of their salient distributional effects, and characteristics of their economic contexts, legislative framework, and administrative features.

For the purpose of this study, we have specified the definition of private finance to be finance by which costs are allocated on the basis of the benefit principle, and in which there is no sharing or cross-subsidization of costs. In this context, exactions, development fees, and special-assessment, constitute forms of private finance. The finance principle establishing legitimate use of exactions and

development fees is "reasonableness under due process," or rational nexus--there must be a rational nexus between the exaction or fee and infrastructure needs created by the contributor. The finance principle establishing legitimate use of special-assessment districts is special benefits--localized or premium benefits. Theoretically, adherence to either of these two financing principles results in infrastructure costs being allocated exclusively among beneficiaries and in accordance to the quality and quantity of benefits received. The chief difference between the principles is in the scope of the type of facilities for which they enable private financing; reasonableness under due process, or, more specifically, rational nexus, enables private funds to be used for any, including general, infrastructure services and facilities, and the special benefit principle limits private financing to local facilities.

The degree to which either finance principle is adhered to determines the extent to which the applications constitute private finance. Based on our observations, few, if any, infrastructure projects are privately financed in the strict sense. In each of the cases we observed, there are public finance or cross-subsidy effects. For instance, in those cases in which private developers have financed the entire costs of facilities that serve general populations (the Fresno fee system and the Fairfax County case in which private developers financed the full cost of a state and interstate highway

interchanges), there is a public finance component.[25] Moreover, the public finance component varies among cases. The financing arrangements of the Fresno development fee system, in which fees vary across small zones to reflect infrastructure cost differences occasioned by the location and character of different development projects and result in fees that closely reflect the distribution of infrastructure benefits, is more private than the Broward County fee system. The Broward County system, in which marginal developers pay the full costs of upgrading highways that earlier development benefits from (they, too, contribute to the depression of highway service below the desired service level standard, but pay nothing for the benefits they receive) is more private than the Palm Beach system through which costs are allocated on the basis of county-wide averages and which, therefore, allocate costs relatively uniformly.

To the extent that exactions, development fees, and special-assessments, do allow infrastructure to be privately financed, costs to be allocated strictly on the basis of the distribution of benefits, and cross-subsidy effects to be minimal, they have limited redistributional effects; those who have the requisite funds may benefit from the quantity and quality of infrastructure of their choice, and those who do not, cannot. Therefore, to the extent that the techniques do establish private finance, they reinforce and perhaps exacerbate existing economic

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[25]The public component is derived from the fact that because the developers are not the only beneficiaries of the improvements, and, nevertheless, pay the entire costs of the improvement, they are, thereby, subsidizing the costs of highway benefits received by the general population of motorists who will benefit from the improvements.

inequalities; this they do to the extent that they result in the allocation of private financial resources to and, thereby, strengthening of infrastructure support systems used in those areas and by those populations characterized by relative economic strength. This observation, that private financing of infrastructure results in more and/or better services and facilities for higher-income users (individuals, regions, households, firms, etc.) is supported by the examples provided in the earlier parts of the chapter. Private financial and other resources were allocated to projects in areas such as Manhattan Island in New York City, New York; Fairfax County, Virginia; and Fresno, California, all of which are areas that can be characterized as relatively high-income and economically strong. They are all areas in which the infrastructure user populations are relatively more capable of supporting the financing principle upon which private finance is based (the benefit principle), and, in which, consequently, the return to private resources is likely to be greatest.

An analysis of the economic context within which exactions, development fees, and special-assessment financing have been applied reveals that the single most salient characteristic is the deterioration of government fiscal capacity. The deterioration has been enough to cause significant declines in public expenditures on infrastructure (Aschauer, 1989, 1990; NCPWI, 1988, pp. 1-10; International Transportation Engineering [ITE], 1986, pp. 3-6; Peterson, 1984, pp. 112-116). As a result of the declines, many parts of the U.S. infrastructure system are functioning at minimal or substandard levels;

and there are some examples of total systems breakdown (Vaughan, 1984, pp. 1; Choate and Walter, 1981). Consequently, some infrastructure systems pose impending threats to public health, safety, and welfare, and in some instances, public health, safety, and welfare have already been compromised (Grossman, 1979, pp. 83-85). As a result, more private resources have had to be allocated to the nation's infrastructure needs (Vogt and Cole, 1983, pp. 1-2; Vaughan, 1984, pp. 57-77; ITE, 1986, pp. 8-11; Hatry, 1989, p.4). We conclude, then, that the seriousness of government fiscal constraints--infrastructure expenditures have been reduced to the point at which public health, safety, and welfare have been and stand to be compromised--constitutes the single most important characteristic of the economic context in which privatization has been implemented in the United States.

The legislative framework for the use of exactions, development fees, and special-assessment financing is best characterized as a intricate and complex web of laws, regulations, principles, and formal and informal guidelines at federal, state, and local levels of government. Any infrastructure project financed with private funds is a product of a myriad of federal and particularly state and local government legal factors. Therefore, it is extremely difficult to characterize "the legislative context" for privatization in the United States. Aside from its breadth, diversity, and complexity, the only other characteristic that we can clearly discern is its increasing liberalization.

Over the years, established laws, legal principles, regulations, guidelines, etc. regarding the use of private funds for infrastructure have been altered and reinterpreted in ways such that, in contrast to fifty years ago, private funds have been or are proposed to be used to finance virtually every type of infrastructure facility and service. Snyder and Stegman, (1986, pp. 22-23; 53-61) provide an account of the historical evolution of the use of private funds for infrastructure projects.

Early case and statutory law limited the role of private funds in infrastructure financing to special-assessment financing of facilities that conferred special benefits. In later years, exactions and development fees were allowed, but only for facilities that were reasonably related or "specifically and uniquely attributable" to the infrastructure needs of their contributor. In both instances, private funds were limited to local facilities. Today, as a result of a considerably expanded legislative context that allows the combined use of special-assessment district and exactions, and the modified use of independent special districts as well as exactions and development fees that must merely constitute a "rational nexus" to the infrastructure needs created by their contributor, private funds have been allocated to a much broader range of facilities and services than historically possible.

Other manifestations of legislative liberalization of the use of private funds for infrastructure include court acceptance of the new benefit-measurement and cost-allocation procedures for special-

assessment financing--procedures that, in effect, allocate infrastructure costs among many indirect as well as direct beneficiaries; and recognition, by most state legislatures, that the powers implicit in existing land-use and development regulations are sufficient legal basis for local government requirements of exactions and development fees.

Finally, one of the most salient characteristics of the administrative features of exactions, development fees, and special-assessment financing, is the role played by the public sector. The public sector is frequently responsible for identifying prospective privatization projects--identifying infrastructure needs on the basis of environmental impact analysis conducted for proposed development projects and developing strategies of public-private cooperation by which to meet those needs. Furthermore, the public sector guides private participation in the projects, through regulations, standards, and guidelines designed to ensure that project outcomes are consistent with social and economic welfare objectives and to ensure that development proceeds in a logical and coordinated manner.

CHAPTER 4

PRIVATE FINANCING OF TRANSPORTATION INFRASTRUCTURE IN SWEDEN

In this chapter, we accomplish three objectives. First, we provide a brief description of the general institutional framework for planning and development in Sweden in order to understand the general institutional context within which private financing of infrastructure has occurred in that country.[26] Second, through a description of the Vasaterminalen project, we provide a conceptual and empirical description of one of the ways in which transportation and other forms of infrastructure is privately financed in Sweden. Third, we conduct a brief analysis of the project to assess the extent to which it constitutes private finance and to identify some of the salient characteristics of its distributional effects, and economic, legislative framework, and administrative contexts. Combined with analogous information for the United States contained in Chapter 3, the information provided in this chapter forms the basis of a comparative analysis of U.S. and Swedish privatization and our conclusions, in Chapter 5, regarding some of the factors that influence infrastructure finance policy.

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[26]The information presented in this section of the chapter is based on a paper written by Cars and Jirlow (1987). Concepts presented in their document, which are sometimes difficult to translate directly from one language to another, are subject to our interpretation. For instance, the "public display" of planning documents referenced in their document is called a "public hearing" in this chapter.

In Sweden, each of the three levels of government (national, regional, and local) is actively involved in planning and development processes. At the national or state level, the Ministry of Housing and Physical Planning is principally responsible for the establishment of the general legislative guidelines followed by the lower levels of government and for the allocation of resources (construction permits and funds) required for physical planning, housing provision, and construction. State decisions and activities with regard to planning and development processes are intended to ensure that social and economic welfare goals are fulfilled and that planning and development take place in an effective and rational manner. They are also intended to ensure that other actors in planning and development processes, such as private developers, fulfill their tasks in a manner that is consistent with established legislation and standards.

The County Administration Boards provide practical guidance and support to planning and building activities at the regional level. They coordinate State and regional planning activities as well as planning activities within their jurisdictions. They also ratify development plans and act in a supervisory capacity to hear appeals.

At the local level, the municipalities exercise the strongest influence on planning and development processes. They play an important role in virtually every aspect of the planning and development process--planning, monitoring, and financing. On the basis of studies and analysis of economic and social needs, they conduct much of the physical planning. They monitor building-permit applications and ensure that new

buildings meet established construction standards. They also play an important role in the administration of state loans and subsidies for development.

Shaping the Swedish Planning and Development Process

Several laws and other factors play a crucial role in the shaping the context for Swedish planning and development. The Building Act and the Building Ordinance, for instance, are used by public administrators to regulate physical planning and building activity. Accordingly, all land used for construction must be subject to planning. This allows the public authorities who regulate land use to decide where, when and, what type of development takes place.

Types of Plans

Land use is regulated by comprehensive and detailed plans. The comprehensive plans are Regional Plans and Master Plans, and the detailed plans are Town and Building Plans.

Regional plans are use to guide development in two or more municipalities that have needs for shared facilities, such as highway systems and airports. Regional Plans may be used as general guidelines for the municipalities involved or they may be ratified by the State, in which case they become compulsory. Master plans are used to guide development within a single municipality. They serve as general guidelines for the more detailed Town and Building plans and are among the most important means by which the public sector regulates land use.

Three other types of plans are used by public land use administrators at the municipal level. First, there are comprehensive Land Use Plans, which contain alternative projections of future municipal development. Second, Structure Plans are used to illustrate the various regulations, guidelines, and restrictions on municipal development. Third, District Plans provide rough guidelines for development in particular areas within municipalities.

Detailed plans are required for all urban development. They consist of schematic maps with regulations and comments that dictate the types and locations of development permitted in particular areas within a municipality. Once adopted by a municipal council, they are subject to State and County ratification. There are two types of detailed plans--town plans and building plans. Both provide detailed regulatory guidelines for development, such as buildings boundaries, blocks, streets, and public places. Town plans are used in urban areas, and building plans are generally used in other areas.

In recent years a new Planning and Building Act has been adopted by the Swedish Parliament. It is essentially the same as the previous Act with the exceptions that it decentralizes planning powers, simplifies and modernizes the planning system, abolishes lengthy building bans and empowers municipalities with the ability to vary building permits, and includes laws and other measures intended to increase the public's participation in the planning process.

In addition to physical planning legislation, the following are other laws and measures designed to regulate planning and development in

Sweden. The Expropriation Act enables municipal acquisition of land needed for development. The Preemption Act allows municipalities to preempt buyers in real estate transactions. The Building Code contains regulations pertinent to building design and construction. The Environmental Protection Act contains regulations governing the protection of air and water resources, noise, etc. The Nature Conservation Act contains regulations used to preserve areas of scientific value and recreational and related needs. Municipal Long-Term Financial Plans and Housing Programs (plans for new construction and reconstruction) also shape planning and development processes.

Another set of legislation relevant to planning and development processes governs land ownership. To enable municipal acquisition of land required for municipal development, in addition to the Preemption and Expropriation Acts, there are voluntary bargains (most common) and land exchanges. Municipalities can also acquire land under certain provisions of the Building and Nature Conservation Acts, as well. Land ownership is also influenced by the "land condition" rule--a rule that establishes eligibility for State-financed housing-development loans. According to it, builders generally are not eligible for State loan subsidies unless the land they are developing has been acquired from a municipality. There are exceptions--owner-occupied single family housing units and estate redevelopment. When municipal land is not needed for municipal use, its ownership can be retained through a lease-hold system; the land may be leased to private developers for use as dictated in municipal plans. Particularly in recent years, because of

strained economic conditions, most municipalities sell land for which they have no need. The municipality of Stockholm operates a very large land-lease system. Municipalities have been buying, selling, and leasing land for several decades. As a result, they own most of the land required for urban development within their jurisdictions. They are in a "strong monopoly" position and, consequently, exert a strong influence on urban development processes. (Anas, et al., 1985, p. 38)

Planning and Development Processes

On the basis of State planning and development guidelines, municipalities adopt comprehensive plans. The plans are intended to reflect changes in labor markets, demographics, living standards, and recreational needs, and they are used to dictate the pattern of municipal land use. The comprehensive plan is also used to guide the more localized detailed plans. The contents of these plans, created by Municipal Executive Committees, include civic survey maps which indicate the conditions of developing areas, lists of the owners of property in developing areas, maps indicating the planned use and density of developing areas, descriptions of developing areas and reasons for their prospective development, regulations, surveys of technical and economic conditions of developing areas, and accounts of preparatory consultations with land owners, public authorities and others in the planning process.

The process of creating plans may be organized in one of three possible ways. First, ownership of the land that is to be developed may be transferred to an investor after the municipality has created the

detailed plan. The responsibilities of the investor, who may be a private or public enterprise and who is, increasingly, the initiator of development projects, include site acquisition, arrangement of project finance, submission of applications for building permits, hiring of consultants and contractors, and the overseeing of the construction process. The second possible way of organizing plan creation involves the transferring of land ownership to the investor during the plan development process. This arrangement enables the investor to participate in the plan development process. The third organizational form, a "flexible plan," provides only general regulatory guidelines and may be created in lieu of a detailed plan.

Once the plan is complete, it must undergo a public hearing and, subsequently, revision by the Building Committee. After a second public hearing, it is submitted to the Municipal Council for adoption and to the County Administration for approval and ratification. Plans of particularly broad interest are subject to State ratification.

Once the plan is ratified, the construction process begins. The first step in the process involves the creation of a development contract, which is used as a complement to the regulations contained in the detailed plan. There are two general types of development contracts. In some instances, the investor owns the land to be developed, and areas needed for parks, roads, etc. are transferred to the municipality. In other instances, the land is owned by the municipality. In these cases, the municipality invites tenders for construction and grants the construction contract to the tender that

makes the preferred offer. The ownership of the municipal land is transferred to the investor during the construction phase, after which infrastructure facilities are handed over to the municipality.

Prior to actual construction, negotiations are conducted between the investor and the municipality. The negotiations establish the legal boundaries and plots of the development. During this time, water, sewer, and other economic and technical studies are conducted, and a building program is agreed upon. Once the negotiations are complete, a legal contract for construction is signed. "Building documents," which contain the detailed information required for the invitation to tenders and the construction work are, then, drawn up. Finally, the investor makes an application for a building permit.

To begin the construction phase, several contractors may be hired through an "invitation to tenders." The responsibility of the contractors is to provide general construction supervision, to conduct the actual construction, to provide the necessary labor, and to maintain the contacts with municipal authorities. The invitation to tenders may be open to any bidders, limited to specific bidders, or not open at all, in which case a particular contractor is selected. Once the contractor is selected, another set of negotiations is conducted--between the investor and contractor to establish purchasing and price agreements. Finally, the actual contract is negotiated. The specific contractual arrangement may take the form of a "distributed contract by tender" in which specific construction tasks are distributed among numerous contractors each of whom has direct contractual arrangements with the

investor. Or, it may take the form of a "general contract by tender." In this arrangement, direct contractual agreement with the investor is limited to a single general contractor who, in turn, hires subcontractors. A "total contract by tender" may also be used. It is similar to the "general contract by tender" except that, in addition to the actual construction, the general contractor is also responsible for the project work. Once construction is complete, investors assume control of the building either for their own use, or they may sell or lease the structure.

Thus, there is a strong formal system for planning and development in Sweden. The public sector, particularly at the municipal level, exerts a powerful influence on development activity through various laws, regulations, and guidelines. Laws governing land ownership, for instance, essentially enable municipalities to have a monopoly over much developable land, enabling them to exert a significant amount of influence on planning and development processes.

We mentioned earlier that the municipality of Stockholm operates a very large land-lease system. The land-lease procedures have recently been applied in a very unusual manner in the city of Stockholm. The application involves a public-private cooperative arrangement through which private financial (and other) resources are used to fund a relatively large-scale transportation infrastructure investment project--the Vasaterminalen project.

The Vasaterminalen Project

Until recently, the area around Stockholm's Central Station has been plagued by severe traffic congestion problems.[27] The problems resulted chiefly from the station's lack of adequate bus terminal facilities. Buses were, therefore, forced to park and to load and unload passengers on adjacent streets. A technical solution to the problem was devised by the Stockholm Real Estate Office (SREO) during the 1960s. The solution called for the construction of a platform or deck over the station's railyard upon which the bus terminal could be constructed. The Swedish State Railroad Company (SSRC), the public authority responsible for capital investments in the national railroad system did not have the funds required to implement the solution, and so for many years, the problem got worse.

During the late 1970s, the SREO staff devised a proposal that has enabled the bus terminal to be constructed. They proposed that the construction of a deck larger than that needed for the terminal would provide the SSRC with new leasable property, the income from which could be used to finance the design and construction of the deck, the bus terminal, and any ancillary infrastructure improvements. In accordance with established municipal plans, the deck would be leased for office space development.

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[27]This part of the chapter is based extensively on interviews with individuals familiar with the Vasaterminalen project. For the names of individuals interviewed, refer to the Appendix 1. Much of the information gathered during these interviews is contained in earlier, more detailed descriptions of the project (Todman, 1987, 1988). We omitted much of that information here, because it is not directly relevant to the present study.

The legal and institutional framework for this proposal is the land-lease system. The law that serves as the legal basis of the proposal is Tomtratt.[28] Tomtratt is a land-lease law that dates back to the early years of this century. It essentially establishes the conditions under which public land can be leased for nonpublic purposes. The lease income is typically used to finance municipal modernization. According to the law, the lease rights to municipal land can be granted to private developers, for instance, for sixty-year periods after which forty-year lease periods can be negotiated. In general, the leases cannot be terminated prior to the end of the negotiated lease period, except under those circumstances in which there is a need or desire on the part of the public owner to alter the use of the land; the land owner can terminate the lease.

Lease payments are determined on the basis of the location of the land and the use into which it is placed while being leased. The payments are, therefore, subject to significant variations. For instance, in recent years, payments for public land located in the city of Stockholm and leased for office development have been relatively high because of shortages of the office space in and around the city, and payments for municipally owned land and leased for residential development have remained relatively low because of a strictly enforced residential rent-control policy. Once negotiated, lease payments remain fixed for 10 years unless otherwise specified in the lease contract. Any appreciation in land value during the lease period may be captured

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[28]This description of the Tomtratt law is based on a translation of the actual legislation--Tomtratt, Jordabalken Kapitel 13.

by the land owner through adjustments in the lease payments at the end of each 10-year period. Such adjustments are made in real estate courts in accordance with the specifications contained in lease agreements and on the basis of factors such as inflation, changes in land use, or regulatory changes.

From our perspective, one of the most interesting aspects of Tomtratt is its conveyance of quasi-private ownership rights to the lessee. The lessee "owns" the land lease and is, thereby, entitled to many of the rights typically associated with land ownership in the United States. For instance, land-lease owners may sell their ownership rights, they are subject to limited restrictions on such sales, and they may use their leases as security for loans. Another striking characteristic of Tomtratt is that it includes provisions that enable the public land owners to demand that the lease owner construct and maintain any necessary infrastructure support facilities. Thus, it is very similar, in effect, to the use of developer exactions and development fees in the United States--private developers are obliged to provide necessary support facilities in exchange for development rights. This characteristic of Tomtratt makes it part of the legal foundation underlying the use of private funds for infrastructure services and facilities in Sweden.

The Vasaterminalen project constitutes an innovative application of the land-lease law, and its outcome is certain to effect the future of the use of private financial resources for infrastructure projects in Sweden. For that reason, we will examine the project in some detail.

Normally, the land leased under the Tomtratt provisions is preexisting public property that is of limited public value in its established use. The lease of such property is frequently of greater value than in it established public use because of the lease income it generates. In the Vasaterminalen case, however, the public property that is being leased was not preexisting; it has been created expressly for the purpose of Tomtratt application. The purposeful creation of leasable public property is considered to be a new and innovative concept in Sweden.

After a detailed analysis of the proposed technical and financial solution to the Central station area traffic congestion problem, and a preliminary feasibility study, in the fall of 1982, the SREO and the SSRC initiated the process of negotiating a development contract. The secondary development contract (described in the first part of the chapter) was selected. An "open invitation to tenders" (a form of competitive bidding) was issued for the design and construction of the deck, bus terminal, and ancillary infrastructure. The winner was to be awarded government design and construction contracts and the land-lease rights to part of the deck. Bidders were instructed to include in their proposals an estimated price for the construction of the deck, bus terminal, parking facilities, street and rail yard reconstruction, and other infrastructure improvements that would be required as a condition of the grant of the lease rights; an estimated annual lease payment; and a proposal as to how the infrastructure facilities could be financed with minimal public financial support.

The opportunity to win government design and construction contracts, to be granted the land-lease rights to public property located adjacent to Stockholm's central business district (the principal hub of Sweden's communications and transportation systems), and to construct, own, and operate an office complex on that property generated considerable interest in the private sector. Seven proposals were submitted, and after several rounds of evaluations by a jury composed of staff from various agencies of the city of Stockholm and the SSRC, the proposal submitted by the investment group Vasaterminalen AB was selected in December, 1983. Vasaterminalen AB and its project, Vasaterminalen, are owned jointly by a consortium of private companies formed expressly to bid on the government contracts--Fastighetsaktiebolaget Hufvudstaden AB, a private real estate developer, SIAB AB, a private contractor, and L. E. Lundbergforetagen AB, also a private contractor. Each owns equal shares in the company, the project, and in what, when completed, will be a 50,000 square meter office complex with work space for 2,000 to 2,500 people, a lecture hall, conference rooms, a restaurant, and other service facilities.

In August 1984, after extensive negotiations between public authorities and the developers, a final agreement was reached. Subsequently, a building program was developed, and a legal contract for construction was signed by the public authorities and the developer. The set of first construction documents, which contained detailed information relevant for the contracting out of various aspects of the construction process, were submitted for approval in March, 1985. After

the developers applied for and were granted a building permit, construction began in April, 1985. The project was scheduled to be completed by December, 1989. Buses started to use the terminal in the spring of 1989, but a minor amount of the final construction was still being completed in the spring of 1990.

During the construction phase, the ownership of the project site was transferred to the developers. When construction is completed, the ownership of the infrastructure will be transferred to the public sector. The deck, bus terminal, and upgraded rail yard works will be transferred to the SSRC; and the ancillary facilities--(re)constructed streets, bridges, a pedestrian tunnel, a viaduct, and a small electrical station--will be transferred to the city of Stockholm, which will operate and maintain the facilities and pay for them through an elaborate financial arrangement.

The SSRC will lease that part of the deck occupied by the bus terminal to Stockholms Terminal AB, a public company created expressly for the purpose of financing, operating, maintaining, and managing the Central Station bus terminal. The company is jointly owned by the Stockholm County Transport Company (40%), the SSRC (40%), and the city of Stockholm (20%). Each owner will share in the use of the terminal. The lease period will extend for 60 years beginning in 1990, the first full year of planned project operation. For the first 20 years of the lease period, Stockholms Terminal AB will make no lease payments to the SSRC. After that, negotiations will be conducted to establish a new annual lease fee.

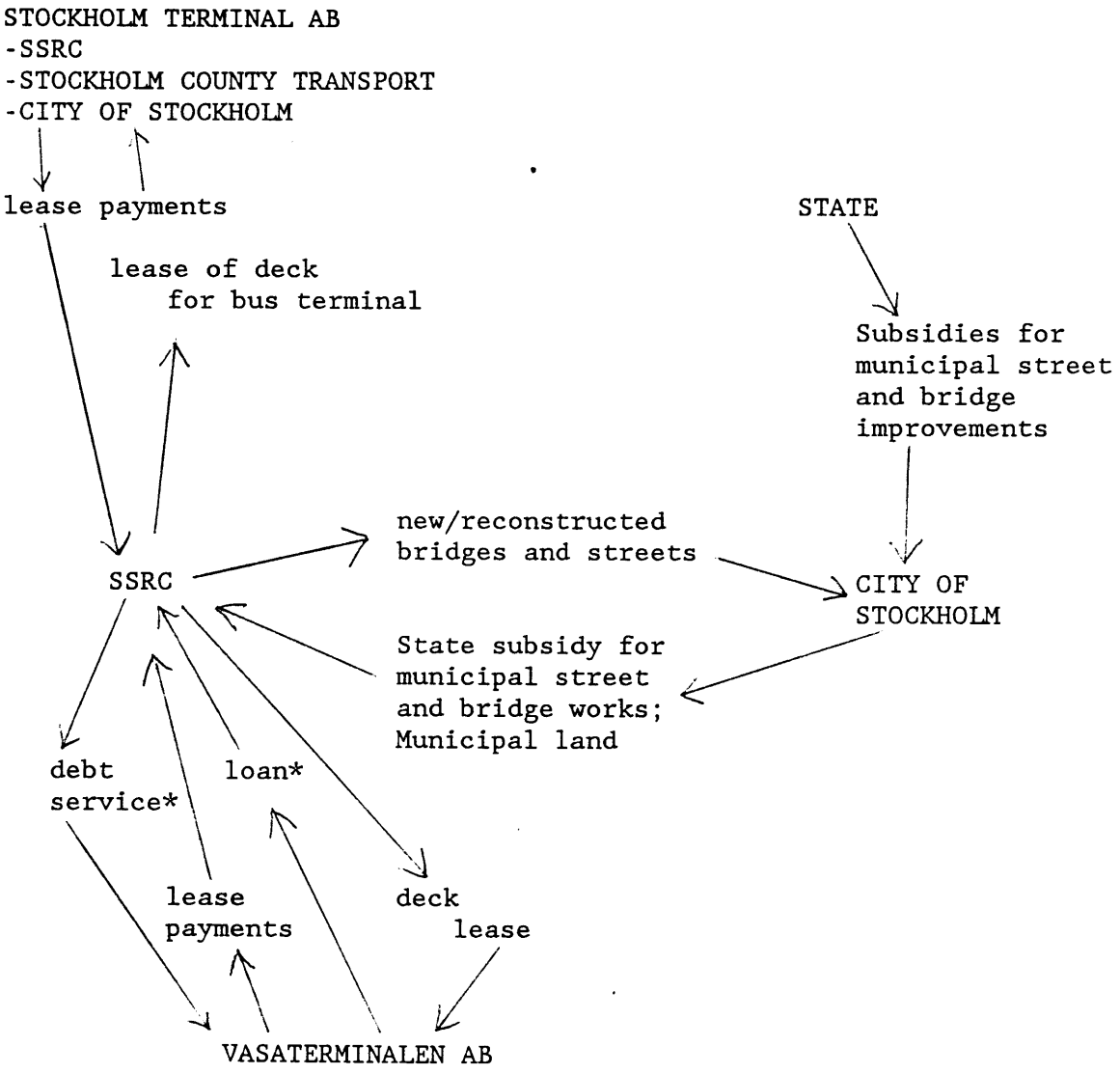
The SSRC will lease the rest of the deck to Vasaterminalen AB, which has been granted the right to construct an office complex on the property. This lease period, too, will extend for 60 years beginning in 1990. The annual lease payment during this period will be 20 million Swedish Kroner (Skr)--the product of a statutorily fixed figure (intended to reflect project location, expected value, and quality) and the size of the office complex--50,000 square meters. After the first twenty years, the lease fee will be renegotiated. Throughout the lease period, the developers will retain ownership and operational and management control of the office complex.

In May 1984, the official cost of the Vasaterminalen project was 660 million Skr. The cost of designing and constructing the bus terminal was valued at approximately 240 million Skr, the ancillary infrastructure was valued at 85 million Skr, the office complex was projected to cost 290 million Skr, and the developer's fee was 45 million Skr. Thus, total public facility cost was 325 million Skr.

The financial arrangement by which the developers proposed to pay the infrastructure capital costs provide an example of how private funds have been used in the financing of infrastructure in Sweden in recent years. (Reference to Diagrams 1 and 2 will assist in understanding the description that follows.) The developers agreed to subsidize the investment costs by almost 50 percent. They agreed to design and construct the facilities for 165 million Skr (out of their retained earnings and funds borrowed in Swedish private capital markets). Moreover, because the SSRC did not even have sufficient resources with

DIAGRAM 1

KEY PUBLIC-PRIVATE FINANCIAL INTERACTIONS
IN THE VASATERMINALEN PROJECT



*Loan and debt service related to the investments costs (paid initially by the developers through a loan agreement and ultimately by the SSRC through amortization and interest payments) of the public infrastructure--deck, bus terminal and ancillary facilities.

DIAGRAM 2

ESSENTIAL CHARACTERISTICS OF THE VASATERMINALEN LOAN AND LEASE AGREEMENTS

5/84----------(grace period)----------12/89

355 m Skr investment costs; Subsidized public cost = 165 m Skr ---inflation--- 200 m Skr =value of infrastructure upon construction completion

3/1/90----------3/1/2010----------2050

first year of project operation--
- -exchange of notes of obligation (20 m Skr annually;
- -amortization period begins
- -lease period begins

400 m Skr = full payment of amortization and lease payments

lease ends

which to pay the even the subsidized investment costs, the developers agreed to lend the 165 million Skr to the SSRC. The deck is being used as collateral for the loan which will be amortized over a 20-year period beginning in 1990. The inflation and interest adjusted annual debt payments will be 20 million Skr and serviced out of the proceeds of the railroad company's deck lease income. Because the developer's lease payments offset the railroad company's debt service payments, there will be no real flow of funds between the SSRC and Vasaterminalen AB during the first 20 years of project operation. The SSRC will receive no cash lease income, and Vasaterminalen AB will receive no cash repayments of the loan.

The payments will be limited to paper transactions, evidenced only by accounting entries. On March 1st of each year from 1990 through 1999, the SSRC and Vasaterminalen AB will exchange notes of obligation; the SSRC will give a 20 million Skr debt note to Vasaterminalen AB, and the developers will give a 20 million Skr lease note to the railroad company. At the end of the 20-year period, when the loan is amortized, the annual fee for the lease of the deck will be renegotiated. In the end, the SSRC will have received capital facilities, at a price greatly subsidized by private financial resources, that it has needed, but been unable to afford for a long time. Eight mutually consistent contracts underlie the Vasaterminalen project. Four of them involve the investors and the SSRC--a leasehold agreement (which contains the details regarding the lease of the deck), a leasehold contract (legal presentation of the leasehold agreement), a building contract

(specifications of the financial obligations of the developer and the railroad company during the project's construction phase), and a climate control agreement (specifies the climactic requirements that the developers must observe during construction).

Negotiations between the SSRC and the city of Stockholm produced a town plan agreement in which the details of the ownership, operation, maintenance, management, and regulation of the bus terminal are specified. The agreement also contains the details of a complicated land exchange between the railroad company and the city. (Refer to Diagram 1.) In exchange for the street improvements, valued at 108 m Skr, that are a part of the Vasaterminalen project and for which the SSRC is paying through foregone lease income, the city of Stockholm has agreed to reimburse the railroad company the investment costs through the transfer of 93 million Skr in state grants for municipal road and bridge improvements, and the ownership rights to 15 million Skr worth of city-owned land. The land is located adjacent to the Central Station and will be used to accommodate the Vasaterminalen project.

Moreover, numerous negotiations took place among the private participants--contractors and subcontractors--to the project, including the contractor's consortium, Konsortiet Terminalbyggarna, which is jointly owned by two private contractors--SIAB (67 percent) and L.E. Lundbergbyggen KB. (33 percent); the project architects--ARKEN arkiteker AB, Ralph Erskine arkiteker/planner AB, and Tengboms arkitekontor AB via AET arkiteker; the structural, heating, and ventilating engineers--

Terminalkonstruktorerna Arne Johnson-SIAB AB, Hugo Theorells ing byra AB; and the electrical engineers--Folke Johansson ing byra AB.

By the fall of 1988, more than two years after the research into the Vasaterminalen project was conducted, there was evidence suggesting that the project had been a qualified success. The project had been successful in that it brought together members of the public and private sectors and combined their comparative advantages to devise and implement a solution to an old problem. Transportation facilities that have been needed but not affordable for many years were virtually completed. Thus, from the perspective of relieving the effects of public sector fiscal constraints of infrastructure provision processes, the Vasaterminalen appears to have been successful.

This success is, however, subject to qualification. By 1988, much of the office complex had not been let, and there was some concern that perhaps office space is not the best use of the deck property. Apparently, other office facilities located on the outskirts of Stockholm are far more attractively priced than the Vasaterminalen complex. In order to minimize their losses, the developers have chosen to alter the use of part of the complex. It will be used, on a temporary basis, to house hotel facilities. Nevertheless, in light of the apparent success of the Vasaterminalen project in making private funds available for public works projects, it is likely to serve as a positive precedent in the future development of Swedish privatization.

A Critique of Swedish Privatization As Illustrated in the Vasaterminalen Project

In this final section of the chapter, we conduct a brief analysis of the Vasaterminalen project to determine the extent to which the infrastructure facilities are, indeed, privately financed, and to identify some of the projects distributional effects, as well as characteristics of its economic legislative, and administrative context.

Four years ago, during the earliest stages of the research for this study, our inquiries into Swedish-style privatization invariably (though not exclusively) led us to the Vasaterminalen project. A close analysis of the project suggests, however, that although it is, to some extent, illustrative of the way in which private funds (and other resources) may be allocated to infrastructure projects in Sweden, it has a very strong public finance component, as well.

Recall, once again, that we have defined private finance as finance in which costs are allocated on the basis of the benefit principle; finance in which there is no cross-subsidization between different levels of beneficiaries or between beneficiaries and nonbeneficiaries. Conversely, public finance is finance in which there is cross-subsidization. Taxes, user charges, and other sources of finance in which costs are allocated uniformly irrespective of the incidence of the benefits for which they pay constitute forms of public finance.

The infrastructure that constitutes the Vasaterminalen project has, to an extent, been privately financed. The private developers have and will continue to benefit from the infrastructure. The deck serves

as the physical foundation for their office complex; the electric power station will provide the energy required to operate the complex; and the transportation facilities will ensure the complex's excellent accessibility. The developers have borne roughly half of the infrastructure investment costs by financing the design and construction costs. There remains, however, a very large public finance component, because the balance of the investment costs are being financed out of the proceeds of the SSRC's future lease income. To the extent that the Vasaterminalen project is illustrative, it suggests that Swedish privatization is characterized by considerable "publicness;" that is, it has a significant public component.

Considering, however, that the infrastructure financed in the Vasaterminalen project will serve the public, as well as the private, sector, from the perspective of the benefit principle of distributional (upon which we have based our definition of private finance), perhaps the financing should, indeed, have a substantial public component. It would, however, be interesting to know if there are cases in Sweden, as in the United States, in which private funds are used exclusively to finance infrastructure projects that provide general or public benefits as well as private benefits. (Then, of course, the implicit cross-subsidy--the public benefits from the facilities without contributing to their costs--raises the issue of whether such an arrangement is indeed private finance, too.)

The Vasaterminalen project seems to have significant distributional effects. Our observation is based on the assumption

that, in general, private funds and other resources tend to be allocated where the return to them is greatest; therefore, a large part of the success that the SREO and the SSRC had in attracting private resources to the infrastructure investments can be attributed to their location--Stockholm's central business district, which is one of the most economically strong regions in Sweden. Therefore, we maintain that through the allocation of financial resources to the strengthening of Stockholm's infrastructure network, the Vasaterminalen project is likely to have reinforced and perhaps exacerbated established regional economic inequalities.

Moreover, the successful solicitation of private funds to the infrastructure investments is likely also to be attributable to the type of development project involved--an office complex, the occupants of which are relatively more likely to be able to support added financial costs associated with developer-financed infrastructure. Infrastructure investments linked to a proposed development of rent-controlled residential development, for instance, might not have attracted the magnitude of private investor interest that the Vasaterminalen project apparently did. We suggest, therefore, that the allocation of private financial resources to infrastructure projects in Sweden is not only likely to reinforce and exacerbate established regional economic inequalities, but also inequalities among economic sectors. To the extent that the Vasaterminalen project is reflective of other privatization projects, privatization in Sweden is likely to reinforce and/or exacerbate established economic imbalances.

A third observation regarding the Vasaterminalen project it that it is clearly a product of its economic context. It is a project the impetus for which was provided by persistent public-sector fiscal constraints. According to people we interviewed, the traffic congestion problems around the Stockholm Central Station area first became apparent sometime during the 1950s, and its technical solution--the construction of a deck over the railyard on which the bus terminal could be located--was devised during the 1960s. Government fiscal constraints, however, prevented the implementation of the solution for approximately two decades. It was not until the early 1980s, when the long-needed infrastructure investments were presented in such a way as to attract private financial resources, that the solution was implemented. Thus, we maintain that government fiscal constraints appear to have been an important factor in encouraging the use of private funds for infrastructure.

Another observation we made is that although the infrastructure improvements were postponed for many years, during the course of our interviews, very few people indicated that the postponement constituted much more than a public inconvenience; that is, the postponements appear to have posed no impending threat to public health, safety, and welfare. Furthermore, the financial arrangements by which the infrastructure is being paid for calls for considerable public participation in the form of 20 years of SSRC's lease income, which suggests that the government's fiscal constraints may not be entirely structural, that they will ease, to some extent, in the long-run so that the public sector will be able

to resume its traditional role in the financing of infrastructure investments. This would suggest that, at least in the past, Swedish privatization, as reflected by the Vasaterminalen case, constitutes a policy response to more of a short-term, cash-flow fiscal problem and than a long-term, structural fiscal problem.

A key element of the legislative framework of the Vasaterminalen project is Tomtratt--the old and well-established law governing the use of the land-lease system. Our information suggests that the Vasaterminalen project constitutes a recently evolved, innovative, and liberal reinterpretation of the law, and that this reinterpretation provides an important legal basis for some privatization in Sweden.

We do not, however, want to overemphasize the importance of Tomtratt as the legal basis of Swedish privatization. It is not the only, or even the most important, legislative basis for Swedish privatization. It is a key element of a broader legislative framework. There are other laws, too, which comprise the framework. In those cases, for instance, in which the private developer owns or purchases land for development purposes, other laws are relevant. Moreover, there is legislation pending that, if adopted, will also help to shape the legislative framework for privatization in Sweden. There is a proposal, for instance, to legalize toll roads, which are currently illegal in Sweden. If the legislation passes, a new avenue for privatization will open. A group of private developers (the Osterleden project) has already indicated that they could construct a part of a major highway

that will encircle the city of Stockholm and could recoup their costs by charging toll fees of motorists who use the road.

Tomtratt is important in that it is a key element of the legislative framework of the Vasaterminalen project--a project which is considered to be important and precedent-setting with respect to Swedish privatization. Most municipalities do, however, sell rather than lease their land, and this practice has increased in recent years as a result of fiscal problems (Cars and Jirlow, 1987, p. 20). Thus, Tomtratt is not so very widely applied, but it is important because it serves as a principle element of the legal foundation for an important privatization endeavor in Sweden.

Finally, we observe that the public sector played a major role in the administration of the Vasaterminalen project from its inception to its completion. Various public authorities were responsible for identifying the technical and financial solutions to the Central Station problem, defining, soliciting, guiding, and monitoring private participation in the implementation of those solutions so as to ensure that the completed project would be of a high quality and consistent with established social welfare, economic, and environmental objectives.

Sweden's is a strong formal planning system in which the public sector plays a major role. Municipal acquisition and ownership of large amounts of "developable" land and various laws and regulations have, traditionally, enabled strict public control to occur over land use and development activities (Anas, et al., 1987, p. 38). Historically, therefore, the initiative for development activities have lain with the

public sector. In many such cases, such as the Vasaterminalen project, the public sector, therefore, does play an important administrative role. In an increasing number of cases, the public sector's role in the development processes has been blunted by private developers going directly to and negotiating with the communities likely to be affected by their development proposals (Harsman, 1986). There appears to be a trend toward negotiations preceding, rather than following, officially established land-use, planning, and development procedures.

One concern we heard on several occasions during the course of our interviews was that, as privatization develops as a concept and is applied more frequently, it could result in the weakening of the potency of planners, official land use, and development control procedures as private investors and other parties increasingly seek to by-pass planners, to circumvent official land use and development procedures, and to negotiate directly with the communities likely to be affected by their proposals. This reflects a general bureaucratic concern regarding how far privatization is likely to go in shaping and controlling Swedish development processes. Thus, who actually takes the initiative in the development process is likely to influence the role of the public sector in privatization projects. If, as official policy dictates, the public sector effectively maintains the right to initiate development (as in the Vasaterminalen project), it will continue to exert its crucial influence on privatization projects. If, however, private developers are allowed to continue to initiate negotiations with communities, and, to the extent that, as a result, official planning, land use, and

development procedures and processes are circumvented, the role of the public sector in privatization projects may diminish.

In summary, to the extent that Vasaterminalen is reflective of Swedish privatization, we conclude that the use of private funds for infrastructure is complemented by a large public component, is likely to exacerbate or, at least, reinforce regional economic and sectoral investment inequalities, and has been encouraged by government fiscal constraints. Furthermore, a salient characteristic of the legislative framework for Swedish appears to be a liberal interpretation of established law, such as Tomtratt and other laws, as well as pending legislation. Finally, to the extent that official planning, land-use, and development policy is observed, successful Swedish privatization requires substantive bureaucratic support.

CHAPTER 5

USE OF PRIVATE FUNDS FOR TRANSPORTATION INFRASTRUCTURE IN THE UNITED STATES AND SWEDEN

In Chapter 2, we presented two theoretical/policy perspectives on how to overcome market inefficiency in the allocation of resources required for the provision of infrastructure. According to the theory of market failure, market inefficiency is most effectively overcome through a policy of government intervention--regulation and/or direct involvement--into infrastructure provision processes. Alternatively, according to the theory of property rights, market inefficiency is most effectively overcome through a policy of structuring the ownership rights to the requisite resources so that they are privately held.

Theoretical Perspectives

Although the theories provide us with some insight into possible policy solutions to the problem of inefficient market allocation of resources required for the provision of infrastructure, they reveal little with respect to the particular circumstances under which the policies are operable. What the theories do not reflect, for instance, and what we propose, is that the decision to adopt one policy solution or the other or some combination of both is a complex decision that is a function of numerous variables. We propose, further, that among the chief determining variables are the distributional objectives and underlying distributional principles of public finance policy of the implementing body. Thus, the policy prescribed under the theory of

property rights--the establishment of private rights of ownership to the financial and other resource inputs--is most likely to be implemented in those public finance policy contexts characterized by a relatively strong orientation toward the benefit principle of distributional equity. The policy prescribed under the theory of market failure--government intervention into, that is, the use of public financial and other resources, infrastructure provision--is most likely to be applied in those public finance policy contexts characterized by a relatively strong orientation toward the ability-to-pay principle of distributional equity. Moreover, the extent to which one policy is relied upon more than the other will depend on the relative importance of the two distributional principles, which, in turn, will be a function of the specific distributional objectives of public finance policy of the implementing body--national, regional, or local government. We will use our discussion of the use of private funds for transportation infrastructure in the United States and Sweden to clarify and support our proposition. We will also use the discussion to illuminate some of the other variables that influence the policy response to inefficient market provision of infrastructure.

In our analyses of the use of private funds for infrastructure projects in the United States and Sweden, we noted that private finance, in its pure form, is rare. In each of the examples provided, there are public finance or cross-subsidy effects. In some cases, the effects are greater than in others. This point--that, in practice, pure private finance is rare--having been established, we suggest that the use of private financial resources for infrastructure needs has been relatively

more pervasive in the United States than in Sweden, in recent years. A clear trend toward greater use of private resources for infrastructure needs is present in Sweden, but the evolution has, to date, not advanced as far as in the United States, even considering differences such as populations and land mass. In this final discussion, we identify some of the factors that might underlie this difference. In doing so, we highlight some of the important factors that shape the policy approach to market failure in the provision of infrastructure, and, in particular, the circumstances under which a privatization policy is implemented as part of that approach. We begin our discussion with the role of distributional objectives and underlying distributional principles of public finance policy. These factors appear, on the basis of our analysis of U.S. and Swedish privatization, to play a significant role in shaping the policy approach to market failure in the provision of infrastructure.[29]

Distributional Objectives and Principles

A recently emerging objective of U.S. public finance policy is an equitable intergenerational distribution of infrastructure provision costs.[30] When we refer to the intergenerational distribution of

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[29]For a brief list of some of the other factors that shape the policy response to the provision of infrastructure, see Humplick, et al. 1990, pp. 9-12.

[30]The emergence has been gradual over the years. It actually began several decades ago with the development of special-assessment districts through which private developers were required to pay for infrastructure that specially benefited their development projects. The emergence of this objective has, however, been most apparent in recent years.

infrastructure costs, we are referring to the allocation of costs across generations of infrastructure users. The emergence of this objective underlies the recent evolution in the distributional principles influencing U.S. public finance policy to reflect a greater emphasis today than in earlier years on the benefit principle of distributional equity. The increased emphasis on the benefit principle of distributional equity in U.S. public finance policy is reflected in a growing reliance on private funds and other resources in the provision of infrastructure.

In the United States, in recent years, public finance policy has become increasingly influenced by the objective of intergenerational equity, and the pursuit of this objective is an important factor underlying the relatively more frequent use of private funds to finance infrastructure in the United States. This objective has been sought through a policy of distributing infrastructure costs among beneficiary populations in proportions to the benefits they receive rather than among the general public. Implicit in this policy is the benefit principle of distributional equity. The emergence in importance of the benefit principle is linked to the distributional effects of traditional public finance.

Under traditional public finance policy, the incidence of infrastructure costs is shared intergenerationally: any generation of infrastructure users benefits from facilities financed by previous generations and finances many of the facilities that will benefit future generations. This structure of cost distribution creates equity

problems when there is rapid growth and development. Under conditions of rapid growth and development, the need for infrastructure also increases rapidly. Traditional public finance forces the current generation of users to bear the associated costs through great and sometimes exorbitant increases in their utility rates, user charges, fees, and taxes, etc. This has given rise to a broadly held concern regarding the equity of traditional public financing of infrastructure when there is rapid growth and development. This concern has been expressed in questions such as:

> To what extent does the current generation of users have a responsibility to future generations for providing infrastructure, since much of the infrastructure used by the current generation was provided by previous generations, and when does that responsibility to future generations become excessive because of rapid growth,...who should pay the increases over time in the unit cost of infrastructure that traditionally has been publicly financed ...(who should assume) financial responsibility for unused excess capacity of public facilities that are constructed to accommodate future growth? (Snyder and Stegman, 1986, p. 29).

There are no definitive answers to these questions, but there are emerging opinions to the effect that the limit has been reached on traditional sources of revenues for infrastructure and other historically public responsibilities,[31] that the current generation of infrastructure users should not be unduly burdened by the costs of facilities required to serve future generations, and that all generations of infrastructure users--current and future--should pay

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[31]This opinion is reflected in legislative changes such as Proposition 13 in California and Proposition 2 1/2 in Massachusetts. It is also reflected in a general trend toward greater electoral resistance to increases in taxes, bond issues, and other traditional sources of public revenue.

their "fair" share of facility and service costs. Increasingly, "fair" share is being defined in terms of "benefits received." In an effort to achieve a more "fair" distribution of infrastructure costs across generations of users, in recent years, there has been a move toward distributing the costs among generations of users in accordance with "benefits received" from the facilities. In other words, there has been an evolution in U.S. infrastructure finance policy toward greater application of the benefit principle of distributional equity and, thereby, the greater use of private financial resources in the provision of infrastructure.

This is in contrast to the situation in Sweden where, traditionally, a chief public finance policy objective has been the redistribution of nominal incomes to achieve a more equitable distribution of real income among Swedish citizens. One manifestation of the seriousness of this objective is the country's tax and transfer system. Through a comparatively progressive personal income tax system and comprehensive transfer system, Swedish real incomes are equalized considerably, relative to nominal incomes (Gramlich, 1987, pp. 250-288).

The progressivity of the income tax system is evidenced by marginal tax rate and personal income figures for 1985. In that year, incomes as low as 70,200 Skr ($10,000) were taxed; the rate was 4 percent. Incomes valued at 124,800 Skr ($18,000) were taxed at 25 percent; and 50 percent of incomes valued at 351,000 Skr ($50,000) or above were taxed. Combined with local income taxes, the marginal

personal income tax rate was as high as 70 percent for incomes of $50,000 (Burtless, 1987, pp. 188-189).

In exchange for their high tax payments, Swedes enjoy a comprehensive (by U.S. standards) social welfare system, which transfers benefits, allowances, subsidies, facilities, etc. to all Swedish households regardless of nominal income level. The combined result of the tax and transfer systems is a redistribution of nominal income that bears little correlation to the pre-tax and transfer distribution--a real income distribution that is considerably more equitable.

The extent to which the Swedish tax and transfer system redistributes and equalizes income is suggested in the results of analysis conducted by Swedish economist, Assar Lindbeck. His work shows that the ratio of factor income between households in the tenth and second decile is reduced from sixty-six to one prior to taxes and transfers to four to one after taxes and transfers (cited in Gramlich, 1987, p. 257).

This commitment to income redistribution suggests that, at least in the recent past, the ability-to-pay principle of distributional equity has exerted a relatively greater influence on Swedish public finance policy than the benefit principle. Recall from our discussion in Chapter 2 that application of the ability-to-pay principle in public finance policy results in a redistribution of income, because those with greater income contribute more to public service and facility costs than those with lesser income, and the former, thereby, transfers some of their income to the latter. The ability-to-pay principle is clearly

evident in the progressivity of the Swedish personal income tax system and the effectiveness with which it is reallocated through the transfer system, as evidenced by findings such as Lindbeck's. We maintain, therefore, that a principal factor underlying the relatively less pervasive use of private funds for infrastructure in Sweden in the past is the importance of the public finance policy objective of the redistribution of nominal income to achieve a vertically equitable distribution of real income and the implicitly greater emphasis on the ability-to-pay principle of distributional equity relative to the benefit principle. We maintain, further, that the lack of sufficient redistributional effects obtainable through application of the benefit principle underlies its relatively modest importance in Swedish public finance policy in the past, and therefore, the relative modest use of private funds and other resources in infrastructure provision process in the past.

The distributional effects of privatization merit serious consideration.[32] Consider the following argument. When the provision of goods and services are financed with private funds, their consumption is dependent upon payment for them, which is, in turn, dependent upon income. Thus, higher-income groups are likely to have better access to privately financed goods and services than lower income groups. As high-income groups increasingly defect to privatized goods and services,

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[32]The distributional effects of privatization policy are a serious issue that are alone worthy of considerable investigative analysis. The principal question is: How are the needs of populations that cannot pay for the benefits met?

the concentration of low-income groups consuming publicly financed goods and services increases, making it increasingly difficult to generate the financial resources required to ensure their optimal provision. Consequently, the provision of publicly financed goods and services becomes suboptimal. At the same time, the high concentration of high-income consumers of privately financed goods and services ensures the adequacy of financial resources required for their optimal provision. What results is a two-tier system of goods and services--one tier of optimally provided privately (and well) financed goods and services, which are consumed by high-income groups, and another tier of sub-optimally provided publicly (poorly) financed goods and services, which serve low-income groups. Privatization appears to reinforce and perhaps worsen existing economic inequalities. That private financing of infrastructure reinforces or worsens existing economic inequalities is supported by our observations made with regard to the distributional effects of privatization in the United States and Sweden. We noted that in both cases, private resources appear to be allocated to those regions, user populations, and economic sectors characterized by their relative economic strength, and that, consequently, privatization appears to reinforce or exacerbate existing economic inequalities.[33]

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[33]We have argued here that privatization policy appears to reinforce or exacerbate economic inequalities through its bias toward regions, economic sectors, and user populations characterized by relative economic strength. It is possible, however, that privatization policy could reduce economic inequality; by reducing the need for public funds in wealthier areas, it could enable more public funds to be allocated to depressed regions.

In addition to the distributional objectives and the relative importance of different principles of distributional equity in public finance policy, we maintain that, at least, the following three other variables exert an influence on the policy response to the market's inefficiency in the allocation of resources for the provision of infrastructure: (1) the extent to which government is fiscally constrained, (2) the extent to which government is capable (willing) to manage a privatization process and policy, and (3) the extent to which there is legislative accommodation to the privatization concept. We base our findings on our observations of privatization of infrastructure financing in the United States and Sweden. We will conclude that differences in these variables underlie the differences in the use of private funds and other private resources for infrastructure in the United States and Sweden in recent years. We will use this conclusion as the basis of our final general observation regarding the circumstances under which private funds and other private resources are likely to be allocated to infrastructure needs.

Government Fiscal Constraints

In recent years, both the U.S. and Swedish governments have faced serious fiscal constraints. In the early 1970s, the U.S. economy began to experience what would become a decade-long period of decline; national productivity and income fell, inflation, public spending, and government deficits increased, in some instances, to historically unprecedented levels; and by the end of the decade, the economy was in recession. All levels of government were experiencing serious

difficulty in maintaining their financial commitment to the provision of infrastructure (Vaughan, 1984, pp. ix-x, 3-4). The Swedish economy underwent a similar transformation--decreases in national productivity, and increases in inflation, public consumption, foreign borrowing, and public budget deficit (Rivlin, 1987). In both countries, economic circumstances have encouraged public finance policy makers to seek financial and other forms of support from the private sector for activities, such as the provision of infrastructure, normally undertaken exclusively by the public sector.

In the United States, however, the fiscal constraints appear to have been relatively more restrictive, as evidenced by the impending and actual compromise to public health, safety, and welfare that resulted from postponed and cancelled expenditures (Gakenheimer, 1985; Vaughan, 1984, Choate and Walter, 1981; and Grossman, 1979). In such a context, the incentive to allocate private resources to infrastructure projects is considerable. This, we argue, is in contrast to the situation in Sweden where the postponement and cancellation of projects has not threatened public health, safety, and welfare to the same extent. Perhaps the relative newness of Swedish infrastructure systems, combined with the relatively less intense demands placed on them by the smaller and less-concentrated Swedish population, have contributed to this (Burger, interview, 1988). Whatever the reasons, the Swedish government appears not to have faced the same magnitude of fiscal constraints as the U.S. government in financing infrastructure and, in the past, has,

therefore, had relatively less incentive to encourage greater use of private resources in the provision of infrastructure.

Moreover, U.S. public finance policy appears to be responding to structural fiscal constraints. The current trend toward greater private sector involvement in public finance policy suggests that government cannot maintain, nor in the near future resume, its traditional and almost exclusive financial responsibility for the provision of infrastructure. This change is a result of the combined effect of the emergence of serious fiscal constraints and changes in spending priorities, such as the recent growth in public expenditures on environmental programs. Together, they call for a fundamental and permanent reorientation in U.S. public finance away from reliance on the government toward a greater role for the private sector in financing infrastructure. Thus, the structural quality of U.S. government fiscal constraints combined with their restrictiveness as manifest in systems breakdowns and threats to public health, safety and welfare have provided compelling incentives to increase the use of private funds and other resources in the provision of infrastructure.

Conversely, Swedish public finance policy, until very recently, appears to have been responding to fiscal constraints that were relatively more transitory than those faced by U.S. governments. An outside observer was left with the impression that once the government's austerity and other economic adjustment programs had taken effect. the government's fiscal constraints would ease and allow it to resume it traditional role as exclusive provider of infrastructure finance. Under

circumstances such as these, the need for fundamental and permanent reorientation of public finance policy to include an expanded private sector role, does not seem warranted.

The point that we are trying to make (without being too presumptuous) is that, in the past, Swedish policy makers seemed to have viewed the public sector's fiscal constraints as transitory and not warranting a radical or permanent reorientation in infrastructure financing policy toward greater use of private resources. This point is supported in a closer analysis of the financing interactions of the Vasaterminalen project. Recall that the facilities are being financed with the proceeds of a loan received by the Swedish State Railroad Company (SSRC) from the developers--Vasaterminalen, AB. Recall, further, that the SSRC is amortizing the loan by forgiving 20 years of lease income that would, otherwise, accrue to it. Thus, the infrastructure is actually being financed by the public sector through the SSRC's lease revenue. This financial arrangement suggests that, unlike in the United States, there remains, in Sweden, a strong confidence in the long-term fiscal capacity of the public sector. The arrangement suggests that although the government cannot bear the facilities' investment costs today, it will be able to bear the costs, as well as the costs of maintenance and operation, in the future. Moreover, it suggests that the recent use of private funds for infrastructure might be a solution to a short-term cash flow problem rather than a long-term, structural fiscal problem. We suggest, then, that the past perception that the public sector's fiscal constraints

were of a transitory nature has also contributed to the relatively limited role of the private sector in Swedish public finance policy in recent years.

Administrative Role of the Public Sector

Our analysis of the use of private funds for infrastructure projects in the United States and Sweden also suggests that the public sector plays an important role in the administration of privatization policy and projects. This observation suggests to us that to the extent that government is (in)capable of undertaking administrative responsibility, private resources are (less) more likely to be allocated to infrastructure needs.

In both countries, the public sector plays an indispensable role in the administration of private funds to infrastructure projects. The public sector, typically, identifies prospective privatization projects; i.e. it identifies infrastructure needs and creates financial strategies of public-private cooperation with which to meet those needs. Moreover, it guides private participation in the projects to ensure that, when complete, they are consistent with established plans, land-use and development objectives, and social and economic welfare goals.

Yet, there is bureaucratic uneasiness with the concept of privatization in both the United States and Sweden. In Chapter 4, we described how on several occasions in Sweden, the view was put forth that privatization might weaken the potency of planners and official land-use and development control processes and procedures; and that this process has already begun in cases in which private developers have

bypassed planners and circumvented official land-use and development control procedures, and negotiated directly with the communities that stand to be affected by their projects. Although this sort of bureaucratic distrust of privatization exists in both the United States and Sweden, it appears to be stronger in Sweden, perhaps because of the relative size and power of the Swedish public sector in the national economy (i.e., it employs a large percentage of the working force and is highly unionized). We conclude that the relatively limited use of private resources in Swedish public finance policy might also be attributable to the lack of bureaucratic support for the concept.

It is worth mentioning here though that the U.S. experience with privatization suggests that, contrary to the view expressed above, planning, land-use, and development control bodies play a critical and indispensable role in the administration of privatization projects--a role that cannot be easily usurped by members of the private sector. Most importantly, the public sector provides the guidance needed to ensure that development and infrastructure provision processes proceed in a logical and coordinated manner, and in a manner that is consistent with economic and social welfare objectives. The U.S. experience suggests that privatization is a partnership; both sectors are necessary to ensure its success.

Legislative Context For Privatization Policy

The policy choice of allocating private funds and other resources to infrastructure projects is also a function of the degree to which there has been legislative accommodation to the privatization concept;

that is, the degree to which the established laws and legal principles have been altered and/or reinterpreted to accommodate the privatization concept. In the United States, where private funds have been used to finance virtually every type of infrastructure, established laws and legal principles governing the financing of infrastructure have been liberalized considerably. Early statutory and case law restricted the use of private funds to local facilities. In recent years, the laws have been liberalized so that private funds have been used to finance general facilities, as well.

In Sweden, too, there has been legislative accommodation to the privatization concept. Liberal interpretation of an established law is reflected in the adapted application of the Tomtratt law--its unconventional application to property expressly created for Tomtratt application. Furthermore, there is a proposal to alter the legislative context further to enable the construction of toll roads, which are currently illegal in Sweden. Such legislation would open the door for numerous other privatization projects such as the Osterleden project.

Despite some degree of legislative accommodation to the privatization concept in Sweden, the process appears to have not gone as far as it has in the United States. In the United States, over a period that began more than 50 years ago with the expanded use of special-assessments to finance local public works, established laws and legal principles have been gradually and consistently broadened, reinterpreted, and adapted to the financial needs of infrastructure systems, so that, today, the legislative framework for infrastructure

finance has enabled extensive private-sector participation in many aspects of the provision of many types of infrastructure.

In Sweden, legislative changes regarding land use, development, and others such factors that affect infrastructure provision policy are rarely altered in comparison to such legislative changes in the United States (Anas, et al. 1987, p. 39). This is reflected in the extent to which legislative changes have been made to accommodate privatization in Sweden. To date the changes appear to have been limited mainly to a new interpretation of an existing law. Consequently, the legal parameters for the implementation of a Swedish privatization policy has not yet been substantially liberalized and have been relatively restricted. This we maintain is another factor that underlies the relatively limited use of private funds and other resources for infrastructure in Sweden in the past.

Conclusions

In Chapter 2, we concluded that the theoretical discussion regarding the correction of market failure in the provision of infrastructure falls short in that neither theory--market failure or property rights--is particularly insightful with respect to the context in which one policy prescription or the other--government intervention or the establishment of private property rights--is likely to be applied. We have attempted to fill this void in the theory by identifying some of the factors influential is the determination of the extent to which private funds (and other resources as prescribed under the theory of property rights) are likely to be allocated to

infrastructure projects, and conversely, when public resources are more likely to be relied upon, as prescribed under the theory of market failure. On the basis of a comparative analysis of the use of private financial resources in the infrastructure provision in the United States and Sweden--countries in which recent infrastructure provision policy has, to date, been characterized by very different balances of public and private sector participation--, we conclude that, at least, the following factors are determinant.

First, the distributional objectives and underlying principles of public finance policy appear to be among the most important variables. We support our conclusion with the observation that in the United States, where recent public finance policy has been characterized by the emerging importance of the allocating the intergenerational incidence of infrastructure costs on the basis of the benefit principle of distributional equity, private funds and other resources have been allocated to infrastructure projects relatively more frequently than in Sweden, where, in the recent past, public financial policy has been characterized by a relatively stronger commitment to income redistribution and vertical income equality achieved through the application of the ability-to-pay principle of distributional equity.

Second, we conclude that the degree to which government fiscal constraints are restrictive and structural is also an important factor in the determination of the extent to which private resources are allocated to infrastructure projects. We support this point through our observation that, in the United States, where government fiscal

constraints have been sufficiently restrictive to force the cancellation and postponement of projects necessary to protect public health, safety, and welfare, and where, furthermore, the public policy makers appear to view the constraints as structural, suggesting the need for a permanent reorientation in infrastructure finance policy, private funds have been relatively more frequently used to finance infrastructure. In Sweden, where government fiscal constraints have, in the past, been relatively less restrictive and policy makers viewed them as more transitory than structural, private funds been used relatively less frequently to finance infrastructure.

Third, we conclude that because of the importance of public-sector administrative guidance in privatization projects, to the extent that such guidance is not forthcoming, private resources may not be allocated as frequently to infrastructure projects. This point we support through our observation that, in Sweden, where the public sector is relatively large and politically powerful, bureaucratic reticence to encourage the implementation of privatization projects (also evident in their U.S. counterparts, but of less significance and impact because they are relatively smaller and less powerful) might have, in the past, blunted the development and implementation of a Swedish privatization policy as compared to its U.S. counterpart.

Fourth, we conclude that legislative support is also an important factor in the determination of the extent to which private funds are allocated to infrastructure projects. In the United States, where established laws and legal principles governing the use of private funds

for infrastructure have been liberalized gradually, consistently, and considerably over the years, private funds are relatively more frequently allocated to infrastructure projects than in Sweden where there has been relatively less legal liberalization.

We do not mean to imply that these are the only or even the most important variables determining the policy response to market failure in the provision of infrastructure, or more narrowly, the extent to which private financial resources are allocated to infrastructure projects. They are variables that are apparent to us on the basis of our comparative analysis of privatization in the United States and Sweden. Other variables, such as the institutional framework for planning and development, the political context, demographics, industrial change, and other spending priorities shape the policy response to infrastructure provision and could provide the basis of other studies.

APPENDIX 1

My general idea for this study was conceived early in 1986, during the initial stages of a research project that was conducted in Sweden at the Stockholm Regional Planning and Economic Development Office (RPO) and funded by the Swedish Council for Building Research. The study is based on research and analysis I conducted over the succeeding three-year period.

The study passed through four distinct phases. In the first stage, I developed of a basic understanding of the theoretical framework for the analysis of the relative roles of the public and private sector in the provision of transportation infrastructure. I focused on two prominent theoretical perspectives that address this issue--the theory of market failure and the theory of property rights. Guidance at this early stage of the study was provided by Karen R. Polenske, Professor of Regional Political Economy and Planning at the Massachusetts Institute of Technology (MIT); Björn Hårsman, Director of Research at the RPO; Hans Wijkander, Professor of Public Finance at Stockholm University; and Jerome Rothenberg, Professor of Economics at MIT. Subsequent input was provided by Folke Snickars, Professor of Regional Planning at the Royal Institute of Technology (KTH) in Stockholm.

In the second stage, I collected information regarding U.S. and Swedish privatization in order to develop an understanding of the privatization concept and its applications within the context of infrastructure provision. Physical distance from the United States meant that I had to collect much of the U.S. data during short visits to the United States, and that I gathered most of the information from

secondary sources--public and quasi-public documents, journals, consultant's reports, published and unpublished results of research conducted by academics, research institutions, and private development firms--in the libraries of academic and other research institutions located in Cambridge, Massachusetts and Washington, D.C.

I conducted the first six months of research in Sweden. During that time, I was able to conduct relatively more intensive primary research. Because language limitations were considerable, I could not easily use written primary materials without translation. The Swedish land lease legislation and much of the material regarding the specific case that is the focus of Chapter 4 was translated from Swedish into English for my use. Most of the other information provided on Sweden in Chapter 4 is based on conversations with the staff of the RPO and other public agencies--Alfred Kanis and Karin Stăhlberg of the Ministry of Finance, and Ulf Torngren and Johan Nyström from the Ministry of Transport and Communications, and Jan-Eric Nilsson of the Swedish Road Authority. Göran Carlén, a graduate student at KTH, shared with me the preliminary results of some of his research on Swedish infrastructure systems.

Interviews with the staff of public and private organizations also provided me with considerable information on Swedish privatization. Hans Wohlin, the Executive Director of the Stockholm City Planning Authority; Bo Wijkmark, Director of the RPO; Göran Tegnér, Research Leader/Transport Sector for the Stockholm Traffic Office; Bo Carlsund, Director of the Planning and Budgetary Office at the Ministry of

Transport and Communications; and Sune Jussil, Director of the Housing Finance Institute each provided information considerable and helpful information. I also conducted interviews with staff at the Stockholm Real Estate Office--Per-Hakan Westin, engineer, and Bengt Satorius, chief project engineer; and the Director of Vasaterminalen A.B.--Eric Engstrom. The information they provided was crucial to me in the Chapter 4 presentation of the Vasaterminalen project. Per Olof Sahlstrom, Chief Project Engineer of the Osterleden Project, an important proposed privatization project, was also very helpful. All of the conversations and interviews took place in Sweden, between February, 1986, and September, 1988. I also gathered a lot of information through feedback from a series of preliminary presentations of the study results in Sweden. I made presentations at the Seventh European Advanced Summer Institute in Regional Science at Umeå University in Sweden (June, 1986), a Royal Institute of Technology (KTH) seminar (September, 1986), a meeting of the Board of Directors of the Swedish Council for Building Research (October, 1987), and an RPO seminar (August, 1988).

In the third stage, I organized vast amounts of data concerning U.S. and Swedish privatization efforts. For the United States, this was a tremendous task because although privatization is a relatively well-developed and widely implemented policy, very little work has been done to systematize and document the concept and its applications in a comprehensive and consistent manner. For Sweden, this third step was relatively less complicated because, the concept had not, to date, been

developed and implemented on as broad a scale as it had been in the United States.

In the fourth stage, I examined selected privatization projects in the two countries to ascertain some of the factors underlying the differences in degrees to which the privatization concept has been developed and implemented in the United States and Sweden in recent years. This information, I hope, will be of aid to policy makers contemplating the adoption of privatization policy as a fiscal tool to aid in the provision of infrastructure in their national, regional, or local contexts.

APPENDIX 2

Summary Outline--U.S. Privatization

Finance Principle: Infrastructure cost allocation on the basis of the benefit principle of distributional equity

I. Linkage of infrastructure financing procedures with land use control and development regulation processes; legal criteria--rational nexus (reasonable relationship) between financing provided and the infrastructure needs created by financier

A. Developer Exactions: in-kind contributions to infrastructure systems

1) Traditional: statutorily fixed; limits private funding to highly on-site and other highly localized facilities

2) Negotiated: subject to negotiation on a case-by-case basis; private funding for facilities that confer general benefits;

B. Development Fees: monetary contributions to the costs of infrastructure systems;

1) Enacted as regulations: authorized under regulatory powers granted to local governments in the zoning and subdivision state enabling legislation that authorizes their control of land use and development.

2) Enacted as taxes: generally requires explicit state enabling legislation; must comply with constitutional provisions regarding taxes, including uniformity; thus, not a form of private financing.

II. Geographically isolate and assess infrastructure beneficiaries

A. Special-assessment financing: financing of infrastructure that confers special benefits (property value increases); costs are directly assessed from beneficiaries

   1) Traditional special-assessment district: financially, administratively, politically, and institutionally dependent government unit legally restricted to financing infrastructure that confers special benefits; limits private financing to on-site and other highly localized infrastructure

   2) Symbiotic use of special-assessment districts and developer exactions: traditional dependent special-assessment district formed upon developer initiative to access tax-exempt funds and lower the cost of exactions; facilitates private financing of facilities that confer general benefits; legally problematic

B. Independent special district: financially, administratively, politically, and institutionally independent government bodies through which private funds can be tapped for infrastructure that confers general benefits

APPENDIX 3

Sometimes, development fees are adopted as taxes. In most states, the adoption of development fees as taxes requires explicit state enabling legislation, and the fees must comply with constitutional tax provisions. For instance, they must be allocated and dispersed from general government funds, and must conform to the uniformity requirement that stipulates that taxes be collected and dispersed nondiscriminatorily. The uniformity requirement precludes the imposition of development fees as a condition of development approval; their payment cannot be enforced through denial or approval of the rights to build, develop, or occupy a structure. Therefore, in contrast to development fees adopted as regulations, fees adopted as taxes must be independent of the development process; they must apply to all properties uniformly; and, therefore, developing property cannot be singled out to pay them. Payment of such fees is generally enforced through liens on property--liens that can be imposed at anytime during the development process.

Aside from constitutional limitations, there are relatively few other limitations on the administration of development fees that are adopted as taxes. Relative to fees adopted as regulations, there are, for instance, few restrictions on the level at which they may be set, and the use to which their revenue may be put; the level at which they are set and the use to which their revenue is allocated need not be related to the cost of the facilities required to serve those who pay them. Rational nexus does not apply to development fees that are adopted as taxes, so governments have more discretion in their

collection and dispersement. Furthermore, because they need not conform to the rational nexus criteria, they need not be used to the benefit of those who pay them and can, like other taxes, be used to redistribute income. Thus, fees adopted as taxes do not really constitute a form of private financing. (Snyder and Stegman, 1986, pp. 60-61)

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