

**Private Sector Participation
in Infrastructure:**

Risk, Fiscal, and Efficiency
Issues in Public-Private
Arrangements
for the Provision of Services

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*This article was originally published in **INFRASTRUCTURE**, Vol I, No. 3, pp. 3-14, Spring 1996. This reprint is issued for internal Inter American Development Bank use. Copyright John Wiley and Sons, Inc., 1996.*

Washington, D.C.

May, 1996

Reprint Series No. IFM-301

Private-Sector Participation in Infrastructure: Risk, Fiscal, and Efficiency Issues-in Public-Private Arrangements for the Provision of Services

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INTRODUCTION

Although most infrastructure assets were privately owned, financed, and managed in the 19th century, over time many countries nationalized most infrastructure companies,¹ so that by the middle of the 20th century, public agencies owned, financed, and managed most infrastructure assets. Construction of infrastructure works was usually the only relevant private-sector participation in the provision of infrastructure services, and most of the time this took place under a contract from a public agency. Although private firms have maintained ownership and management of some infrastructure assets in some countries, these are more the exception than the rule, especially in developing countries.

Over the past decade, the role of the public sector in infrastructure services has been changing worldwide, from one of owning and managing infrastructure assets to one of planning and regulating privately owned and managed assets to balance the interests of consumers and private-sector firms.

Over the past decade, the role of the public sector in infrastructure services has been changing worldwide, from one of owning and managing infrastructure assets to one of planning and regulating privately owned and managed assets to balance the interests of consumers and private-sector firms. The forces that have led to these changes in infrastructure provision are

rooted in both fiscal and efficiency issues. Public deficits and increasing social demands have led governments to privatize infrastructure assets to increase revenues, reduce public-sector participation in new investments, and decrease public expenditures resulting from public-enterprise losses. State-owned enterprises have traditionally performed poorly in three areas: meeting growing consumer demand, upgrading technology, and providing adequate customer services. The main causes of this are inadequate pricing, poor financial management, and the lack of appropriate incentives.

Although private-sector participation in infrastructure provision may increase efficiency and reduce fiscal pressures, infrastructure assets have features that require some degree of public-sector involvement. The high level of investments, economies of scale and scope, externalities, and the nontradable nature of the output of infrastructure assets are features that demand public-sector involvement to avoid monopolistic behavior or other market failures. Governments usually wish to ensure that infrastructure services do not jeopardize economic growth. Thus, private-sector participation in infrastructure provision requires an arrangement between the private and public sectors. The public sector regulates the provision of the service and, in some cases, may be involved in some aspects of the provision of the service, as will be seen below. Such public-sector involvement introduces other noncommercial risks for the private sector, risks that must be adequately dealt with.

The objective of this article is to characterize different institutional arrangements involving the public and private sectors in infrastructure provision and analyze their efficiency and fiscal features.² Risks to the

* The findings, interpretations and conclusions contained in this paper are the authors' own responsibility and should not be attributed to the Inter-American Development Bank, its Executive Board of Directors, or any of its member countries.

¹ For a discussion of nationalization and privatization waves, see Klein and Rogor [1].

² This article focuses on public-private arrangements for infrastructure provision in emerging markets. However, many conclusions can be applied to mature markets.

private sector derived from the public-private arrangement are also analyzed. In order to draw some policy recommendations for multilateral institutions and the public sector, and to guide the actions for effective private-sector participation, the article gives special attention to these main topics:

- Private-public arrangements in which a private firm has the responsibility for financing infrastructure assets.
- Regulatory risk derived from decisions of regulators about prices of infrastructure services.
- Credit risk derived from the public entity's failure to pay.³

Arrangements that strike the proper balance between the needs of consumers, minimum cost, good quality, and the interests of the private sector are likely to be sustainable in the long run. Therefore, the design of the role and behavior of the public and private sector should set incentives for the private firm to minimize the cost of infrastructure services, but should also establish attractive conditions for private investors.

The remainder of this article is organized in five sections. In order to analyze the efficiency and fiscal implications of arrangements, Section 1 proposes a characterization of them using two features of public-private arrangements: the *source of revenues* to the private firm and its *responsibilities over the assets*. Section 2 discusses arrangements in which a public entity assumes responsibility for owning and financing the assets, and a private firm manages them. Given the important implications of private-sector financing, two sections of the article are dedicated to arrangements in which a private-sector firm is responsible for financing assets. Section 3 examines arrangements in which a private-sector firm finances the assets but the firm revenues come from a public entity. Section 4 elaborates on arrangements in which the private firm is responsible for financing assets and revenues stem from final consumers. A summary of major conclusion is given.

³ Other political risks of infrastructure projects, such as expropriation, inconvertibility, or foreign-exchange risk, are not addressed in this article as they are not exclusive of infrastructure projects, and insurance schemes are commonly available and discussed elsewhere. See, for example, Bensman [2].

SOURCE OF REVENUES AND ASSET RESPONSIBILITIES OF PRIVATE FIRMS IN PUBLIC-PRIVATE ARRANGEMENTS

Private participation in infrastructure services requires that a government make the decision of allowing private-sector involvement and establish some schemes to balance the interests of users and producers. Many institutional arrangements have been devised. The choice depends on factors that range from the country's legal framework to financial resource requirements, and from the nature of macroeconomic adjustments to demand or supply characteristics. Each institutional arrangement has advantages and disadvantages for dealing with the provision of a specific infrastructure service; therefore, an analysis of an individual arrangement should be made in each case. Nevertheless, a simple characterization of private-public arrangements is useful to identify the relevant issues.

Although an institutional arrangement for providing infrastructure services may be defined by a multiplicity of features, this article proposes to characterize such arrangements using only two: the source of revenues and asset responsibility of the private firm. The first criterion has been used by the World Bank in its World Development Report [3]. The second has been used by Guislain and Kerf [4]. Using both allows us to identify the problems derived from the combination of both features which, as will be seen, is critical to understanding the efficiency and fiscal issues underlying the arrangement.

Sources of revenues of private firms

The source of revenues is a relevant feature to consider when assessing public-private arrangements for providing infrastructure services. The source determines (a) the incentives of a private firm to adjust the cost and quality to consumer willingness to pay for them, (b) the amount and timing of public expenditures, and (c) the nature of the risks to which revenues are exposed.

In a public-private arrangement, private-firm revenues may come from consumer payments, from public-entity payments, or from both. To simplify matters, this article only addresses the two pure cases. Nevertheless, because mixed cases share features of the pure cases, they may be evaluated by using the relative participation of final consumers and the public agency in the private-firm revenues.

Private-firm revenues stemming from final users

When private-firm revenues stem from final users they are the result of quantities and prices. The market consumption quantity results from decentralized decisions by consumers that are determined by prices, consumer preferences, service quality, and the existence of other substitute services. Thus, consumption levels are subject to variability and expose the firm's revenues to commercial risk. However, the private-firm revenues are also a function of prices or user fees; prices can be set independently by the firm or by regulation. For instance, in most countries the private firm is free to set user prices of cellular telephone services, but in general the government fixes or regulates electricity prices. When prices are set by competitive markets, project revenues are only exposed to commercial risk; however, if regulators set or control prices, private-firm revenues are also exposed to the decisions of regulatory authorities. This introduces regulatory risk.

The possibility of a change in revenues due to public authorities' decisions about user prices is called regulatory risk.⁴ There are three main differences between regulatory and commercial risks. First, commercial risk derives from the decisions of many different economic agents, whereas regulatory risk derives from centralized decisions, which may be discretionary and unrelated to firm choices. Second, managers can rationally forecast and manage commercial risk, but there are no standard techniques to do so with regulatory risk. Although managers may reduce regulatory risk through lobbying and the public media, investors do not like controlling regulatory risks in this manner. Finally, commercial risk is the result of continuous changes in different directions, whereas regulatory risk is usually the result of a random shock.

There are three important points to bear in mind with respect to arrangements in which all revenues come from final users. First, revenue providers are not a legal party in the contract that set the conditions of the private-public arrangement. Second, collecting from final users may be difficult, so operators must have tools for enforcing payment, such as stopping service. Third, private-firm decisions usually minimize

⁴ Regulatory risk may also derive from the decisions of regulatory authorities on the prices of substitutive services. For example, a gas subsidy may reduce the revenues of firms that distribute electricity.

the internal cost of infrastructure services, but the resulting prices and quantities may not be appropriate from a social standpoint in the presence of externalities, increasing returns, and other market failures. Therefore, regulation is usually required.⁵

Private-firm revenues arising from a public agency

In some cases where private-firm revenues come from a public agency, the private-firm provider of infrastructure services sells the output to a public entity (e.g., independent power producer selling to a national utility). In other cases, the private firm provides services to final consumers, but receives payments from a public entity (e.g., solid-waste service in some localities). Payments from the public agency are directly or indirectly public expenditures and will therefore have a negative impact on the fiscal budget. The degree to which these arrangements may (or may not) reduce fiscal pressures depends on the cost of the provision of the services through a pure public-sector arrangement relative to the payments made to the private firm by the public agency.

In addition, if a public agency makes the payments to the private firm, the direct relationship between consumers and private firms is lost. As a result, private-sector involvement is less likely to solve the problems of unattended demand and poor-quality service. Operational efficiency may or may not improve with private-sector involvement. Other features of a public-private arrangement, such as management and ownership of assets, should also be considered in analyzing operational efficiency.

Revenues originating from a public agency are not usually exposed to commercial risk. They are, however, dependent on the willingness and capacity of the public agency to make the payments. Failure to pay may be seen as a contract failure, similar in nature to a regulatory failure. A distinction between regulatory and payment commitments should nevertheless be made, because the fulfillment of a regulatory commitment does not depend on the financial capacity of the public entity, and because schemes to mitigate and share the risks derived from both types of failures may be different.

⁵ For a discussion of these issues, see [5, Chap. 11].

There are three reasons private investors may be unwilling to accept public-payment risk. First, investors cannot usually impose conditions on the public entity to ensure its financial soundness. Second, cumbersome procedures are usually required to sue a public agency. Finally, public assets are often not subject to seizure.

Private-firm responsibilities for Infrastructure assets

Responsibilities for and rights over infrastructure assets can be assigned between the public and private sector in many ways. Private-public arrangements can be classified according to who owns, manages, and finances infrastructure assets. The four cases that present themselves are discussed below.⁶

A private firm owns, finances, and manages Infrastructure assets

A private infrastructure firm has the same rights over the assets as any private industrial or commercial firm has over their productive assets. Most power-generation plants in Chile and Argentina are owned, managed, and financed by private companies, and the public sector regulates the relationships between them and consumers.

A private firm finances and manages Infrastructure assets but a public agency owns them

The private firm manages and operates the assets for a fixed period of time, after which assets are transferred back either to the public sector or to another private firm. Concessions fall into this group. These schemes are socially demanded for natural monopoly infrastructure assets, because the community members are willing to maintain public ownership over these assets to ensure long-term service quality. Two groups can be distinguished, depending on the conditions at the time of setting the arrangement. In the first case, existing assets were financed by the public sector but a private firm finances new assets (this is the case in most potable water and sanitation concessions). In the second

case, all assets are financed by the private firm, either because they were purchased as a part of a privatization or because there were no assets before the arrangement (green-field projects, as in the case of some concessions for electricity distribution). For the purposes of this analysis, no distinction will be made between the two cases.

A private firm manages assets, but the public sector finances and owns them

The private firm may manage all or part of the assets owned by the public sector. For instance, private-sector management contracts for operating a public utility (potable water in Mexico City is provided through an arrangement of this type) fall into the first group. Arrangements in which a private firm manages commercial services, such as billing, collection, or customer service, fall into the second group (commercial water and sewerage services will be provided by a private firm in Guayaquil, Ecuador, with water itself being provided by the public firm).

A private firm owns and finances Infrastructure assets but the public sector manages them

These are rather unusual cases in which the private firm owns infrastructure assets but leases them to a public entity. Examples of these arrangements are some thermoelectric power-generation plants. In these cases, the private sector cannot provide operational efficiency, as its involvement is limited to financial responsibility and, in some cases, to asset construction.

A characterization of arrangements

For the purposes of analysis, a characterization of public-arrangements is made by using both the source of private-firm revenues and the distribution of responsibilities over infrastructure assets. In Figure 1, the participation of user fees in private-firm revenues is represented on the horizontal axis, and the assignment of rights and responsibilities between the private firm and the public sector over infrastructure assets is represented on the vertical axis. The combination of the two criteria, source of revenues and assignment of rights and responsibilities over assets, generates eight classes of arrangements.

The top area of Figure 1 (Zones I, II, III, and IV) represents arrangements in which a relevant private-

⁶ The case where a public entity owns, finances, and manages infrastructure assets is not considered a public-private arrangement, because all asset responsibilities lay in the public sector. Such a case is called a pure public-sector provision. For the purposes of analyzing fiscal and efficiency issues of each public-private arrangement, they will sometimes be compared with the case of pure public-sector provision.

sector involvement occurs whereby a private-sector firm manages and finances infrastructure assets. These are at the core of the new model of infrastructure provision being instituted around the world. The middle area of Figure 1 (Zones V and VI) corresponds to arrangements with limited private-sector involvement in the provision of services, since the private firm does not manage assets.⁷ The lower area of Figure 1 (Zones VII and VIII) represents arrangements in which the public entity is responsible for financing infrastructure assets and a private-sector firm manages them. This

last type is often used as a preliminary step leading to a larger private-sector participation. The arrangements shown in Figure 1 are analyzed in more detail in the sections that follow, proceeding in inverse order of the degree of private-sector involvement, that is, from the bottom to the top of Figure 1.

Infrastructure
Asset Responsibility

MOF Private firm manages, owns and finances infrastructure assets.	Zone I	Zone II
MF Private firm manages and finances infrastructure assets, but a public entity owns them.	Zone III	Zone IV
OF Private firm owns and finances infrastructure assets, but a public entity manages them.	Zone V	Zone VI
M Private firm manages infrastructure assets but a public entity owns and finances them.	Zone VII	Zone VIII
	Private firm revenues from final consumers	Private firm revenues from a public entity

Source of private firm revenues

FIGURE 1. Public-private arrangements.

⁷ If a private firm owns infrastructure assets and a public entity manages them, the source of private-firm revenues is usually the public entity. Therefore, arrangements of Zone V, in which the sources of private firm revenues are final consumers, do not exist in practice, and as such they are not addressed in this article.

PRIVATE INVOLVEMENT BY MANAGEMENT: A PUBLIC ENTITY OWNS AND FINANCES INFRASTRUCTURE ASSETS

In countries where political and economic risks are high, private firms may not be interested in financing a new infrastructure asset or may request a very high risk premium in return for their participation. This may be the case of water and sanitation in countries without a regulatory framework in place or where public opinion is not ready for private ownership or private-sector concession. It could also be the case where rates must be set so low that private-sector interest in any form of ownership or concession does not exist, as is the case of rural water systems. In these circumstances, private-

In countries where political and economic risks are high, private firms may not be interested in financing a new infrastructure asset or may request a very high risk premium in return for their participation.

sector involvement may be limited to management, with the public sector financing and owning the assets (Zones VII and VIII of Figure 1). This arrangement may eventually lead to larger private-sector participation. An implication of these arrangements is that the duration of contracts between the public and private sector may be relatively short as compared with the life of the assets under management, and mistakes can thus be easily corrected by contract modifications. As already mentioned, water provision in Mexico City is an example of an arrangement falling into Zone VIII, in which private-firm revenues come from a public entity and a public entity owns and finances assets. The provision of water in Guinea is through an arrangement in which private-firm revenues are derived from final consumers and assets are owned and financed by a public entity (arrangements in Zone VII).

Fiscal issues

To analyze fiscal issues, a distinction is made between two types of public expenditures: public investment and current public expenditures. Public investment in these arrangements are larger than in arrangements in which a private firm owns, finances, and manages infrastructure assets. Although in these cases assets are financed by a public entity, as in the case of provision without private involvement, public investments may be smaller with management contracts than with a pure

public-sector provision. The reason is that efficiencies in management may translate into a lower level of assets, thus reducing the need for new public-sector investment. Nevertheless, because the cost of assets is borne by a public entity, the new investments under management contracts (arrangements in Zone VII and VIII) will increase fiscal pressures, for they imply public expenditures.

As for current public expenditures, if private-firm revenues were to derive from consumer payments (Zone VII), there would be no current public expenditures derived from the arrangement. If the private firm pays a fee to the public sector for the exploitation of the assets, then public revenues will be generated. The current fiscal impact of a change from pure public provision to a contract arrangement will depend upon the operational results under pure public provision. If operational losses occurred before the management contract, private-sector involvement would reduce fiscal pressures.

If revenues were to come from a direct management fee from the public sector (Zone VIII), the arrangement generates public expenditures to fund fee payments. In arrangements with public payments, the public-sector entity may receive payments attached to services from consumers that may be larger or smaller than payments to the private firm. Usually, payments from consumers to the public entity are smaller than payments to the private firm from the public entity; therefore, they increase fiscal pressures.

In summary, the overall fiscal impact of a change from pure public-sector provision to contract management is usually very limited, because the cost of assets remains in the public sector. The fiscal impact of operational losses of an infrastructure service provided by a public entity are usually reduced through management contracts in which the sources of private-firm revenues are consumer payments.

Efficiency Issues

From an efficiency point of view, private-sector involvement may have an impact on customer service and meeting demand, depending on the features of the contract, but it will not significantly improve the problem of lagging technology, as new technologies are usually introduced in a productive process through new

long-term investments, which in this case are the responsibility of the public sector.

In arrangements in which private-firm revenues come from final users, the private firm has incentives to manage assets to meet demand and improve quality. These incentives are more difficult to find when private-firm revenues come from a public entity, for they may be independent of consumer satisfaction. Schemes relating public payments to fulfillment of consumer preferences may be envisioned, but they are difficult to implement in most cases, because benchmarks for consumer satisfaction are difficult to establish and measure, and they tend to be a source of conflict, not of benefits.

Issues derived from regulatory risk and failure of public-entity payments

Private-sector revenues are exposed to regulatory risk or the risk of nonpayment by the public entity, depending on the source of private-firm revenues. Nevertheless, because the private firm does not have long-term investments that need to be recovered, it has higher mobility. Thus the task of mitigation of risk appears as less relevant than in the cases where there is a long-term commitment. Both issues, regulatory risk and the risk derived from a failure of public entity payments, are discussed in the corresponding section dedicated to arrangements in which a private firm finances the infrastructure assets. However, because management arrangements are used as a stepping stone to larger private-sector involvement, a contract failure, whether regulatory or financial, will jeopardize future private-sector involvement.

PRIVATE INVOLVEMENT BY PRIVATE FINANCING: PRIVATE-FIRM REVENUES FROM A PUBLIC ENTITY

These arrangements correspond to zones II, IV, and VI in Figure 1. Arrangements of Zones II and IV, where assets are managed by the private sector, may generate some public expenditures, but are likely to improve efficiency. Arrangements of Zone VI, in which assets are managed by a public entity, do not have incentives either for reducing fiscal pressures or improving efficiency. Examples of arrangements with private financing and private firm revenues from a public entity are some power plants in Guatemala and Mexico (Zone II

or Zone VI) and the water service in Puerto Vallarta, Mexico (Zone IV).

Assets managed by a public entity: fiscal issues and efficiency issues

These arrangements are likely to have a negative fiscal impact compared to a pure public-entity provision. In these arrangements a private-sector firm builds an asset and leases it to a public entity for the entire length of the asset life. The public entity saves the cost of investment, but has to pay a lease during the asset life. The present value of lease payments will be larger than the cost of investment under pure public-sector provision. The reasons for this are the higher rates of interest that a private firm would have to pay compared to the public sector. Private firms will pay higher interest rates because normally they are perceived as riskier than the public sector that hosted the project, and revenues coming from the public sector may not be accepted as guarantees for bonds or other debt.

It is worthwhile to consider the timing of the fiscal impact. Arrangements with private financing and revenues from a public agency, even though they may have an overall negative fiscal impact relative to arrangements with pure public provision, allow a public expenditure to be postponed and spread out over the life of the assets. This may give the public sector time to correct a temporary fiscal deficit or overcome liquidity restrictions.

Private-sector involvement will not improve efficiency, because assets are managed by a public entity. The private-sector role is limited to financing and construction. However, financing infrastructure assets through a private firm will, in general, be more expensive than direct public financing. The benefits of private involvement during the construction period can be achieved through other methods, for instance, competitive bidding for turnkey contracts. An additional problem that may arise from these arrangements, is the lack of transparency regarding the real level of public debt because public payments to private firms financing infrastructure payments are in many cases not accounted for as public debt; thus, they are often used to overcome public-debt restrictions.

Assets managed by a private firm: fiscal issues and efficiency issues

The fiscal impact of these arrangements compared to a public provision is better analyzed by disaggregating it into three components: public saving from private financing, public saving from reducing the need for new assets, and public saving from operational efficiency. The first component is the difference between the cost of financing an asset by a public entity and the cost of financing by a private firm. The impact of this component will be negative, because interest rates for private financing will be higher than those for public financing. The second component is usually positive, because asset management improvement will reduce the need for new investment (for instance, private management of power plants in Chile has increased utilization by around 40%). The third component is usually also positive, because payments from public to private sector are usually smaller than the cost of operating and maintaining assets by the public entity. The overall fiscal impact will depend upon the relative size of the three components.

In these types of arrangements, a private firm will generally have an incentive to operate efficiently, but it may not have incentives for meeting demand or improving quality. The reason for this is that the private firm does not derive its revenues from consumers; therefore revenues are not tied to consumer satisfaction. The degree to which incentives work depends upon each specific contract. If it is a “take-or-pay” contract, where the agency pays even if it does not buy, there are few incentives to provide good service or even for good maintenance. For instance, consider the case of a country that has ample gas reserves and wants to introduce gas consumption. A gas pipeline would be extremely risky for a private firm in the face of uncertain consumer demand. As a result, to ensure that the project is undertaken, the government may need to guarantee payments, even if consumer demand fails to materialize. In this case there is little incentive for efficient performance, except that derived from some contractual clauses specifying asset availability.

This is not to say that contracts with take-or-pay or similar clauses should not exist. It does point out, however, that the contract should carefully evaluate costs and benefits and incorporate the proper incentives. In

the previous example, the contract between the private and public sectors may have a phasing out of the take-or-pay clause so as to incorporate market demand in the incentives for the private firm. Contracts with take-or-pay clauses during the initial phase of the project are appropriate for infrastructure projects that generate their own demand. For example, a government willing to introduce competition in the electricity sector through electricity imports may use an arrangement with the following conditions:

1. A private firm builds and operates a transmission line joining two countries.
2. At the beginning of project life when there is no electricity market between the countries, the public sector makes payments to the private firm.
3. Later, when the market develops, the government reduces the payments to the private firm.

Thus, because revenues after an initial period come from final consumers or electrical distribution firms and depend upon the electricity imports, the private firm has incentives to support competition in the electricity sector. The project also does not entail public expenditures after the initial period.

Failure of public-sector payments

Private-firm revenues are exposed to the willingness and capacity of the public agency to make payments. As a result, the financial soundness of the public agency is a relevant issue in financing projects under these arrangements. The following tools may be used to reduce or mitigate the risk of payment failure by a public entity.

Transparent Accounting Rules. Even though public entities in most countries are required to report future contractual commitments, in some countries the rules of public enterprises and public accounting may allow long-term contracts to be ignored in the financial statements or in budgets of the central government or municipalities. For instance, in many countries capital leases may be treated as operational leases for accounting purposes. In many cases, capital leases are done without reporting them, not even in the notes to the financial statements. Accounting for the present value of future contractual payments as on-balance-sheet debt in financial statements and public budgets gives a better picture of the capacity of the public entity to

carry on additional debt. This introduces an element of control and thereby reduces the probability of default. Nevertheless, it does not mitigate the risk derived from poor management or a reduction in the public agency's future revenues.

Trust Funds and Escrow Accounts. The use of externally managed trust funds and escrow accounts for mitigating contract failure risks should be explored to mitigate the risk of public-payment failure. A fund would be used to make payments on behalf of the public agency in case of default. To be efficient and acceptable, a fund of this sort should meet the following requirements:

1. The fund or account should be fed by contributions made by the agency that has to pay the revenues to the infrastructure project; otherwise the public agency would not be motivated to meet its commitments.
2. The size of the fund or account and the payments from the public entity should be jointly determined in the public bid that awards the project to the offer that minimizes both periodic payments and the size of the trust fund.
3. The funds should be managed independently of the public entity making the commitment.

As an alternative to using multilateral loans to finance directly the full cost of infrastructure investments, multilateral financial institutions should explore the possibility of providing financing to the public entity to fund these escrow accounts. With a significantly lower amount they could help mobilize private-sector financing for a project perceived as risky because revenues come from a public entity.

Multilateral Bank Guarantees. The use of multilateral bank guarantees may also mitigate this risk. However, they may be less flexible than the above-mentioned funds to be integrated in a bid process. From a transparency standpoint, funds would be better than guarantees, because contributions from a public agency to the fund would be accounted as public debt, whereas the accounting standards of guarantees are not always clear. Furthermore, guarantees on the full face value of the private-sector financing would be more expensive than funds used to cover only a predetermined portion of the revenues.

INVOLVEMENT BY PRIVATE FINANCING AND MANAGING: PRIVATE-FIRM REVENUES FROM FINAL CONSUMERS

These arrangements correspond with Zones I and III of Figure 1. Arrangements in both zones have similar features, and they have the best properties to deal with efficiency and fiscal issues. Arrangements for the provision of phone services in most countries are in Zone I, whereas the provision of water in Buenos Aires is made with an arrangement in Zone III.

Efficiency, fiscal, and risk issues

In Zone I a private firm owns, finances, and manages assets, with revenues coming from final users. A private firm providing infrastructure services with an arrangement in this area has strong incentives for balancing asset costs and quality improvements. Providing infrastructure services under these arrangements does not generate public expenditures, and incentives for proper asset maintenance are present. Assets and revenues can be used as guarantees or collateral for financing, allowing for greater flexibility in the management of risks. These cases are very close to the noninfrastructure or industrial cases. Investors bear the commercial risk and, depending on the price-setting mechanism, they may or may not bear the regulatory risk. If the market is truly liberalized, regulatory risk may be minimal, but in most cases it will still be present.

For example, in many countries the cellular telephone service falls into this zone, because a private company owns, finances, and manages the assets, and revenues come from final users. In some countries, regulatory risk exists, because service prices are set by regulations. In others, where there is competition, regulatory risk does not exist, as each firm is free to set its own price. In most countries, electricity distribution to the general public bears a regulatory risk, as the service is a monopoly and some regulatory agency must approve changes in rates.

In Zone III, a private firm manages and finances the assets, but does not own them, with revenues coming from final users. Arrangements in this zone have fiscal and efficiency effects similar to those in Zone I. Revenue risks are also similar in both zones. The relevant differences that derive from the lack of private ownership of assets in Zone III are the following:

1. Fixed assets cannot be used as collateral or as guarantees, making infrastructure financing harder. Only customer revenues and receivables may be used for this.
2. There is a lack of incentives to carry out appropriate maintenance or provide good service during the years prior to the transfer back to the public sector or to another firm winning the reconcession. However, if asset life is close to the concession period or if there are good chances of it winning back the concession, then the private firm has incentives to maintain the assets properly and provide quality service.

This arrangement is generally the case of potable water concessions, where old assets belong to the public sector and even new investments, financed by the private sector, may not be used as collateral, because they become part of the concession and belong to the public sector.

Regulatory frameworks

These arrangements usually rest on a regulatory framework to balance the interest of consumers and producers. A regulatory framework may reduce the incentives for the private firm to seek efficiency, and it introduces regulatory risk. Some guidelines for avoiding efficiency problems and ways of mitigating regulatory risk are discussed below.

If competition is present in the provision of an infrastructure service, the regulatory framework should focus on maintaining competition and ensuring that consumers receive appropriate information. Prices should be mainly set through the markets.

The presence of externalities and public goods may generate service allocations (quantity and prices) that are not efficient from a social point of view. For example, the consumption of electricity in rural areas will be less than optimal if electricity prices are set to cover the total cost of providing the service to those areas. In these cases, the government may be willing to provide some subsidies. However, if an infrastructure service is provided in a competitive market, subsidies may destroy the efficiency derived from competition. Direct subsidy schemes usually do not destroy competition, but their implementation is very expensive. Governments should balance the loss of efficiency

from a reduction of competition and the cost of implementation with the equity gains from subsidy schemes.

Lack of competition in the provision of an infrastructure service requires that a regulatory framework set service prices to protect consumers from monopolistic behavior. Regulatory systems that rely heavily on the actual costs of the private firm for setting prices should be avoided. Otherwise, regulatory price systems may destroy incentives for the private firm to reduce costs.⁸

Prices of infrastructure services are far below cost in many developing countries where private-sector involvement is sought. However, private-sector involvement requires that prices cover total costs and generate profits. Thus, at the beginning of its activities, a private firm may face social rejection and problems in collecting bills because of the price increases required to fill the gap between costs and prices. Regulatory frameworks should provide the private firm with tools to enforce consumer payments and include transitional systems that allow a gradual increase in prices.

Mitigating regulatory risk

In public-private arrangements with private-firm revenues coming from final consumers, private revenues are usually exposed to regulatory risk because of a lack of competition in infrastructure markets. As previously discussed, private investors are not willing to accept this risk. Therefore, in designing these arrangements, authorities should contemplate schemes to reduce it, and, if at all possible, to introduce competition.

A well-functioning regulatory commission is one tool for reducing regulatory risk. A regulatory commission is a public entity of the central government with a certain degree of independence. The independence can be achieved by requiring that commission members have high professional qualifications and a term of office usually longer than that of the government. Most existing regulatory commissions in emerging markets are relatively new and, therefore, it is too soon to evaluate their actual performance in mitigating a long-term regulatory risk. However, they are appropriate for reducing regulatory risk under certain institutional arrangements. The following guidelines can be used to

⁸ For a discussion of this point, see Smith and Klein [6].

assess the capacity of a regulatory commission to reduce regulatory risk:

1. When the responsibility for supplying the infrastructure service is at the national level (telecommunications, energy generation, major highways), revenues come from final user prices, and when sponsors and operators are private firms with good reputations, regulatory commissions should be useful in mitigating regulatory risk. The presence of a private firm with a good reputation moves members of the regulatory commission to balance the interest of users and infrastructure firms. When prices are set at the national level, local governments cannot reject the decisions of the regulatory commission.
2. When primary responsibility for the infrastructure service is local (water, electricity distribution in some countries), a central regulatory commission may not be very useful. Conflicts between the central commission and the local government usually arise. In addition, the central commission often lacks the skills and staff necessary to evaluate many different infrastructure companies. For instance, a central regulatory commission for water and sewerage in an institutional environment in which service responsibilities rest mainly with municipalities may not be appropriate.
3. Investors in emerging markets tend not to trust regulatory commissions, whereas investors in mature markets rely on them. The reason for this is that mature markets have clearer rules than emerging markets on how authorities make decisions on the prices of infrastructure services, and the rules are designed to make decisions less centralized and less discretionary. In mature markets, investors are able to appeal to the judicial system if a regulatory decision is inappropriate. Investors usually trust judicial decisions in mature countries. Although many emerging markets have taken steps to make the decisions of regulatory authorities less discretionary, it takes time to gain the trust of investors. As the judicial systems are slow in emerging markets, investors feel that an erroneous regulatory decision may not be changed within a reasonable amount of time.

Most investors in emerging markets would like to have insurance for regulatory risk, but this is a limited option in the real world. Although existing political-risk insurance schemes cover currency inconvertibility risk, war, and expropriation or confiscation risk, they seldom cover regulatory risk. Specialized public agencies from developed countries are the main suppliers of political-risk insurance; these public agencies provide broad coverage for that portion of the project associated with exports or investments from each agency's home country, but they do not cover regulatory risk, although many agencies are allowed to do so. The Multilateral Investment Guarantee Agency of the World Bank (MIGA) provides political insurance in developing countries for those niches that bilateral agencies do not cover, but MIGA does not usually cover regulatory risk. Some private companies supply political-risk insurance, including traditional political risk and some form of insurance for regulatory risk, but premiums are extremely high and terms very short.

The promotion of regulatory-risk insurance is a challenge for developing countries attempting to increase private-sector participation and for multilateral financial institutions supporting these efforts. In promoting a market for insuring regulatory risk, the following points should be considered:

1. Distortion of financial markets should be minimized, and incentives for countries to comply with their regulatory framework should be established.
2. Regulatory-risk insurance can be supplied jointly with more conventional types of political-risk insurance, but it can also be supplied independently. The second route seems more promising because the skills required to assess both types of risks are different, and conventional political-risk insurance markets are mature, whereas regulatory-risk markets are new.
3. Regulatory-risk insurance requires simple, clear, and enforceable regulatory frameworks. Future prices are more predictable if they are set through a concession contract than if they are set through legislation. Concession contracts are more specific than regulatory laws because concession contracts have a more limited domain. In addition, the private firm may also impose conditions on a concession contract. Last, concession contracts are out-

side the political process, whereas regulatory laws are political in nature.

CONCLUDING REMARKS

This article has analyzed different public-private arrangements for infrastructure provision and developed some guidelines to evaluate their capacity to reduce fiscal pressures and increase efficiency. As pointed out in the Introduction, these have been the leading forces for increasing private-sector participation. Some recommendations for mitigating the risk derived from public involvement, regulatory risk, and failure of public payments have been also established.

The following is a summary of the guidelines for assessing public-private arrangements and recommendations for mitigating risk.

- 1. Public-private arrangements in which private firm revenues come from final users and assets are owned, managed, and financed by a private firm are the most conducive to increasing efficiency and reducing public expenditures. Therefore, if feasible, they should be preferred to other arrangements. Mitigation of regulatory risk is one relevant issue of these arrangements.**

Private infrastructure investors in these arrangements bear regulatory risk in addition to other risks (commercial risk, exchange rate risk, inconvertibility risk, expropriation risk, etc.). However, if some degree of competition is present, the regulatory risk will be less than would be the case without competition, because a natural monopoly requires price regulation, whereas services provided in a competitive market do not.

The mitigation of regulatory risk requires clear rules for regulators to make decisions and systems to ensure that regulators follow established rules and procedures. However, although clear rules and enforcing systems may be in place, time is required for investors to trust in them. Therefore, the multilateral development institutions should be prepared to promote coverage of regulatory risk.

- 2. Public-private arrangements in which private-firm revenues come from a public agency and a private firm finances assets should be carefully designed to avoid or minimize negative fiscal**

impacts and efficiency problems. These arrangements often raise efficiency problems and increase public expenditures compared with other arrangements. Private Investors bear a risk derived from the payment failure of the public entity. Schemes for mitigating this risk without enticing the public entity to default (moral hazard problems) need to be developed.

These arrangements should meet the following requirements to mitigate fiscal and efficiency problems:

1. Proper accounting standards should be used to make sure that these arrangements are not used to overcome restrictions on public debt or to artificially enhance debt capacity.
 2. Projects should be awarded through competitive bidding or other schemes to ensure that the present value of all public payments, including the cost of guaranteeing the public payments, is the minimum required for a private-sector involvement.
 3. The private firm should manage the assets. If assets are managed by the public agency, the private-sector role is merely financial. Therefore, if acceptable, the present value of all public payments, including tax incentives, should be smaller than the financial cost of public-sector investment through a turnkey contract. However, this acceptability criterion is unlikely to hold.
- 3. Public-private arrangement in which the public sector owns and finances assets and the private firm manages do not reduce significantly public expenditures, and private Involvement is very limited. Nevertheless, they may improve operational efficiency in relation to arrangements in which a public agency undertakes all activities.**

These arrangements are used as a prior step for a larger private-sector involvement in countries where investors perceive a high political or economic risk. They are also used as a vehicle to subsidy consumption in cases where positive externalities are present. In such cases, the public sector finances infrastructure assets through taxes and the private firm covers operating and maintenance costs through payments on final consumers.

To conclude, two remarks should be made. The first one is that social acceptance is needed for a public-private arrangement to be sustainable in the long term. This acceptance depends upon its efficiency and capability to reduce fiscal pressures, but also upon other social values. Thus, an arrangement may be more socially acceptable than others with better efficiency and fiscal properties. However, the efficiency and the fiscal implications should be evaluated for a rational social decision. The second remark is that real-world arrangements for the provision of infrastructure services are complex. The most appropriate arrangements for one infrastructure service depend on the economic and social conditions of each country and on the features of each specific infrastructure service. Therefore,

the analysis should be made on a case-by-case basis and no general rules should be applied. Nevertheless, problems and advantages of a real-life arrangement may be evaluated with references to the relatively simple arrangements presented in this article. ■

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