RMC DISCUSSION PAPER SERIES 117

Private Financing of Toll Roads

Gregory Fisher

Suman Babbar

Private Financing of Toll Roads

Authors
Gregory Fishbein, Mercer Management Consulting, Inc.
Suman Babbar, World Bank, Project Finance and Guarantees Group

Advisory Committee, World Bank Group
Ram Chopra (Chair)
Cofinancing and Project Finance Department

Gregor Dolenc
Asia Technical Department

Thomas Duvall
Legal Department

Michael Klein
Private Sector Development Department

Amnon Mates
International Finance Corporation

Hans Peters
Transport, Water, and Urban Development Department

Graham Smith
Europe and Central Asia–Middle East and North Africa Technical Department

Lou Thompson
Transport, Water, and Urban Development Department

Contents

Acknowledgments

This study, sponsored by the World Bank's Project Finance and Guarantees Group and produced in collaboration with Mercer Management Consulting, Inc., was guided by an Advisory Committee that was formed in December 1995 and chaired by Ram Chopra, Director of the Bank's Cofinancing and Project Finance Department. The Advisory Committee included representatives from the Bank's Transportation, Water, and Urban Development Department, the Latin America and the Caribbean, South Asia, Europe and Central Asia, and Middle East and North Africa Regions, the Legal and Private Sector Development Departments, and the International Finance Corporation.

The principal authors of the report are Gregory Fishbein of Mercer Management Consulting, Inc. and Suman Babbar of the Bank's Project Finance and Guarantees Group. Other important contributors to the report include Alan Kaulbach, Tom Morsch, and Shelby Sax of Mercer Management Consulting, Inc. and David Baughman of the Project Finance and Guarantees Group. The report benefited from the comments of several Bank staff, including Gregor Dolenc, Tom Duvall, Tomoko Matsukawa, Nicola Shaw, and Graham Smith. Alex Mirkow, of the Bank, facilitated document processing and production and Nancy Mensah, also with the Bank, assisted with word processing. The text was edited by Paul Holtz and laid out by Glenn McGrath, both with American Writing Corporation.

Foreword

The trend toward greater private participation in infrastructure development is firmly established in many developing countries, and the benefits of the initial wave of privatizations and new investment are becoming apparent. The move to private infrastructure, launched in the mid-1980s, began primarily in the power sector, especially power generation facilities undertaken as build-own-operate (BOO) or build-operate-transfer (BOT) projects. More recently, investors have become active in other types of infrastructure as governments promote private involvement in water, transport, and other sectors.

Although much has been written about the evolution of private involvement in the generation, transmission, and distribution of electric power in developing countries, much less has been written about how other private infrastructure projects are financed and about the risk-sharing issues that are critical for these investments. Indeed, for private toll roads the universe of successfully financed projects has until recently been somewhat limited, making this study timely in its review.

This study examines the global experience with private toll roads and reviews eight projects, six in developing countries and two in industrial countries. Like most private infrastructure projects, toll roads require a partnership between the public and private sectors, making the allocation of responsibilities critical for the success of the project. The study examines common elements in toll road financings and highlights key public-private risk-sharing issues relating to the large amounts of private financing required for these investments. These findings have implications for both policymakers considering private toll road programs and private investors seeking to finance a project.

Ram Chopra
Director
Cofinancing and Project Finance Department

Nina Shapiro
Manager
Project Finance and Guarantees Group

Abstract

This study provides an overview of the issues and challenges related to private toll road development by considering the experience of eight privately financed toll road projects. The projects selected represent a range of physical and market characteristics, country and concession environments, public-private risk-sharing arrangements, and financial structures.

After reviewing the history of toll roads, the study examines the public policy and financing approaches used to develop private toll road concessions and to mobilize capital for their construction and operation. It analyzes key aspects of private toll road development for each of the eight projects selected, including project economics, country and concession environment, risk sharing between the public and private sectors, and financing structures and sources. The study also discusses the main public policy issues in toll road development and briefly assesses the future outlook for the private toll road industry.

The findings suggest that:

- The economics of toll road projects vary widely depending on their function, physical characteristics, and traffic profile.
- The public sector generally is responsible for right-of-way acquisition and political risk and in some cases shares traffic and revenue risk, while the private sector generally bears primary responsibility for remaining project risks.
- Project economics and the country and concession environment are key factors that influence the level of government support required for a toll road to attract financing.
- Funding for private toll roads is primarily in the form of commercial bank loans and sponsor equity—few facilities have been able to access public capital markets.
- Large toll road financings in countries with undeveloped capital markets have relied on foreign capital, while smaller financings and financings in countries with highly developed capital markets generally use local capital.
- Various mechanisms are available to governments to support toll road development, and the value of each mechanism should be weighed against the exposure it creates before committing to a particular arrangement.
- Designing the bidding process for a toll road concession involves tradeoffs between transparency and competitiveness versus flexibility and private sector innovation.

The study concludes that while private toll road development is likely to experience modest growth in the near future, public resistance to tolling, the time and cost of implementing concessions, and other factors will probably limit industry activity.

Private Financing of Toll Roads

Expanding global demand for infrastructure is driving an emerging industry for the private provision of roads, power, water and sanitation, telecommunications, and other services. Interest in private toll roads is particularly strong because governments require alternative methods of financing their extraordinary transport needs. Tolling has also become an attractive option for managing traffic demand on increasingly congested highways.

Many of the challenges to developing and financing toll roads are similar to those faced by other infrastructure projects, which are typically capital-intensive and share certain risks, including construction risk, political risk, currency risk, and force majeure risk. But toll roads face greater risks in certain important areas, including acquisition of long segments of right-of-way, unforeseen geological and weather conditions that may increase costs and cause delays, and, perhaps most important, the unpredictability of future traffic and revenue levels. Power projects, for example, may face fewer risks than toll roads because the physical plant is in one location (which facilitates land acquisition) and future revenues are generally secured by a long-term power purchase agreement.

Because of the unique challenges facing toll road projects, the toll road industry is less developed than other private infrastructure sectors, most notably the private power industry. The World Bank estimates that private toll road development accounts for 8 percent of the $60 billion annual market for private infrastructure projects worldwide (figure 1). If private toll road development is to expand and provide a more significant portion of highway funding, the considerable challenges to toll road development must be understood and overcome. This study reviews eight privately financed toll road projects, discusses public policy issues relating to toll road concessions, and assesses future developments in the private toll road industry.

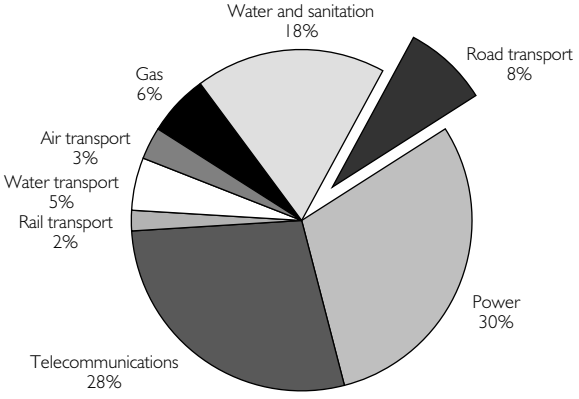
The projects reviewed are Chile's South Access to Concepción (Forestry Road), Colombia's Buga-Tuluá Highway, Mexico's Mexico City-Toluca Toll Road, China's Guangzhou-Shenzhen Superhighway, Malaysia's North-South Expressway, Hungary's M1/M15 Motorway, the United Kingdom's Dartford Bridge, and the United States' SR-91. These projects are among a select group of road projects that have been successful in attracting private financing over the past decade. Collectively, they represent a broad range of project types, including different physical and market characteristics, country and concession environments, public-private risk-sharing arrangements, and financial structures.

Why Private Financing?

Governments are facing dramatic growth in highway needs, both for new facilities and for maintenance and rehabilitation of existing facilities. This demand is particularly strong

FIGURE 1

Private infrastructure projects, by sector



Source: World Bank, Private Infrastructure Project Database.

in congested urban areas and regions experiencing rapid economic and population growth. Governments worldwide spend an average of 4 percent of GDP a year on transportation infrastructure (Klein and Roger 1994). In the United States alone an estimated $55 billion a year will be required over the next twenty years simply to maintain highways and bridges in their current condition—considerably more than the $34 billion that was spent on highway and bridge improvements in 1993 (USDOT 1995).

The highway needs of developing countries are even more acute. According to World Bank data, these countries have about 1,000 kilometers of paved roads per million people (compared with more than 10,000 kilometers per million people in industrial countries), and many of these roads require substantial investment. For example, in Argentina, Chile, and Colombia less than half the paved roads are in good condition. Indonesia needs to build 28,000 kilometers of national and provincial roads by 2004 to relieve traffic congestion. And China's most recent highway development plan targets 92,000 kilometers of new highway construction.

Highway infrastructure traditionally has been funded through general government budgets and dedicated taxes and fees rather than tolls. In most industrial countries 90 percent or more of highway kilometers are publicly funded; in developing countries governments often bear the entire cost. However, the limited resources available through traditional government funding sources has led to increasing interest in private toll roads as an alternative way of meeting highway needs.

Several additional factors have contributed to the renewed interest in private tolling, including a worldwide trend toward commercialization and privatization of state-owned enterprises; the success of public toll roads in raising capital; and advances in tolling technology, making tolling more efficient and convenient.

Private toll roads have a long history in the United States and Europe. In the United States the concept of private toll roads is gaining renewed interest after decades of inactivity. In the first half of the nineteenth century private toll roads outnumbered public roads in the United States. By the mid-nineteenth century more than 10,000 miles of private toll roads were in operation (Meyer and Gomez-Ibañez 1993). The public sector provided support through land grants and subsidies, and public roads were built primarily to support the network of private roads.

During the late nineteenth and early twentieth centuries the growth of rail transport and problems with toll evasion caused a decline in private toll roads. In the 1930s, however, some states began developing public toll road programs in response to the growing needs of commerce, the dramatic growth in automobile ownership, and the absence of a major federal highway program. Most of these roads were on the East coast, where the concentration of urban areas and high traffic densities made tolling more economically attractive.

Toll road development slowed after 1956, when the Federal Aid Highway Act established a federal gas tax to fund the interstate highway system and prohibited tolling on new, federally funded highways. But in the 1980s public funding constraints and increasing infrastructure needs led to a renewed interest in public and private toll roads. By 1993, 4,000 (7 percent) of the 55,000 public expressway miles in the United States were publicly tolled (Meyer and Gomez-Ibañez 1993). That same year, California's SR-91 and Virginia's Dulles Greenway became the first toll roads in modern U.S. history to be privately financed.

European countries have had more experience with private toll roads in recent years, but with mixed results. Toll financing developed in Europe after World War II, when budget constraints and rapid traffic growth made private toll financing attractive. In France public toll financing was used in the late 1950s and early 1960s, and private toll financing was introduced in the late 1960s and early 1970s. Only one of four private French concessionaires has survived, however. In Spain private toll financing was used for the intercity *autopistas* in the late 1960s and early 1970s. Nine of the twelve original concessions remain private and continue to have a major presence in the Spanish road system. In Italy more than 5,000 kilometers of toll roads have been constructed by more than twenty concessionaires, although the central and regional governments retain majority ownership. The largest of the Italian concessionaires, Autostrade, operates most of the highway network. Overall, private tolling appears to be gaining popularity in Europe once again, with new projects being pursued in France, Germany, Hungary, the Netherlands, Poland, Portugal, Spain, and the United Kingdom.

Developing countries became interested in toll financing during the 1980s, when economic and population growth led to increasing demand for infrastructure. In Mexico President Salinas established a national highway building program that relied heavily on private toll financing. In Indonesia expected traffic growth and projections of high construction costs led the government to launch a joint venture private toll financing program to fund and manage toll projects. Private tolling is now being pursued in a wide variety of countries, including Argentina, Chile, China, Colombia, Ecuador, Hong Kong, Hungary, India, Indonesia, Malaysia, Mexico, the Philippines, and Thailand.

Project Economics

Project economics refers to the cost of developing, constructing, and operating a project relative to the revenue it generates. This is typically measured in terms of net present value or internal rate of return on investment. The project economics of a toll road are determined by a number of factors, including the toll road's function, physical characteristics, and market demand. The predictability of market demand is a particularly sensitive variable for toll road economics because of the difficulty of forecasting traffic and revenues on previously untolled highways. There is no standard project in the private toll road industry; rather, toll facilities exhibit widely varying characteristics and project economics.

Function

Toll roads can be classified as congestion relievers, intercity arteries, development roads, or bridges and tunnels. A facility's function is a major determinant of its physical characteristics and cost, as well as its market demand and revenue potential.

Congestion relievers are relatively short roads that are constructed to relieve heavy traffic congestion on existing urban routes. Examples include the Mexico City-Toluca Toll Road and the United States's SR-91. The Toluca Toll Road connects the western suburbs of Mexico City with the principal east-west highway from Mexico City to Toluca, an industrial city of more than 500,000 people. SR-91 adds two lanes in each direction in the median of an existing four-lane highway in Orange County, California. Both roads compete with heavily congested public roads for traffic. Congestion relievers are generally inexpensive to build relative to their revenue potential because they tend to be short and to serve heavy traffic demand.

Intercity arteries are built to improve access between major metropolitan areas. Four of the projects studied here fall into this category: the Buga-Tuluá project, which rehabilitates and expands a section of highway connecting Colombia's three largest cities; the Guangzhou-Shenzhen Superhighway, which connects the Guangzhou ring road to the city of Shenzhen in southern China; Malaysia's North-South Expressway, which completes the link from the Thai border through Kuala Lumpur to Singapore; and Hungary's M1/M15 Motorway, which connects Budapest with Vienna and Bratislava. Intercity arteries are generally expensive to construct because they are often long, high-capacity roads. However, they may benefit from heavy traffic in certain corridors.

Development roads link relatively remote areas targeted for economic development with urban centers or major transportation routes. For example, Chile's South Access to Concepción project involves rehabilitating existing road sections and constructing two urban bypasses to link a forestry region with metropolitan Concepción and the Pan-American Highway. This road will facilitate the movement of forestry products to the port at Concepción and the Pan-American Highway. Development roads can provide a significant economic stimulus to the regions they serve. However, they often require future economic development to generate sufficient traffic in order to be economically viable. Thus development roads are often speculative from an economic standpoint. The Chilean project is somewhat of an exception because it is primarily a rehabilitation of an existing road, which substantially limits its construction cost.

Finally, bridges and tunnels are considered in a separate category because of their unique characteristics. They are typically very short, very expensive to build per kilometer relative to roads, and serve high volumes of captive traffic. Bridges and tunnels can be thought of as extreme examples of congestion relievers, and like congestion relievers they tend to have strong economics as a result of the heavy traffic volumes served. The Dartford Bridge, for

example, was built to relieve congestion in the two tunnels crossing the Thames river as part of the M25 ring road around London.

Physical characteristics and project costs

A project's physical characteristics are the primary determinants of its cost. Important characteristics include whether a project is a new facility or an expansion of an existing facility, as well as its length and capacity (that is, number of lanes), geography, and toll collection mechanism (table 1).

New facilities involve substantially higher costs per kilometer than do rehabilitations and expansions of existing facilities. Rehabilitations and expansions not only require less construction work than new facilities, but projects involving existing tolled facilities can use the toll revenues during construction to offset construction costs, thereby lowering financing requirements. For example, the Buga-Tuluá project used about $16 million in toll revenues during construction to construct a highway costing $47 million, resulting in a financing requirement of $31 million. The Dartford Bridge used about $32 million in toll revenues from the existing tunnels during construction, although the project was also required to assume $76 million in debt from the tunnel facilities.

Capacity and geography are also important determinants of cost per kilometer, since wide roads and roads constructed across difficult terrain (such as mountains and swamps) are more expensive than narrow roads and roads built across flat, dry terrain. The toll collection mechanism has a much smaller effect on costs then these factors.

TABLE 1

Characteristics and costs of the eight projects

Country, project	Project scope	Length, initial capacity[a]	Geography	Toll collection mechanism	Total cost (millions of U.S. dollars)	Total cost per kilometer (millions of U.S. dollars)
Chile, South Access to Concepción	Rehabilitation of existing roads and construction of two new urban bypasses	112 km, 2 lanes	Forest with moderate hills	Manual, open	27	0.2
Colombia, Buga-Tuluá Highway	Rehabilitation and expansion of existing two-lane road into a four-lane highway; revenue from existing toll used to finance construction	23 km, 4 lanes	Flat	Automatic and electronic, open	47	2.0
Mexico, Mexico City-Toluca Toll Road	Securitization of existing facility	22 km, 6 lanes	Traverses mountainous region between Mexico City and the plain to the west	Manual and automatic, hybrid	313[b]	14.2
China, Guangzhou-Shenzhen Superhighway	New facility	123 km, 6 lanes	Runs parallel to Pearl river delta; experiences frequent rains and flooding	Automatic and electronic, closed	1,922	15.7
Malaysia, North-South Expressway	Construction of 500 km of new road and rehabilitation of 370 km of existing facilities	870 km, 4–6 lanes	Difficult terrain: rugged mountains, swampy areas, and soft soil	Manual and electronic, hybrid	3,192	3.7
Hungary, M1/M15 Motorway	42 km extension of M1 highway to the Austrian border (M1); construction of 15 km branch from M1 to the Slovak border (M15)	59 km, 4 lanes	Flat farmland and small forests	Manual, closed	440	7.5
United Kingdom, Dartford Bridge	New facility; revenue from existing tunnels used to finance construction	2.8 km, 4 lanes	Crosses Thames river	Manual, automatic, and electronic; closed	247	88.2
United States, SR-91	New lanes in the median of an existing facility	16 km, 4 lanes	Mountainous area	Electronic, closed	126	7.9

a. Total number of lanes in both directions.
b. Amount of bond issue, not original project cost.

The range of outcomes that can result from different project characteristics is demonstrated by the South Access to Concepción project, which cost just $0.2 million per kilometer, and the Guangzhou-Shenzhen Superhighway, which cost $15.7 million per kilometer (see table 1). The Concepción project primarily involves rehabilitation of existing roads through forested land, with new construction required only for two new urban bypasses. The Guangzhou-Shenzhen project involved new construction of six lanes. Moreover, it experienced substantial cost overruns resulting, in part, from frequent rains and flooding in the right-of-way. As a result its cost per kilometer was about 65 times that of the Concepción project.

By far the most expensive project studied here is the Dartford Bridge. With a project cost of $247 million for just 2.8 kilometers of route length, the cost per kilometer reached $88 million. As noted earlier, bridges and tunnels tend to be very expensive to construct on a per kilometer basis relative to roads because of the engineering challenges associated with crossing water and other geographic barriers.

Market demand

Market demand can be measured in terms of actual or expected traffic levels, predictability of expected traffic, and willingness of users to pay tolls. Each measure is critical in demonstrating a revenue stream of sufficient magnitude and predictability to obtain financing. Because of the inherent difficulty in accurately projecting toll revenues, the predictability of an expected toll revenue stream is particularly important for attracting capital (table 2).

Traffic levels (with toll rates held constant) are affected by the markets served, the competitive alternatives, and the road's links to the broader transportation system. The Chile project, for example, serves a market with limited demand and is expected to attract only 1,200 vehicles a day, despite limited competition. The Dartford Bridge concessionaire, by contrast, controls all the bridge and tunnel crossings from the heavily used M25 ring road and serves 120,000 vehicles a day. SR-91 provides additional capacity in a heavy-demand corridor. Despite direct competition from the untolled parallel lanes, it is expected to attract 37,000 vehicles a day. All the projects studied, with the exception of the Dartford Bridge, face significant competition from other roads, although these alternatives are often slower, less convenient, and less safe than the tolled alternative.

The predictability of expected traffic on a toll road can be assessed on the basis of existing traffic levels on the corridor (if any) and on the competitive alternatives available. An existing toll road, such as Toluca, or one with nearly captive traffic, such as the Dartford Bridge, is considered to have highly predictable traffic patterns, reducing the risk involved in project financing. Traffic projections for improvements to existing roads have moderate predictability, while new roads have the least predictable traffic, since speculative judgments must be made about their ability to draw traffic from existing alternatives and to generate new traffic. The potential for inaccurate traffic forecasts for new roads is illustrated by the M1 project in Hungary. In its first six months of operation the M1 attracted only about 50 percent of the expected traffic. The Dulles Greenway, located in the state of Virginia near Washington, D.C. provides another example of the dif-

TABLE 2

Market demand characteristics of the eight projects

Country, project	Average daily traffic[a] (vehicles a day)	Predictability of expected traffic[b]	Passenger vehicle toll rates[c]	Average toll rate per kilometer
Chile, South Access to Concepción	1,200 (projection)	Medium	$3.70	$0.03
Colombia, Buga-Tuluá Highway	10,000 (actual)	Medium	$2.37	$0.10
Mexico, Mexico City-Toluca Toll Road	22,000 (actual)	High	$4.86	$0.22
China, Guangzhou-Shenzhen Superhighway	50,000 (actual)	Low	$6.14	$0.05
Malaysia, North-South Expressway	250,000 (actual)	Low	$25.00	$0.03
Hungary, M1/M15 Motorway	11,000 (projection)	Medium	$2.59	$0.03
United Kingdom, Dartford Bridge	120,000 (actual)	High	$1.35	$0.48
United States, SR-91	37,000 (projection)	Medium	$0.25–$2.50[d]	$0.02–$0.16[d]

a. Traffic levels are estimates and may not be comparable due to differences in measurement techniques. In addition, traffic may not travel the entire length of the facility.
b. High for existing toll road or captive tolling of existing traffic stream; medium for improvements to existing roads; low for primarily new road.
c. All nondollar amounts were converted at the prevailing exchange rate.
d. Tolls vary depending on day and time.

ficulty of predicting traffic levels. Originally predicted to attract 34,000 vehicles a day within a year of operation, it attracted only 11,500 a day, on average, in its first six months. After the toll was cut from $1.75 to $1.00, however, usage increased to 23,000 vehicles a day by September 1996 (Carr and Wright 1996; Reinhardt 1996)

The Dartford Bridge project is unique in that it has a nearly captive traffic base. The M25 ring road is one of the most traveled routes in England. Motorists crossing the Thames River on the M25 must pass over the bridge or through one of the two tunnels, all of which are operated by the Dartford Bridge concessionaire. Although alternative river crossings are available on local roads, long-distance traffic demand for the Dartford Bridge and tunnels is highly inelastic.

Users' willingness to pay tolls is largely a function of their wealth, the value they assign to time savings and other toll road benefits, and the cost and quality of competitive alternatives. The projects studied charge toll rates for passenger vehicles of $0.03–$0.10 per kilometer —compared with the U.S. average public toll road charge of $0.03—with three exceptions: the Toluca project, which charges $0.22 and is widely regarded as a high-priced facility; the Dartford Bridge, which charges $0.48 and is a short facility with nearly captive traffic; and SR-91, which has a rate structure ranging from $0.02–$0.16 per kilometer. SR-91 is perhaps the most interesting example of users' willingness to pay tolls, since the rates will vary by time of day and day of the week in order to manage congestion on the facility.[1]

Overall assessment

Project economics are typically measured in terms of net present value or internal rate of return on investment. Actual net present value and internal rate of return data for the projects studied are not available; however, project economics can be approximated by placing each project on a matrix that reflects the cost per kilometer, average daily traffic, and an assessment of the predictability of expected traffic (figure 2). Although this is an imprecise method of measuring project economics (for example, it does not take into account the toll rates charged), it does provide a basis for making general observations.

Three of the projects are considered to have strong project economics: the North-South Expressway (because it has high traffic relative to its costs) and the Dartford Bridge and Mexico City-Toluca Toll Road (because they both have relatively predictable demand). Because the data on the remaining projects are inconclusive, they are categorized as having moderate project economics.

A project's ability to obtain financing however is not determined solely by its economics. The country and concession environment and public-private risk-sharing arrangement also have important effects on financing.

Country and Concession Environment

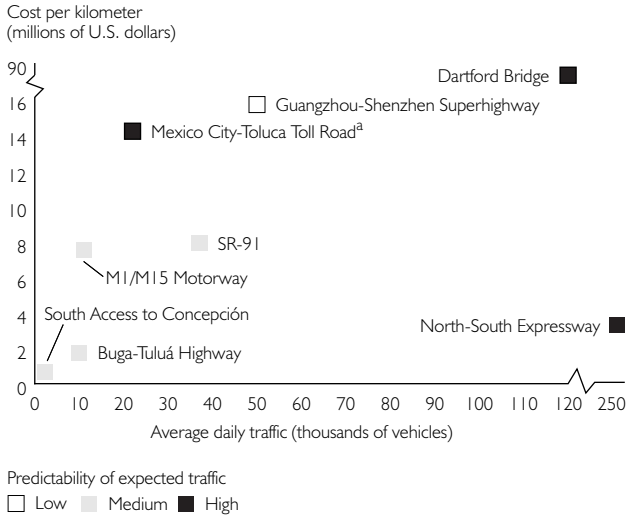
A favorable country and concession environment can be crucial to attracting financing and limiting the need for government assumption of risk, while an unfavorable environment may preclude financing without substantial government support. The three principal components of the country and concession environment are the concession policy and process environment, economic and political context, and local capital markets.

Concession policy and process environment

The concession policy and process environment refers to the policies, laws, and procedures a country has in place to support the implementation of a concession program, including:

FIGURE 2

Project economics of the eight projects



a. Based on bond issue amount, not on original project cost.

- *Overall road concession policy.* Is the government committed to a sound concession program that is coordinated with its broader transportation policy? Has the government successfully concessioned other roads?
- *Concession legislation.* Has the government enacted legislation to encourage concessions generally and to authorize toll road concessions specifically?
- *Concession process.* Are the concession term and regulatory mechanism conducive to attracting long-term private capital? Is the process competitive, transparent, and based on reasonable evaluation criteria?

The countries studied were categorized qualitatively as having either more or less favorable concession environments. Of the eight countries, Chile, Colombia, Hungary, the United Kingdom, and the United States scored high in terms of concession environment, while China, Mexico, and Malaysia were considered to have less favorable environments (table 3).

All of the favorably rated countries have specific concession legislation, sound concession policies, and competitive concession processes. Although the concession environments in these countries vary in other respects, the variations were not considered detrimental. For example, Chile has an ambitious national program for concessioning roads, with the Concepción project the second to be concessioned. In the United States, by contrast, roads are concessioned at the state level, and SR-91 was the first private toll road to be financed in modern U.S. history.

Mexico's concession environment is considered less favorable because the concession process has been problematic. The Mexican program concessioned toll roads on the basis of the shortest proposed concession term. Although this structure supported the government's objective of transferring control over the roads back to the public sector as soon as possible, it resulted in extremely short concession terms (initially 4.5 years in the case of the Mexico City-Toluca Toll Road), extremely high toll rates (and resulting low traffic levels), and difficulty with servicing debt. In addition, the program did not encourage concessionaires to conduct adequate traffic and revenue studies or other forms of due diligence during the concession process. As a result many Mexican projects have experienced severe financial problems. For example, the Mexico City-Toluca Toll Road project was eventually restructured, and the concession term was extended to eleven years.

China's concession environment is considered less favorable because of the relatively informal process used to concession roads. No specific concession legislation authorizes the program, and there was no competitive process for tendering the Guangzhou-Shenzhen project. Although to some extent these practices may reflect cultural differences between China and the other countries studied, the lack of clear legal authorization and a transparent concessioning process may be of concern to some investors.

Malaysia also lacks specific concession legislation authorizing the program for the North-South Expressway. In addition, issues have been raised about the transparency of the bidding process because of the close ties between the winning concessionaire and Malaysia's leading political party.

Prior experience with toll roads was not a good indicator of the favorableness of the concession environment. Most countries have only recently begun implementing private toll road programs. Of the eight projects studied, six were either the first or among the first private initiatives the country had undertaken, yet four of these countries were categorized as having favorable concession environments. Mexico, on the other hand, is one of two countries that had prior experience with concessions (Chile is the other), but Mexico was categorized as having an unfavorable concession environment.

All the projects, with the exceptions of those in China and the United States, involve maximum toll rate regulation. In Chile, Colombia, Mexico, Malaysia, and the United Kingdom these toll rate ceilings are indexed to local inflation to compensate for local cost increases and to provide indirect protection against exchange rate movements (relative inflation between currencies and movement in their exchange rates are correlated when purchasing power parity holds). Toll rates in Hungary are indexed to local inflation and to the devaluation of the currencies of the project's foreign loans, should devaluation exceed the inflation differential between the Hungarian forint and the respective foreign currency.

Except in Malaysia, toll rate indexation adjustments are based on a formula and do not require government approval (all toll rate increases in Malaysia require government

TABLE 3

Concession policy and process environment of the eight projects

Country, project	Government experience with toll roads	Concession legislation	Prior experience with private toll roads?	Bid process and evaluation criteria	Concession term	Contractual regulatory mechanism	Rating[a]
Chile, South Access to Concepción	Second concession of ambitious government toll road program	Yes	Yes	• Open, competitive process based on minimum toll, minimum one-time subsidy, and other factors • No contract negotiations	25 years	Maximum toll rate indexed to local inflation	+++
Colombia, Buga-Tuluá Highway	One of the first toll road concessions in Colombia; concessioned by the Province of Valle del Cuaca in advance of a coordinated national toll road concession program	Provincial: Yes Federal: No	No	• Open, competitive bid process based on design, construction, and rehabilitation plan, operating plan, and financial plan (including toll rates)	15 years	Maximum toll rate indexed to local inflation; maximum traffic ceiling of 125% of base case scenario above which revenues are transferred to the province	+++
Mexico, Mexico City-Toluca Toll Road	Ambitious private and public toll road program; several concessions experienced financial problems due to short concession terms and high toll rates	Yes	Yes	• Open, competitive process based on shortest concession term at a fixed toll rate • Negotiations permitted	4.5 years, later extended to 11 years	Maximum toll rate indexed to local inflation	+
China, Guangzhou-Shenzhen Superhighway	Substantial number of toll road concessions under development; coordinated largely at the city and provincial levels	No	No	• No competitive tender	30 years	None (Hopewell receives 50% of joint venture profits)	+
Malaysia, North-South Expressway	First private toll road; concessioned to complete failed public project	No	No	• Open, competitive bid process • One of five submitted proposals selected based on undisclosed criteria • Negotiations permitted	30 years	Toll rates specified through 1996 and indexed to local inflation thereafter. All increases must be approved by the government; compensation is paid by the government if toll increases are deferred	+
Hungary, M1/M15 Motorway	First private toll road; intended to set a precedent for future roads	Yes	No	• Open competitive process based on construction cost, equity commitment, financial plan, sponsor qualifications, and other factors • Negotiations permitted for two finalists	35 years	Maximum toll rate indexed to local inflation and devaluation of foreign loan currencies	+++
United Kingdom, Dartford Bridge	First private toll facility; intended to set a precedent for future roads	Yes	No	• Open, competitive process in which bidders propose the projects • Negotiations permitted for three finalists	20 years maximum, likely to end 6 years early	Maximum toll rate indexed to local inflation	+++
United States, SR-91	One of the first state-led initiatives on private toll roads	State: Yes Federal: No	No	• Open, competitive process in which bidders propose the projects • Selection on basis of best technical and financial proposal • Negotiations permitted	35 years	Ceiling on return to total capital (debt and equity combined). No toll rate regulation.	+++

a. + is less favorable; +++ is more favorable.

authorization). In most cases a consumer price index is used as the inflation index and adjustments are made according to a fixed schedule (usually once or twice a year). Adjustments may be more frequent if the index increases beyond a specified amount (for example, 10 percent).

Economic and political context

A stable economic and political environment is critical for attracting investment to a project. The environment can be evaluated on the basis of macroeconomic stability, country risk ratings, and sovereign debt ratings (table 4).

Of the countries studied, Hungary and Mexico were categorized as having less favorable economic and political contexts because of high country risk ratings, below–investment grade sovereign debt ratings, and generally weaker economies. The United Kingdom and the United States have country risk ratings of 5 percent or lower and AAA-rated bonds, as well as stable economies, and were rated the most favorable. The other four countries were rated in the middle because they combined high country risk ratings with investment-grade sovereign debt ratings and strong economic growth.

Local capital markets

Countries with local capital markets that are capable of providing long-term financing for toll road projects have several advantages in supporting toll road concessions:

- Financing denominated in local currency avoids exchange rate risk because payments to capital are in the same currency as the toll revenues generated by the project.
- Local financial institutions and investors may have a better understanding of project economics and government policies, and be more willing than foreign investors to assume local economic and political risk.
- Unlike some infrastructure sectors (such as power), the labor, materials, and equipment required for toll road construction can largely be provided locally, which obviates the need to fund construction costs in foreign currencies.

Useful measures of the depth of capital markets to fund toll road projects are the types of financial instruments and volume of funds potentially available for such projects, the length of the term available on project debt, and the interest rates charged on debt. An analysis of each of these items for each project country is beyond the scope of this study. As a proxy, however, the study examined the longest term available on local currency government debt and its associated Standard & Poor's sovereign rating, to determine a rating for local capital markets (table 5).

The countries were placed in three categories ranging from less favorable to more favorable. The United Kingdom and the United States are considered to have more favorable capital markets because they are both AAA-rated with

TABLE 4

Economic and political context in year of financial close

Country, project	Year of financial close	Country risk rating[a]	Standard & Poor's rating[b]	Annual inflation (percent)	Annual GDP growth (percent)	Local interest rate (percent)	Change in currency relative to the U.S. dollar (percent)	Economic and political context rating[c]
Chile, South Access to Concepción	1994	25	BBB+	12.0 (1993)	6.0 (1993)	20.3	4.0	++
Colombia, Buga-Tuluá Highway	1994	36	BBB–	21.7 (1993)	5.3 (1993)	40.5	–2.1	++
Mexico, Mexico City-Toluca Toll Road	1992	36	BB+	9.7	2.8	18.9	2.6	+
China, Guangzhou-Shenzhen Superhighway	1991	25 (1992)	BBB (1992)	4.9	8.0 (1989)	11.2 (1989)	11.3	++
Malaysia, North-South Expressway	1988	28 (1990)	A (1991)	2.4	8.9	7.3	4.0	++
Hungary, M1/M15 Motorway	1993	34	BB (1992)	22.6	–2.7	25.0	16.4	+
United Kingdom, Dartford Bridge	1988	5 (1990)	AAA	5.3	5.0	10.3	–8.2	+++
United States, SR-91	1993	4	AAA	2.9	3.1	6.0	—	+++

a. Lower number indicates higher ranking and less country risk; based on a ranking of countries by *Institutional Investor.*
b. Rating of government-issued debt.
c. + is less favorable; +++ is more favorable.
Source: Institutional Investor; UN Statistical Yearbook, 40th issue; IMF, various years.

TABLE 5

Local capital markets

Country, project	Year of financial close	Longest term of local currency government debt[a]	Standard & Poor's rating[b]	Assessment of local capital markets
Chile, South Access to Concepción	1994	20	BBB+	++
Colombia, Buga-Tuluá Highway	1994	3	BBB–	+
Mexico, Mexico City-Toluca Toll Road	1992	2	BB+	+
China, Guangzhou-Shenzhen Superhighway	1991	5	BBB (1992)	+
Malaysia, North-South Expressway	1988	21	A (1991)	++
Hungary, M1/M15 Motorway	1993	10	BB (1992)	++
United Kingdom, Dartford Bridge	1988	25	AAA	+++
United States, SR-91	1993	30	AAA	+++

a. Terms given are for 1995, excludes index-linked bonds and private investments.
b. Rating of government-issued debt (in year of financial close unless otherwise noted).
c. + is less favorable; +++ is more favorable.

government debt terms as long as twenty-five to thirty years. China, Colombia, and Mexico have less favorable capital markets because they have low sovereign ratings and government debt terms of five years or less. Chile and Malaysia are in the middle because they have investment grade ratings and government debt terms as long as twenty years. Hungary was also placed in the middle category because of its ten-year term on government debt.

Overall assessment

Considering the above factors in combination, the eight countries studied exhibited a wide range of ratings (table 6). Not surprisingly, the United Kingdom and the United States received the highest overall ratings. China and Mexico scored less favorably in most areas and were rated as having less favorable environments overall. Chile, Colombia, Hungary, and Malaysia had mixed ratings and were therefore ranked in the middle category.

Although all the projects were able to attract private capital, projects in less favorable country and concession environments generally require stronger project economics or greater government support to compensate for the additional risk.

Public-Private Risk Sharing

Private toll road development requires that project risks and responsibilities be assigned to the public or private entity that is best able to manage them. The private sector is generally better at managing commercial risks and responsibilities, such as those associated with construction, operation, and financing. But in order for a project to obtain financing, public participation may be required in areas such as acquisition of right-of-way, political risk, and, in some cases, traffic and revenue risk.[2]

Project responsibilities

The principal responsibilities for toll road development include design, construction, maintenance, toll collection, arranging financing, and legal ownership. The build-operate-transfer (BOT) model is the most common approach used to assign responsibilities in toll road projects. BOT is a broadly defined term that includes build-own-operate-transfer (BOOT), build-lease-transfer (BLT), rehabilitate-operate-transfer (ROT), lease-rehabilitate-operate (LRO), and similar arrangements that are used to develop new facilities or improve existing ones.

Under the BOT model a private consortium receives a concession to finance, build, control, and operate a facility for a limited time, after which responsibility for the facility is transferred to the government, usually free of charge. The private party typically assumes primary responsibility for constructing the project, arranging financing, performing maintenance, and collecting tolls, while the public sector retains legal ownership. In most projects design responsibility is shared, with the public sector taking the lead in the preliminary design (including route alignment, number of lanes, interchanges, and other high-level design specifications) and the private sector completing the detailed design, subject to government approval.

TABLE 6

Overall ratings for country and concession environment

Country, project	Concession policy and process environment	Economic and political context	Local capital markets	Overall rating
Chile, South Access to Concepción	+++	++	++	++
Colombia, Buga-Tuluá Highway	+++	++	+	++
Mexico, Mexico City-Toluca Toll Road	+	+	+	+
China, Guangzhou-Shenzhen Superhighway	+	++	+	+
Malaysia, North-South Expressway	+	++	++	++
Hungary, M1/M15 Motorway	+++	+	++	++
United Kingdom, Dartford Bridge	+++	+++	+++	+++
United States, SR-91	+++	+++	+++	+++

Note: + is less favorable; +++ is more favorable.

The projects studied generally follow the BOT model for assigning project responsibilities. In all the projects the private sector was primarily responsible for construction and toll collection, while the public sector retained legal ownership of the facility. Design responsibility was generally shared. Only in the Buga-Tuluá Highway and the Dartford Bridge did the private partner have primary responsibility for design. Arranging financing was largely a private sector responsibility, except in China and Malaysia, where state-owned financial institutions were significantly involved in the financing package. In most cases the private sector is also responsible for maintenance. The exception was SR-91, where the private consortium contracts the California Department of Transportation to maintain the lanes for a fee.

Project risks

The main risks facing private toll road projects include pre-construction, construction, traffic and revenue, currency, force majeure, tort liability, political, and financial (table 7). These risks must all be addressed in a manner satisfactory to debt and equity investors before they will commit to project funding.

Pre-construction. Right-of-way acquisition, environmental compliance, and other project requirements before the construction period may cause delays and cost overruns during project development. The private sector usually bears the risk of delays associated with right-of-way acquisition, environmental compliance, and other pre-construction activities. The public sector, however, often takes responsibility for acquiring the right-of-way, using its power of condemnation. The public sector also often bears the cost of acquisition. In most of the projects studied the government provided the right-of-way at no cost. For example, in Malaysia the government made all land required for highway construction available to the concessionaire free of charge. In California the concessionaire was authorized to use the median of an existing highway free of charge. In Chile, however, the concessionaire was responsible for right-of-way costs totaling $230,000.

Construction. During the construction period, design changes, unforeseen geological and weather conditions, and the unavailability of materials and labor can cause delays and cost overruns. The private sector typically takes primary responsibility for cost overruns and delays during the construction period and often allocates these risks to a construction contractor through a fixed price contract. The public sector often supports the project during the construction period by assuming specific construction period risks. For example, the public sector is usually responsible for those activities or risks under its control, including completing any facilities that it contributes to the project (such as connecting roads or interchanges) and cost increases associated with major design changes.

In some cases the public sector may share the responsibility for cost increases due to unforeseen geological conditions and other high-risk aspects of the project. Roads with relatively predictable construction costs, such as those developed on existing right-of-way or through low-risk terrain, may involve very limited public sector risk sharing. But roads that face substantial uncertainties during the construction period, such as longer roads that pass through high-risk terrain (for example, mountains and rivers), may require the public sector to share construction period risk

TABLE 7

Public and private risk sharing

Country, project	Pre-construction	Construction	Traffic and revenue	Currency	Force majeure[b]	Tort liability[b]	Political[b]	Financial	Overall assessment of public sector risk
Chile, South Access to Concepción	◐	○	◐	None[a]	○	○	●	◐	Medium
Colombia, Buga-Tuluá Highway	◐	○	◐	None[a]	○	○	●	○	Medium
Mexico, Mexico City-Toluca Toll Road	None (securitization)	None (securitization)	○	○	○	○	●	○	Low
China, Guangzhou-Shenzhen Superhighway	○	○	○	○	○	○	●	●	High
Malaysia, North-South Expressway	◐	○	●	●	○	○	●	●	High
Hungary, M1/M15 Motorway	◐	○	○	○	●	○	●	○	Low
United Kingdom, Dartford Bridge	◐	○	○	None[a]	○	○	●	○	Low
United States, SR-91	◐	○	○	None[a]	○	○	●	○	Low

Note: ○ major risk to private sector; ● major risk to public sector; ◐ risk shared.

a. Indicates all or nearly all financing is in local currency.

b. A general assessment of the risk allocation was provided by project sponsors or advisers. Detailed analysis of these issues was not possible because of the confidentiality of many of the concession agreements and the limited scope of this study.

in order for the project to attract private partners. Construction risks may be lower for extensions, expansions, or rehabilitations than for new projects.

In most of the projects studied the private sector took primary responsibility for construction period risk and used fixed price construction contracts to protect investors. Construction risk did not create problems for most of the projects, which were completed close to the original cost estimate, with the important exceptions of the China and Malaysia projects.

In China design changes (including construction of additional interchanges and the need to elevate more than 30 kilometers of roadway) and problems with right-of-way acquisition caused project costs to run 60 percent higher than was originally anticipated. The concessionaire bore the primary risk for cost overruns, resulting in an additional $700 million equity investment by the sponsors. In return for the additional investment, the sponsor negotiated an increase in the profit sharing agreement (from 42.4 to 50 percent) for the first ten years of operation, with similar increases for subsequent years (Reinhardt 1996).

Costs for the Malaysia project increased by more than 70 percent for a number of reasons, including soil conditions and design changes. Although the government did not explicitly assume construction risk, extensive government financial support for the project mitigated the concessionaire's exposure to these increases.

Traffic and revenue. Traffic and revenue risks are perhaps the greatest risks faced by toll road projects. These are defined as risks associated with insufficient traffic levels and toll rates too low to generate expected revenues. The treatment of traffic and revenue risk ranges from full private sector assumption of the risk to government-provided minimum traffic and revenue guarantees.

The SR-91, Dartford Bridge, M1/M15 Motorway, and Guangzhou-Shenzhen projects allocated full traffic and revenue responsibility to the private sector. For projects that included minimum traffic and revenue guarantees, the actual form of the guarantee varied widely. For example, the minimum traffic guarantee for the Mexico City-Toluca Toll Road provides for an extension of the concession term in the

event traffic falls below minimum levels. However, concession term extensions are of limited value in providing cash flows to make debt service payments in the event of low traffic volumes. The South Access to Concepción project uses a minimum revenue guarantee with cash compensation if revenue falls below the minimum level. The Buga-Tuluá project includes a minimum traffic guarantee with cash compensation and a maximum traffic ceiling above which all revenues are transferred to the government. The North-South Expressway includes standby government loans to support traffic and revenue risk. The policy issues involved in addressing traffic and revenue risks are discussed in the section on policy issues.

Currency. Currency risk is a major issue for toll roads financed with foreign capital because a project may be unable to pay a return on foreign currency–denominated capital if local earnings are not convertible at the expected exchange rate. Projects can avoid this risk by tapping local capital markets for funding.

For projects involving foreign capital, the private sector generally assumes the exchange rate and inconvertibility risk, although in some cases political risk insurance may be available to cover inconvertibility. The exchange rate risk is often mitigated by indexing the toll rates to local inflation or to the exchange rate of the foreign currency–denominated capital. Large foreign currency debt service reserves can also be used (as in Mexico) to protect against the risk of exchange rate fluctuations and inconvertibility, although tying up capital in reserve funds is expensive.

The SR-91, Dartford Bridge, South Access to Concepción, and Buga-Tuluá projects avoided exchange rate risk by using local capital to fund nearly all capital costs. In Mexico and China full risk was allocated to the private sector. In Mexico the devaluation of the peso two years after the international bond issue has resulted in a substantial decline in dollar revenues, although the project has been able to continue making debt service payments. In Hungary the European Bank for Reconstruction and Development (EBRD) provided currency convertibility guarantees for the debt through its B-loan program (described in the section on financing structures and sources), and in Malaysia the government assumed exchange rate risk by providing standby loans to compensate for unanticipated exchange rate movements.

Force majeure. Force majeure involves risks beyond the control of a project's public and private partners—such as floods, earthquakes, or war—that impair the facility's ability to generate earnings. Force majeure risk is assigned primarily to the private sector, which in more developed countries generally can cover natural force majeure risks (such as floods or earthquakes) through private insurance. Political force majeure risks (such as riots or wars) may not be insurable, and for some projects the public sector may be willing to assume these risks when such protection is required to attract capital on reasonable terms. The public sector also may extend the concession term if any force majeure event disrupts the operation of the facility. Except for Hungary's motorway, all the projects studied appear to have assigned force majeure risk primarily to the private sector. To the extent, however, that minimum traffic or revenue guarantees continue during a force majeure event, the government implicitly covers this risk. It could not be determined from available information if this is the case for the projects in Chile, Colombia, or Malaysia, which all have some form of minimum traffic or revenue guarantee from the government.

Tort liability. Tort liability relates to the risk of having to pay substantial legal awards as a result of accidents on the tollway. All the projects studied assigned tort liability primarily to the private concessionaire. Such liability is generally covered by private insurance.

Political. Political risk concerns government actions that could impair a facility's ability to generate earnings. Such actions could include terminating the concession or imposing taxes or regulations on the project that severely damage its value to investors; not allowing the private partner to charge and collect tolls as specified under the concession agreement; preventing investors from transferring earnings out of the country; or not allowing for contract disputes to be settled fairly under neutral jurisdiction.

Governments generally agree to compensate investors for termination of the concession and violations of the concession agreement, including agreed toll rates. However, private concessionaires generally assume the risk associated with dispute resolution and the ability to obtain compensation in the event of a government violation of the

concession agreement. Government assumption of political risks has value to investors only to the extent that there is a fair and timely process for compensating the concessionaire for contract violations. The issue of meeting financial obligations while a dispute is being resolved can be addressed through such measures as debt service reserves and standby financing, provided that disputes are resolved within a reasonable period of time.

The contractual obligations, willingness, and creditworthiness of governments to provide compensation to cover political risks are critical issues for attracting private capital. This is especially true for foreign capital, which is perceived by investors as being more vulnerable to political risks. Some of the relatively risky countries that hope to attract private financing of toll road programs may require support from multilateral or bilateral financial institutions to mitigate political risks. For example, multilateral and bilateral credit enhancements that guarantee the government's obligations under the concession agreement can provide important protections for investors by ensuring that cash will be available to pay debt service should certain contractually defined circumstances occur. In addition, political risk insurance can provide protection to investors against certain political risks, such as confiscation, currency convertibility, and repatriation of profits.

Financial. Financial risk is defined as the risk that project cash flows may be insufficient to pay an adequate return on the private debt and equity invested in the project. The private sector is generally responsible for financial risk, although in some cases governments may provide debt guarantees, equity guarantees, and other types of financial guarantees. Governments also may provide cash grants, equity, or subordinated loans, which improve the expected rate of return on private capital invested. The Guangzhou-Shenzhen project includes a government cash flow deficiency guarantee for the $800 million in senior project debt. The cash-flow deficiency guarantee covers any difference between project cash flows available to pay debt service and required debt service payments. In Chile the government provided an up-front cash grant of $5 million, or almost one-quarter of total project costs, while in Malaysia the government provided $634 million in loans, or about one-quarter of the project's total debt.

Overall assessment

In most of the projects studied, the government took primary responsibility for political risk and right-of-way acquisition, while the private partner took primary responsibility for pre-construction (excluding right-of-way acquisition), construction, force majeure, and tort liability risk. The area with the greatest divergence among the projects studied is the treatment of traffic and revenue risk, although there were also differences in the approaches to currency and financial risks.

The China project is considered to have a high share of public sector risk assumption because of the government's extensive involvement in supporting financing for the project. The Malaysia project is also categorized as having a high share of public sector risk assumption because of the government's support for traffic and revenue and currency risks, as well as its sizable financial participation in the project.

The Hungary, Mexico, U.K., and U.S. projects involve limited public sector risk assumption because the primary responsibility for traffic and revenue, currency, and financial risks lie with the private sector.

In Chile and Colombia the governments are considered to have assumed a moderate level of risk because they use minimum traffic or revenue guarantees and, in the case of Chile, an up-front cash grant. The next section analyzes risk allocation in the context of project economics, the country and concession environment, and project financing.

Financing Structures and Sources

The projects studied involve various tradeoffs between project economics, country and concession environment, and government support to attract private capital. The projects also used a variety of debt and equity instruments from a range of local and foreign sources.

Project finance approach

Most private toll roads are undertaken on a project finance basis, whereby investors rely on the performance of the project for payment rather than the credit of the sponsor. This arrangement is also referred to as limited recourse financing, which indicates that lenders have limited recourse to

the sponsors for payment if the project fails to generate adequate returns.

A primary benefit of project finance structures is that they allow sponsors to leverage their resources and expertise with outside capital in order to undertake projects that they otherwise would not be able to finance on the strength of their own balance sheet. In addition, project finance allows sponsors to share project risks with lenders and maintain the project debt off their balance sheet. Governments also seek to limit the recourse of investors to their credit, except to the extent that they provide financial support through such means as minimum traffic and revenue guarantees and loans.

Toll road project financing normally involves:

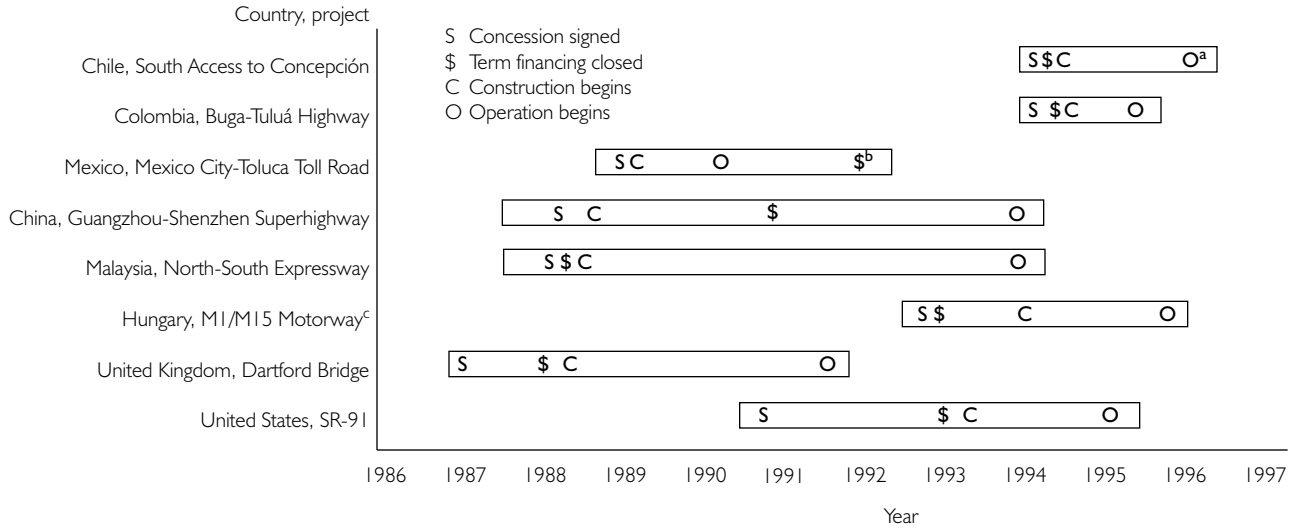
- Complete analysis of the country, economic, legal, and political environment in which the project will be developed.
- Detailed studies by engineering experts and financial advisers, including traffic and revenue projections, construction cost estimates, preliminary design documents for the project, and financial feasibility studies.
- Complex loan and security documentation, often involving multiple lenders, investors, project sponsors, and government agencies.
- Negotiation of a concession agreement, including a detailed allocation of risks and responsibilities among the various project participants.

The complex financial and contractual arrangements required for project financing make the closing of financing a difficult and lengthy process for many toll road projects (figure 3). In five of the eight projects studied, term financing was closed several months after the initial signing of the concession. For the Mexican, Chinese, and U.S. projects, however, term financing took several years to arrange. China's Guangzhou-Shenzhen Superhighway relied on sponsor equity funding to begin construction but did not complete term debt financing until three years later. Mexico's Toluca Toll Road used short-term (four-year) debt and refinanced two years after the beginning of operations. The United States's SR-91 took more than two years to close financing after the concession was signed, primarily because of the extensive studies and contractual arrangements required and the lack of experience with private toll road financings in the United States at that time.

The financing arrangements for the projects studied are presented in table 8. As is the case with most project financing, toll road projects are highly leveraged, with debt

FIGURE 3

Project development timetable



a. Expected to begin operation.
b. Date of securitization.
c. The dates for Hungary represent M1 only. M15 is scheduled to begin construction upon completion of M1.

TABLE 8

Financing arrangements

(millions of U.S. dollars)

Country, project	Total debt[a]	Total equity	Total capital	Debt/ equity	Foreign participation	Government financial support[b]
Chile, South Access to Concepción	13	9	22	60/40	None	$5 million cash grant and minimum revenue guarantee
Colombia, Buga-Tuluá Highway	15	16	31[c]	50/50	Equity participation by Ferrovial (Spain)	Minimum traffic guarantee of 90 percent of the base case scenario
Mexico, Mexico City-Toluca Toll Road	313	None	313	100/0	$208 million international bond issue	Minimum traffic guarantee with compensation in the form of concession extension
China, Guangzhou-Shenzhen Superhighway	800	1,122	1,922	40/60	$800 million loan from international banks, $922 million in foreign equity	Government cash-flow deficiency guarantee for $800 million loan and government equity of $200 million
Malaysia, North-South Expressway	2,416	775	3,192	75/25	Foreign banks participated in $870 million syndicated loan	Government loan of $634 million and soft loan facilities available to support minimum traffic levels and currency fluctuations
Hungary, M1/M15 Motorway	352	88	440	80/20	$58 million EBRD A-loan, $163 million EBRD B-loan syndicate, and $88 million in equity	None
United Kingdom, Dartford Bridge	292	0.002	292[d]	100/0	None	None
United States, SR-91	107	19	126	85/15	Equity participation by Cofiroute (France)	$7 million in subordinated debt from Orange County

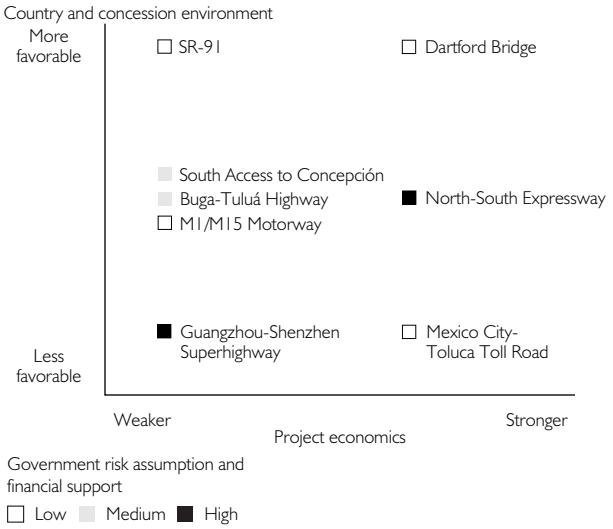
a. Total debt may not equal the sum of the debt instruments because of rounding.
b. Does not include in-kind contributions of right-of-way, existing facilities, and pre-construction studies. Includes support by host government only and does not reflect participation by multilateral financial institutions.
c. Total capital is $16 million lower than the construction cost because toll revenues contributed to construction financing.
d. Total capital includes cost of assuming tunnel debt, net of toll revenues during construction.

ratios ranging from 50–100 percent for most of the projects studied. The one exception is the Guangzhou-Shenzhen Superhighway, where the debt ratio was 40 percent because of the 60 percent cost increase that was funded with sponsor equity.

The Mexico City-Toluca Toll Road and Dartford Bridge were both financed with 100 percent debt. The lack of equity participation in these financings may appear to limit the investors' financial interest in the success of these projects. However, the Toluca financing was a securitization of an existing private toll road concession in which the private consortium, led by Tribasa, retained an equity interest. The Dartford Bridge financing included a long-term (eighteen-year) subordinated "loan stock" that was provided by the consortium members at interest rates above the senior debt. This quasi-equity provides a financial incentive to the consortium to perform, although not as strong an incentive as true equity. The government chose to avoid true equity investment in the Dartford Bridge in order to limit the required toll rates and accelerate the transfer of the bridge back to the government. All debt is expected to be repaid and the bridge returned to the government six years before the end of the twenty-year concession, as provided for in the agreement between the sponsors and the government.

FIGURE 4

Government risk assumption and financial support



Government financial participation

Governments often provide financial support to toll road projects in the form of cash grants, loans, and in-kind contributions, in addition to assuming various project risks. In Chile the government provided a one-time up-front cash grant of $5 million to the concessionaire in addition to a minimum revenue guarantee. (The size of the grant, which is 23 percent of total capital, was one of the criteria for awarding the concession.) In China and Malaysia the governments provided substantial loans and financial guarantees. By contrast, in Colombia, Hungary, Mexico, the United Kingdom, and the United States governments provided no or minimal project capital, although in some cases they did provide in-kind contributions. For example, the Hungarian government provided the right-of-way for the M1/M15 project and constructed about 130 kilometers of toll-free highway that connects with the toll road.

In some cases government risk assumption and financial support may be necessary to support a project that would otherwise be unable to close financing because of weak project economics or an unfavorable country and concession environment. The relationship between project economics, country and concession environment, and level of government risk assumption and financial support for each project studied is shown in figure 4. Attracting private capital clearly depends on a combination of these factors. For example, projects like the Mexico City-Toluca Toll Road, with strong economics in an unfavorable country and concession environment, can be financed with minimal government support. Projects like South Access to Concepción, with less favorable economics in a moderate country and concession environment, may require moderate levels of government support. Finally, projects like the Guangzhou-Shenzhen Superhighway, with weak economics and an unfavorable country and concession environment, may require substantial government support.

Two apparent exceptions are Malaysia's North-South Expressway and Hungary's M1/M15 Motorway. The Malaysia project has strong economics in a moderate country and concession environment and could therefore be expected to require low to moderate government support. In reality, it received very high levels of government support. One reason may be that its sheer size (total cost of $3.2 billion) and the risks associated with large projects led the government to believe that extensive government support would be required to attract financing. The close ties between the concessionaire and Malaysia's leading political party also may have contributed to the high level of support.

The Hungary project, which received a moderate rating in terms of both economics and country and concession environment, could be expected to require at least moderate government support in order to attract financing. In reality, the project received no significant financial support from the government. The project did, however, benefit from right-of-way contributions and the construction of connecting highway segments. In addition, the EBRD provided substantial support in the form of a $58 million A-loan on its own account and a $163 million syndicated B-loan for which it assumed certain noncommercial risks for the members of the loan syndicate.[3] The EBRD's extensive involvement contributed to the Hungarian government's ability to avoid extending financial support to the project.

Foreign and domestic capital

As discussed in the section on the country and concession environment, accessing local capital markets for toll road projects has several benefits—most important, the avoidance of exchange rate risk between local currency toll

revenues and foreign currency debt. In many countries, however, local capital markets are not sufficiently developed to provide the long-term capital required for toll road projects.

Four of the projects studied used little or no foreign capital—those in Chile, Colombia, the United Kingdom, and the United States. The United Kingdom and the United States have highly developed capital markets, while the projects in Chile and Colombia were relatively small ($22 million and $47 million) and could be financed locally. Chile and Colombia are currently pursuing larger road concessions and are seeking foreign capital to supplement locally available capital.

The Mexico City-Toluca Toll Road involved a $313 million securitization, $208 million of which was raised outside of Mexico with no government support. This financing resulted in part from an explicit government objective to attract foreign capital to Mexico's toll roads because domestic banks had become overexposed to toll road debt and were reluctant to provide additional capital.

In China and Hungary the bulk of project financing came from foreign sources. As noted earlier, $1.7 billion of the Guangzhou-Shenzhen Superhighway's $1.9 billion cost was financed with foreign capital. In Hungary the EBRD lent on its own account or syndicated internationally $221 million of the $352 million in project debt.

In general, large financings in countries with undeveloped capital markets (such as China, Hungary, and Mexico) may require substantial amounts of foreign capital, while smaller financings (Chile and Colombia) and financings in countries with highly developed capital markets (the United Kingdom and the United States) are more likely to rely on local capital.

Debt financing

Most of the debt for the projects studied was in the form of senior commercial bank loans (see annex 1 for a summary of the debt terms). Commercial banks are the traditional providers of project finance loans because they tend to be more willing and able than other debt providers to structure acceptable debt packages in the context of complex and risky project finance transactions.

Institutional debt from pension funds and insurance companies was also used in Malaysia and the United States. There is great interest in many countries in tapping institutional debt, particularly from pension funds, to fund toll roads and other infrastructure projects. The large pool of funds available and the long investment horizons of these institutions correspond with the long-term debt requirements of infrastructure projects. Many developing countries, however, do not have large institutional debt markets. Moreover, the role of pension funds and other institutional investors is often limited by regulatory restrictions and modest risk appetites for investing in projects prior to operation when the facility has no track record and faces construction period risks.

In Chile, for example, privatization of the national pension system has resulted in tremendous growth in pension fund savings available for private investment. But regulatory barriers and concerns about risk have limited the involvement of pension funds in providing debt to toll road projects. If these obstacles can be overcome, a large pool of long-term debt would be released for investment in private toll roads.

Public bond markets are another source of debt financing. Public bond issues are the predominant method of raising capital for public toll roads in the United States. Of the projects in this study, only the Mexico City-Toluca Toll Road was able to access public capital markets with a bond issue, through U.S. Rule 144A.[4] The Toluca financing, however, was for an existing toll road with no construction period risk and an established toll revenue stream, which greatly reduced the traffic and revenue risk relative to start-up toll roads. Accessing the public bond markets will be a bigger challenge for start-up toll facilities. As with institutional debt markets, many developing countries lack substantial bond markets. Where they exist, bond investors are generally reluctant to assume construction and traffic and revenue risk. Bond issues, however, may be an important source of financing for securitizations or expansions of facilities in countries that either have substantial bond markets or are able to access international capital markets.

Regardless of the source of debt financing, one of the critical challenges for toll road projects is obtaining medium- and long-term debt that approaches the useful lives of these facilities (typically ten to thirty years). In this study, debt maturities generally reached eight to ten years for projects in developing countries (Chile, China, Malaysia, Mexico) and ten to twenty-five years for projects in industrial countries

(the United Kingdom and the United States). Hungary was able to obtain debt financing with a term of twelve to fifteen years, although EBRD support was an important factor in making that possible. The debt maturity in Colombia was just four to five years.

The Mexican toll road program provides examples of the risks of financing projects with short-term debt and short concession terms. Many of these projects, with concession and debt terms of less than five years, have been unable to meet their high debt service payments. The Toluca project, for example, had an initial debt term of four years and a concession term of four and a half years. After two years of operation, its financing had to be restructured to a debt term of ten years and a concession term of eleven years.

Another significant issue facing private toll road financings is that, although bank loans are often the only available source of debt that will accept construction and traffic and revenue risks, in many countries (such as Colombia) the terms on loans are less than five years. As a result the proposed financing for projects in such environments often assumes bank debt through construction plus two to three years of operation, followed by refinancing once the project revenue stream is established. The risk of this arrangement is that if the project does not perform according to expectations, refinancing of the initial bank loans may not be possible. The commercial banks are implicitly taking the long-term financial risk on the project, since they will have to retain and restructure the loan if it cannot be refinanced. However, there is no preestablished mechanism for addressing this eventuality.

Equity financing

All the projects studied include at least 15 percent equity, with the exceptions of the Mexico City-Toluca Toll Road and the Dartford Bridge, which had 100 percent debt financing (see annex 1 for a summary of the equity terms). The Guangzhou-Shenzhen Superhighway was the only project in which the government took an equity stake.

The sponsors of the projects studied were led by construction companies, with the exception of the Guangzhou-Shenzhen Superhighway, which was led by the Hong Kong infrastructure developer Hopewell Holdings, and the M1/M15 Motorway, led by the French toll road operator Transroute International. A substantial equity contribution from the project sponsor is important for toll road projects because it provides a strong incentive for the sponsor to maximize the road's long-term financial performance rather than maximize earnings from the construction contract.

Several international infrastructure investment funds have been established in recent years to invest equity and quasi-equity in private infrastructure transactions, including toll roads. Examples include the AIG Infrastructure Investment Fund and the Asia Infrastructure Fund. These funds raise most of their money from insurance companies and other large institutional investors in industrial countries. The projects studied were financed prior to the establishment of most of these funds, however, and so do not reflect their activity. In the future such funds could provide equity to the private toll road industry if projects demonstrate an ability to generate attractive returns and adequately address project risks. The willingness of governments to allow investors to earn the high returns on equity that they require will be an important factor in the ability of toll roads to attract equity from all sources.

Local investment funds are also increasingly important sources of equity capital for toll road projects. For example, numerous funds have been established in Chile to channel the growing pools of private pension fund savings into attractive equity investments, including toll roads. Two of these funds participated in the equity financing of the South Access to Concepción project, and other funds are actively pursuing additional toll road investments in Chile.

Three of the projects studied involve profit or revenue sharing with the host government that may affect returns to equity. Profits from the Guangzhou-Shenzhen Superhighway are evenly split between the private sponsor, Hopewell Holdings, and its joint venture partner, controlled by the Government of Guangdong. In Colombia all revenues above 125 percent of the base case traffic estimates are transferred to the government sponsor. And in California half of the "incentive returns" that the investors are entitled to earn if certain passenger throughput objectives are met will be shared with the state of California. The investors in the Chile, Hungary, Malaysia, and Mexico projects are entitled to retain all project profits and revenues, while the Dartford Bridge concession requires that project cash flows be used to repay debt, with no provision for distributions to private equity holders or the government.

The expected returns on equity in toll road projects are difficult to ascertain from project sponsors because of the sensitive and confidential nature of these estimates. Although the expected returns for the projects studied were unavailable, discussions with industry participants indicate that toll road investors generally expect annual returns on equity in after-tax, nominal U.S. dollar terms in the range of 15–30 percent. The wide variance in expected returns can be partly explained by the very different risk profiles of toll road projects. Expected returns also vary based on the characteristics of local capital markets, such as the return objectives of local equity investors and the return available on alternative investments of comparable risk within the country. Local capital market characteristics are particularly important for projects that obtain equity funding locally, as did most of the projects studied.

Policy Issues

Private financing of toll roads raises several important policy issues for sponsoring governments and multilateral financial institutions:

- Under what circumstances should governments concession roads to the private sector?
- How should concessions be structured?
- When and how is it appropriate for governments to provide financial support?
- What are the critical elements of a concession agreement?

This section briefly reviews selected public policy issues facing private toll road development. The critical elements of a concession agreement are described in annex 2.

Private or public?

Diminishing general budgetary resources have provided the impetus for governments to explore "off–balance sheet" methods to raise financing for infrastructure projects, including private toll roads. Before pursuing a private toll road program, however, the advantages and disadvantages of private tolling relative to public funding or public toll roads should be carefully weighed. Assessing the appropriateness of private toll roads is a complex, project-specific process involving numerous economic, policy, and political considerations.

The primary economic benefits of tolling, public or private, are the user-based funds generated to support road development and the ability to influence road use and traffic patterns through road pricing. Although certain traditional sources of public funding, such as gas taxes and registration fees, are also user-based, they are not collected at the point of use and therefore are less effective in managing traffic. The primary economic disadvantages of tolling are the time and cost required to implement toll systems and the potential delays and excessive traffic diversions associated with toll collection. On purely economic grounds, therefore, tolls should be used when the benefits of toll revenues and traffic management exceed the costs of implementation and any delays and excessive diversions caused by the system.

The difference between private toll concessions and public tolling is best illustrated by considering the "value chain" for toll road development. Links in the value chain include project design, construction, maintenance, toll collection, and financing. The biggest difference between public and private tolling is in the financing arrangement, since all the other links in the value chain can be contracted to private parties under either a public or a private tolling scheme.[5]

The primary economic advantage private tolling has over public tolling is the strong incentive for financial success created by the use of private debt and equity to fund the project. In addition, in some countries a public entity may be unable to attract capital to a project that a private consortium can finance because of the government's weak reputation among investors. The economic disadvantage of private over public tolling is the potentially higher cost of developing, implementing, and administering a private concession program relative to a public tolling scheme. On purely economic grounds, therefore, private tolling should be used whenever the value of the private sector's financial incentive exceeds the additional costs associated with the private concession process. It is important to note that if investors assume similar project risks, the cost of capital for a specific project should be similar whether it is tolled publicly or privately. Any financing advantage that a public entity may have is due to greater government risk assumption or distortive tax policies (as with the tax-exempt debt

market in the United States), not to an inherent ability of the public sector to access lower-cost capital.

In addition to the economic considerations discussed above, policymakers must consider numerous noneconomic issues when evaluating toll road programs. These include public acceptance of tolling, the equity of charging tolls for road use, and the impact on the government's flexibility in future road development. In particular, public acceptance is one of the overriding issues in toll road development and may be the greatest impediment to tolling. Noneconomic issues tend to be greater impediments to private than to public toll road development. After taking these important noneconomic issues into consideration, policy-makers may make different decisions than those indicated by a purely economic assessment.

In general, private tolling is preferable for projects that are able to fund most, if not all, of their capital requirements through toll revenues. Private tolling is preferable to public tolling because of the tremendous financial incentives and accountability created by private debt and equity investment.

When the toll-backed portion of total project capital falls below a threshold amount, the benefits of private tolling may be diluted to the point that they no longer exceed the costs. In that case public tolling may be preferable. Public tolling also may be preferable if noneconomic policy considerations make private tolling unattractive. Public tolling is preferable to general government funding in these cases because of the additional funds generated from the direct beneficiaries of the project and the ability to use tolls to manage traffic. Projects that are unable to generate sufficient revenues to justify the cost of a tolling system and any delays or excessive diversions created by toll collection should be funded by traditional government sources.

Concession program structure

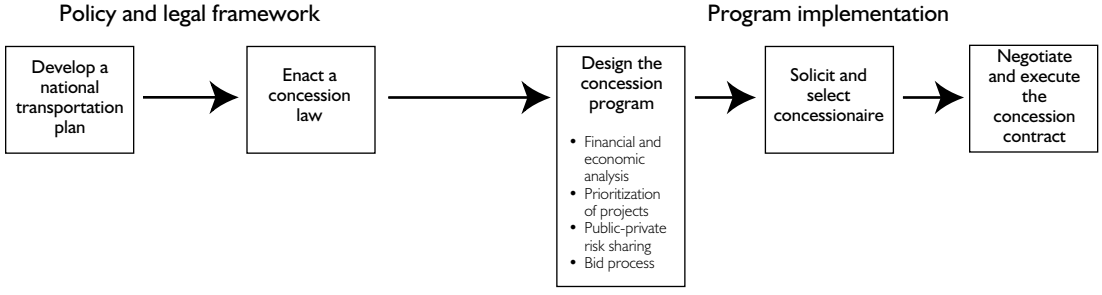
The overall concession structure can be divided into two critical phases, beginning with the policy and legal framework and followed by program implementation (figure 5).

Policy and legal framework. A successful concession program requires a supportive policy and legal framework. A private toll road program should be integrated with national, regional, and local transportation policies and programs and should be enabled by a concession law. Transportation policy objectives typically include providing efficient mobility at lowest cost and with the least environmental impact, and facilitating economic development. The interaction between a private toll road program and the overall transportation policy raises several critical issues:

- What types of roads should be targeted for tolling?
- Is a specific toll road concession law necessary, or can the program be implemented under the existing contract and investment law?
- How specific should the concession law be with respect to program structure?
- What government entity should be authorized to implement the program?

One of the first steps in a private toll road program is selecting the roads that are the most appropriate or attractive projects to concession. Because early successes are important in establishing credibility for future programs, the selection and design of the initial projects are critical. A country's concession program should begin with a feasible project of manageable size that carries a high probability

FIGURE 5
Concession program structure



of success. For example, rehabilitation and expansion of an existing facility with strong economics and a capital cost that can be financed in local capital markets may be a better initial candidate than a new multibillion-dollar intercity artery requiring foreign capital.

In addition, it is important to select projects that maximize the benefits of private tolling relative to the costs. Roads with strong project economics that can be financed mostly with private funds are preferable to projects that require extensive government financial support. The costly and time-consuming concession process may not be worthwhile for a project that requires a majority of funding from government sources. Figure 6 presents some of the questions that should be asked in selecting private toll road projects.

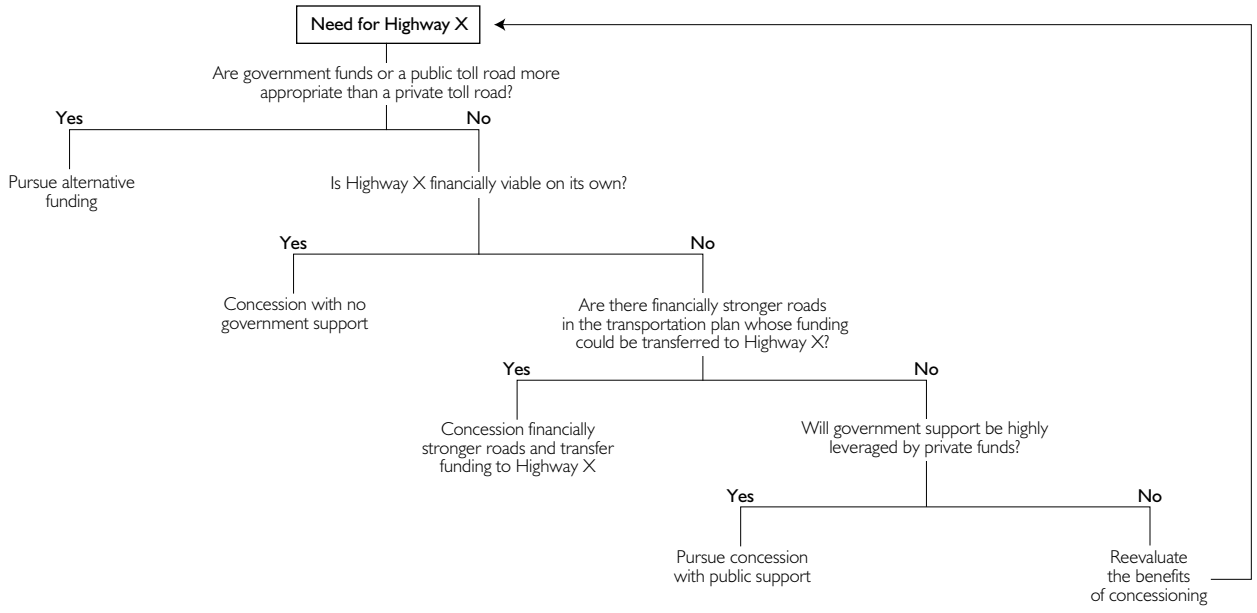
A concession policy that combines toll financing and public funds for road development should target projects with the strongest economics for concession and fund the weaker projects with public funds. This approach is contrary to the tendency of some governments to fund high-priority and high-demand projects with public funds, and offer low-priority projects with relatively weak economics for concession.

An additional issue in selecting roads for concession is the possibility of concessioning a network of roads together rather than concessioning each road as a separate project. An entire network can be concessioned at one time or begin with a core segment and phase in additional segments over time. Toll road networks are easier to finance than stand-alone projects because they rely on a diversified revenue stream from several projects rather than just one. This advantage is particularly strong if the concessions are phased in over time and the financing for later facilities can be secured, in part, by the revenues of the earlier segments. A potential disadvantage of concessioning networks is that, because of their size, they may be more difficult for one concessionaire to develop and finance than for several concessionaires to undertake, particularly if the network is to be constructed within a short period. In addition, concessioning a network to a single concessionaire, whether all at once or over time, may limit competition for traffic. Finally, many of the benefits of networks are achieved by using economically strong or existing segments of the network to cross-subsidize weak or new segments. Policymakers should consider this issue when deciding whether to concession a network.

Once a decision has been made to pursue a private toll road program, a concession law that specifically addresses toll roads is critical for providing clear legal authority and establishing government support and accountability for the program. Although in some jurisdictions toll concessions

FIGURE 6

Concessioning decision process



can be pursued under the existing legal framework, specific concession legislation is important to encourage private participants.

The concession law should explicitly assign responsibility to implement the program to a single government entity. Although input and support may be required from several government entities (such as environmental and fiscal agencies), dividing responsibility for program implementation among multiple entities can greatly complicate and delay the process. In addition, the legislation should provide broad authority to implement the program, avoiding numerous specific or detailed requirements that could inhibit the program's flexibility. A properly constructed concession law will provide private participants with a relative degree of comfort and help mitigate perceived risks.

Program implementation. Once the policy and legal framework is in place and initial projects have been selected, a well-defined and controlled process for implementing the program can accelerate the program schedule, improve the quality of bids, and ensure that government objectives are met. The objectives of the implementation phase include achieving early successes, limiting government risk and financial exposure, conducting a transparent and competitive process, attracting qualified bidders and innovative bids, and completing the process in a timely manner. Implementing a program to achieve these objectives raises several important issues:

- Who should be responsible for funding preliminary design, environmental, and traffic and revenue studies?
- What bidding criteria should be used?
- How should the facilities be financially regulated?
- How flexible or defined should the project design be?
- Should the concession contract be negotiated, competitively negotiated, or fully defined prior to bidding?

Government assistance during the development stage—the riskiest phase of a project—can be critical in attracting qualified developers. Consequently, governments should consider funding preliminary studies for initial projects in order to demonstrate public commitment and reduce the cost of private participation in the bidding process. Governments can facilitate private development of toll facilities by arranging approvals and funding pre-construction development costs, including environmental studies, traffic and revenue studies, preliminary design, land acquisition, and local permits and agreements. Government participation at this stage can also allow the government to better define the risks and responsibilities to be allocated to the private partner.

Issues of bidding criteria, financial regulation, design, and negotiations involve tradeoffs between transparency and competitiveness on the one hand and flexibility and private sector innovation on the other. The following discussion presents the available options.

- *Bid selection criteria.* There are two broad approaches to establishing bid selection criteria. The first is based on a qualitative scoring of technical and financial proposals; the second is based on objective and quantifiable factors such as the maximum toll rate or the minimum government contribution to the project. The qualitative scoring approach allows the selection committee to consider a range of important factors in choosing a concessionaire. It also affords the concessionaire the flexibility to propose innovative solutions. This approach, however, generally requires comparing nonuniform proposals on a somewhat subjective basis, and thus reduces the transparency and competitiveness of the process.

  The objective approach allows for a transparent and competitive process focused on the factors of most importance to the government. This approach, however, requires that all other factors—such as road design and risk-sharing terms—be held constant. Doing so may limit the private sector's flexibility to propose what it considers to be an optimal project. In addition, when this approach uses numerous factors that are evaluated through a formula—such as in the South Access to Concepción project, which used seven factors—the competitive focus on the one or two most important factors may be diluted. The Chilean government later simplified the process for the North Access to Concepción concession and other concessions. Under the North Access to Concepción process, bidders could propose toll rates equal to or less than the government-set maximum with no government subsidy, or propose the maximum government toll rates with an

up-front government subsidy. Selection was based on either the lowest toll rates (with no government subsidy) or the minimum government contribution (with the maximum toll rates).

- *Financial regulation.* Financial regulation can employ a variety of mechanisms, including a maximum toll rate indexed to inflation (or other indices), a return on investment ceiling, a traffic or revenue ceiling, and public-private profit sharing. An indexed maximum toll rate is the most common form of regulation because of its ease of administration and explicit limitation on toll rates. Regulating toll rates increases the revenue risk of toll road projects, however, because revenues at or below the maximum rate may be substantially lower or higher than expected, with limited flexibility for adjustment. If traffic is lower than expected, rates cannot be adjusted upward to their optimal profit-maximizing level. If traffic is higher than expected, the government cannot limit the concessionaire's returns by lowering toll rates. In addition, toll rate regulation limits the flexibility of the concessionaire to manage traffic through variable-rate, market-based tolls.

  Return on investment regulation with no toll rate ceiling, the method used in California's SR-91 project, is highly flexible in allowing toll rate adjustments to optimize revenues and profits. This type of regulation can also be more precise than toll rate regulation in limiting the returns earned by project investors. However, return on investment regulation can be cumbersome to administer, since the government must define and monitor all capital expenditures, operating costs, and revenues to ensure that the concessionaire does not exceed the return on investment ceiling. In addition, return on investment regulation does not provide an incentive for the concessionaire to invest and operate efficiently once it has reached the return on investment ceiling.

  Public-private profit sharing can take many forms. China's Guangzhou-Shenzhen Superhighway project does not set a limit on toll rates, and the private sponsor retains up to 50 percent of project profits. This approach allows for a flexible toll rate policy, but may not be effective in regulating the private return on investment if market demand is stronger than expected.

  The regulatory approaches described above can be combined with minimum traffic or revenue guarantees and maximum traffic or revenue ceilings to place upper and lower boundaries on revenue volatility. A traffic or revenue ceiling can also be combined with profit-sharing arrangements above the ceiling to maintain the concessionaire's incentive to perform once it has reached the ceiling. These mechanisms can be extremely useful in providing comfort to investors concerned about downside risk while protecting the public interest by limiting private sector returns.
- *Design specifications.* Design specifications can range from virtually no public sector responsibility for design to public sector responsibility for preliminary design (including general alignment, number of lanes, location of interchanges and crossings, environmental measures, materials, and pavement cross-sections) to public sector specification of detailed design plans. A lower level of public sector responsibility for design allows the private sector to propose innovative solutions and better match the design specifications to market demand. But allowing private sector design flexibility results in incomparable proposals, since different bidders may take different approaches to project design.
- *Negotiations.* Approaches to contract execution range from full negotiations (with either one party or multiple parties simultaneously) to immediate execution of a predefined contract with no negotiations. Because toll road concession negotiations can be complex and time consuming, a predefined contract can be appealing. In addition, a predefined contract makes the selection process more transparent and competitive since all proposals are subject to the same contract terms. Developing a predefined contract that is acceptable to all bidders may be difficult, however. This approach also limits the flexibility for structuring innovative arrangements for sharing project risks and responsibilities that are responsive to the needs of specific bidders and investors.

  If negotiations are preferred, competitive sessions with multiple parties can enhance the power of the public sector in negotiating contract terms. However, competitive negotiations require extensive resources

and stamina on the part of the public sector. Competitive negotiations may also reduce the interest and focus of the private partners in participating in the concession program. Negotiating with one party at a time, perhaps with a second party in reserve in the event that the primary negotiations cannot be completed, may achieve the objectives of competition while conserving public and private resources.

Comparison of the Chilean and U.S. approaches. A comparison of Chile's South Access to Concepción and the U.S. SR-91 projects illustrates the tradeoffs involved in developing a concession process. In Chile the government stipulated the preliminary design of the road and the concessionaire was responsible for detailed design, subject to government approval. In addition, maximum limits were set for toll rates (indexed to inflation) and there was no allowance for negotiations with the concessionaire after selection—the government completed the contract prior to bidding based on consultations with potential bidders. With potential concessionaires all bidding on the same project with a similar design and identical contract terms, selection was based on consistent and objective criteria such as minimum government cash grant, minimum average toll rate, and other factors.

Bidders for SR-91 proposed the projects they would develop and had full responsibility for all project design, subject to government approval. Toll rates were not regulated, but a 17 percent ceiling was placed on return on investment. The contract was fully negotiated only after a concessionaire was selected (runner-up bidders were held in reserve). The basis for comparing bids and selecting the concessionaire was therefore somewhat subjective, since the government had to compare different projects and designs without predefined contractual terms. However, this process allowed the private sector to propose innovative projects and designs and negotiate risk-sharing terms. In addition, the lack of toll rate regulation allowed for variable-rate, market-based toll pricing.

In both cases bidding was open and competitive. In Chile flexibility in project selection and design was sacrificed in favor of complete transparency, which allowed the selection process to be objective and quantifiable. The Chilean approach ensures that the government receives the most favorable terms based on the selection criteria. This approach also can reduce the time and effort required for selection and contract negotiation, limit the basis for contesting the award, and reduce the potential for adverse political reaction. In California a more complex and less transparent process was used to stimulate innovation in project selection and design, giving the government flexibility in selecting a concessionaire and allowing for market-based tolling.

An important issue for policymakers to consider is under what circumstances these two approaches, or hybrid approaches, are most appropriate. Although an in-depth analysis of the various hybrids and the appropriate conditions for each is beyond the scope of this study, some general observations follow.

The two critical variables for analyzing alternative approaches are:

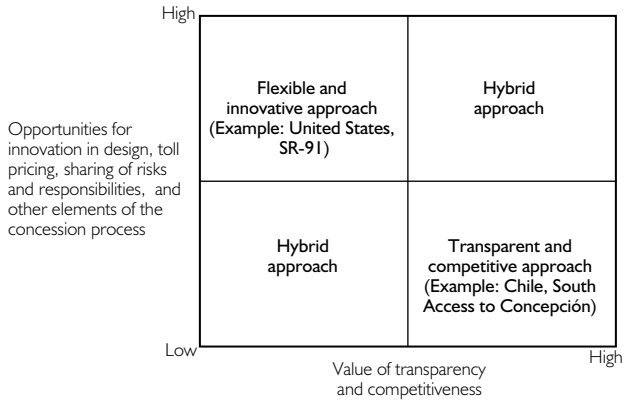
- the opportunities for innovation in design, toll pricing, and sharing of risks, responsibilities, and other elements of the concession process; and
- the value of transparency and competitiveness in the concession process.

The tradeoff between these variables and the implications for the preferred concession process are summarized in figure 7.

Projects with limited opportunities for private sector innovation generally should use a more transparent and competitive concession process, perhaps drawing on the Chilean model. Projects with large opportunities for innovation in environments where transparency and competitiveness are secondary priorities generally should adopt more flexible and innovative approaches, perhaps drawing

FIGURE 7

Alternative concession approaches



on the California model. Projects with large opportunities for innovation in environments that place a high priority on transparency and competitiveness should develop hybrid approaches to balance their somewhat conflicting needs. The challenge of developing an appropriate concession process lies in identifying a project's position on this matrix and developing the specific hybrid features that strike a balance between the critical variables.

Government financial support

As noted earlier, governments should seek to minimize the need for public financial support for toll road concessions in order to maximize the benefits of concessioning relative to its costs. Public financial support may be appropriate, however, if it helps mobilize large amounts of private capital. Governments involved in toll road projects should also seek to limit their contingent liabilities, such as minimum traffic and revenue guarantees, as well as their direct financial contributions.

If public financial support is appropriate, a variety of mechanisms can be used to support private toll financings. These mechanisms range from revenue enhancements, which involve low risk to the public sector but may be of limited value to investors, to equity guarantees, which provide strong protection to equity investors but create high government exposure. In general, the type and level of government financial support incorporated into the concession terms should be limited to the extent needed to attract financing and promote a successful project.

Equity guarantees. Of the various mechanisms available to government, risk exposure is highest for equity, debt, and exchange rate guarantees. Under an equity guarantee the concessionaire is granted an option to be bought out by the government with a guaranteed minimum return on equity. Although there is no public cost under this arrangement as long as the project generates the minimum return on equity, the government essentially assumes all of the project risk, and private sector performance incentives are severely reduced. None of the projects studied included equity guarantees, although an equity guarantee has been used in other projects, such as the San Juan Lagoon Bridge project in Puerto Rico. To date, the Puerto Rican government has not been required to make payments to support the project's return on equity.

Debt guarantees. Under a debt guarantee the government provides a full guarantee or a cash-flow deficiency guarantee for repayment of loans. As with an equity guarantee, a debt guarantee entails no public cost as long as the project generates sufficient cash flow to service debt. However, it creates extremely high government exposure and reduces private sector incentives. In China the government provided a cash-flow deficiency guarantee for the $800 million in senior project debt.

Exchange rate guarantees. Under an exchange rate guarantee the government compensates the concessionaire for increases in the local cost of debt service due to exchange rate movements. Because currency fluctuations can constitute a significant project risk when foreign capital is involved, government guarantees can have a substantial impact on a project's ability to raise financing. Although not on the same scale as debt or equity guarantees, exchange rate guarantees can still expose the government to substantial risk. They also tend to create an artificial incentive to raise foreign capital since the exchange rate risk premium on foreign capital is eliminated by the government guarantee. Exchange rate guarantees were used extensively in Spain's toll road program, resulting in large annual exchange rate payments by the government that peaked at about $500 million in 1985 (Gomez-Ibañez and Meyer 1992).

Grants and subordinated loans. Equity, debt, and exchange rate guarantees all create contingent exposure of varying degrees, depending on the expected operational performance of the toll road project. Alternatively, governments can furnish grants or subordinated loans at project start-up as cash or in-kind contributions. These can provide a critical boost to project economics. In the projects studied, Chile provided a $5 million cash grant—nearly one-quarter of total project capital—with no provision for repayment. By providing a subordinated loan, a government can fill important gaps in the financial structure between senior loans and equity and can be repaid if the project is successful. Subordinated loans are repaid after debt service on senior loans but before returns to equity.

Malaysia, for example, provided a $634 million subordinated loan, or about a fifth of the total project capital of $3,192 million. It also made soft loan facilities available to support minimum traffic levels and currency fluctuations.

Shadow tolls. An alternative structure to a one-time, up-front government payment is a "shadow toll," whereby the government contributes a specific annual payment per vehicle recorded on the road. The advantages of shadow tolls are that they are paid over time and therefore may be less of a burden to the government than an up-front grant. Furthermore, they enhance the concessionaire's incentive to attract users to the facility.

The drawback of shadow tolls is that they may not use government funds efficiently to protect investors from revenue risk. Government contributions under a shadow toll arrangement are higher when traffic is high and lower when traffic is low. Thus government support may inadequately protect investors when traffic falls below expectations. On the other hand government support may be unnecessarily high when traffic exceeds expectations. In addition, the payment of contributions over time creates a credit risk for the concessionaire that is avoided with up-front grants. The inefficiencies of shadow tolls can be reduced in a number of ways, including a declining schedule of shadow toll payments as traffic levels increase or a maximum traffic ceiling above which shadow toll payments are not paid. Shadow tolls were not used in any of the projects studied. They are, however, being used in the United Kingdom's Design Build Finance Operate program. The U.K. Department of Transport concessioned the first in a series of these concessions in late 1995.

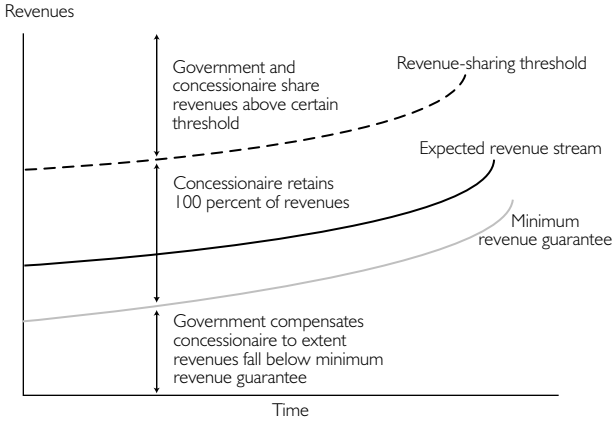
Minimum traffic or revenue guarantees. A minimum traffic or revenue guarantee, in which the government compensates the concessionaire in cash if traffic or revenue falls below a specified minimum level, is a relatively common form of government support. Typically, the minimum traffic or revenue threshold is set below (for example, 10–30 percent) the expected level in order to reduce government exposure while providing sufficient coverage to support the debt component of the capital structure. Under such a structure the government can support private financing for a road that it would otherwise have to fund on its own, while limiting its financial exposure to the possibility that revenue may fall below the guaranteed minimum. In addition, traffic and revenue guarantees retain the sponsor's financial incentive in the project, provided the minimum revenue stream does not allow for an attractive return on equity. Chile's South Access to Concepción project includes a minimum revenue guarantee, while Colombia's Buga-Tuluá Highway project uses a minimum traffic guarantee.

Especially if they are sharing significant "downside" risk with the private sector—for example, when extending minimum traffic and revenue guarantees—governments should also consider sharing "upside" potential with concessionaires (figure 8). This approach can be used by establishing a revenue-sharing threshold at a specified level above anticipated revenues. The concessionaire retains 100 percent of revenues up to the threshold level, and the government receives a percentage of any revenues above the threshold. The Colombia project includes a maximum traffic guarantee above which all revenues are transferred to the government sponsor.

Concession extensions and revenue enhancements. Two final types of financial support involve very limited public sector risk, but are also limited in their ability to support financing. First, a government can extend the concession term if revenue falls below a minimum amount, as was the case with the Mexico City-Toluca Toll Road. Term extensions do not impose any cash cost on the government, but they also do not provide any short-term protection to investors from traffic and revenue shortfalls.

FIGURE 8

Example of public-private revenue sharing



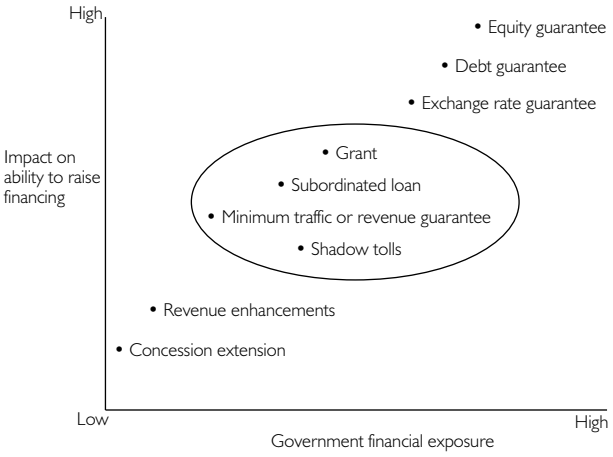
Second, as part of the concession structure a government may enhance revenues by limiting competition, building complementary facilities to feed traffic to the concession, and allowing for the development of ancillary facilities above or adjacent to the facility. The SR-91 project includes a limitation on the government's right to construct or expand competing facilities, and the concessionaire received rights for ancillary real estate development. These approaches involve very limited financial exposure for the public sector and may have significant value to investors. In many cases, however, these measures have a limited ability to support financing because of their unpredictable revenue streams. In addition, such agreements typically restrict public control over future development, which may be unattractive to the public partner.

Overall assessment

Along the spectrum of possibilities for government financial support, four alternatives significantly increase a project's ability to raise financing without creating a high level of government exposure and distorting the concessionaire's incentive to perform (figure 9). Grants, subordinated loans, and traffic and revenue guarantees all balance government financial exposure with their impact on a project's ability to raise financing. Shadow tolls can also be appropriate in some cases, although they generally involve equal or greater government financial exposure and have less of an impact on a project's ability to raise financing than the other three approaches. Under certain circumstances revenue enhancements provided by noncompetition agreements, complementary facilities, and ancillary development can also play an important role. In general, concession extensions and equity, debt, and exchange rate guarantees should be avoided. Concession extensions have a limited value in supporting financing, while financial guarantees require the government to assume a high level of financial risk.

FIGURE 9

Range of options for government support



An important issue for policymakers to consider is under what circumstances these methods of government support, or combinations of these approaches, are most appropriate. A detailed analysis of the various combinations and appropriate conditions for each is beyond the scope of this study. However, some general observations regarding the use of grants, subordinated loans, and minimum traffic and revenue guarantees follow.

There are two reasons for government to provide support to toll road projects: to reduce capital requirements or improve revenues to the extent necessary for a project to be capable of covering debt service and to earn a reasonable return on equity based on the expected cash flows of the project; and to protect investors (principally lenders) from the risk that actual cash flows will fall below expected cash flows and be inadequate to cover debt service.

Subordinated loans are the preferred means of addressing the first reason for government support, provided they are adequate to achieve the objective of project feasibility. Subordinated loans improve feasibility by increasing the debt service coverage on senior debt and reducing the need for private equity, which requires a higher return than debt instruments. Another benefit of subordinated debt is that it provides for repayment of the contribution to the government with a return. However, because subordinated debt requires repayment of interest and principal, it has less of an impact on project feasibility than grants. Grants may be the most direct and efficient means of supporting projects that require a substantial boost to become feasible. Minimum traffic and revenue guarantees are poor mechanisms for supporting infeasible projects because they do not address the core issue—that expected cash flows are too low to cover debt service. If a minimum guarantee is set below expected cash flows, the project remains infeasible, while setting the minimum guarantee above expected cash flows would expose the government to considerable financial risk.

Minimum traffic or revenue guarantees, however, are the best means of addressing revenue risk for feasible projects because they provide a defined floor on revenues that is generally set at a level sufficient to cover senior debt service payments. In addition, minimum guarantees have the benefit of requiring a government contribution only if traffic or revenues fall below a specified level. Grants and subordinated loans can mitigate revenue risk by improving coverage ratios. However, these instruments may not provide adequate protection when traffic is low, and they involve government support even when traffic is high and government support is unnecessary.

These mechanisms can also be used in combination when both of the reasons for government support are present—a project is not financially feasible on its own and revenue risk is substantial. In such a case a grant and minimum revenue guarantee together may allow the project to attract private capital. The Chilean project uses such a structure.

Determining if a project requires government support to attract financing and, if so, how the support should be structured requires a detailed analysis of project costs, revenues, and risks, as well as a strong understanding of the terms and conditions required by toll road investors. Before bidding a concession, governments should be aware of a project's critical elements, including environmental issues, traffic and revenue potential, preliminary design and costs, local permitting requirements, major areas of risk, financial feasibility, and views of potential investors. Governments can greatly enhance the chances of project success by undertaking studies to review these issues and working with experienced advisers, where appropriate.

Finally, the value of government support to investors depends, in part, on the credit risk of the government sponsor. Investors may be particularly inclined to discount the value of support mechanisms—such as debt and equity guarantees, minimum traffic and revenue guarantees, and shadow tolls—that are extended over long periods. Where governments are implementing sound road policies but do not have adequate credit for their support mechanisms to be effective, multilateral financial institutions can provide risk guarantees and credit enhancements to support the commitments of host governments during a transition period, until the government sponsor has developed adequate credit to support projects on its own. Such mechanisms have been used successfully in the power sector.

Future Developments

The private toll road industry is still in the early stages of development. There are compelling reasons why the trend toward private toll roads is likely to continue—most important, the severe public funding shortfalls for roadway maintenance, rehabilitation, and construction. Nearly 300 new, privately financed or operated motorway, bridge, and tunnel projects with development costs totaling $143 billion are currently being prepared in fifty-five countries (Reinhardt 1996). But a number of factors may inhibit private toll road development, including public resistance to tolling, the time and cost of implementing concessions relative to traditional public procurement, and the ability to attract capital to risky projects and countries.

On balance, private toll road development is likely to experience a modest increase over the next decade, with several new toll facilities financed each year. However, the inhibiting factors probably will not allow for a dramatic transformation in highway funding toward private toll roads.

Supporting factors

Continued growth in private toll road financings will be supported by a number of factors:

- *Funding needs.* Governments will continue to experience severe funding shortfalls for road maintenance, rehabilitation, and construction. As noted in the first section of this report, governments have severely underinvested in road infrastructure. Although highway needs are expanding, public funding sources are constrained by limited resources and spending priorities in other areas. Governments have been unwilling and unable to raise taxes to meet highway needs. Private tolling will be an increasingly attractive option for closing a portion of the highway funding gap.
- *Success of toll roads in raising capital.* Since 1950 public authorities in the United States have sold about $40 billion in bonds to fund some thirty roads and twenty bridge and tunnel facilities. In Europe pub-

lic and private toll roads have raised substantial amounts of capital to fund highway improvements. The demonstrated success of public and private toll roads in raising capital will be an important contributor to future toll road development.

- *Privatization trends.* A global trend toward commercializing and privatizing state-owned enterprises and reducing government's role in the economy has increased support for private toll roads. Concessions attract private capital and technical expertise and use market incentives (such as toll pricing) to promote more efficient road usage.
- *Electronic tolling.* Advances in electronic tolling technologies—such as automatic vehicle identification, which allows motorists to pay tolls without stopping—can make toll collection more convenient, lower toll collection costs, and allow use of peak period pricing. The SR-91 project is an excellent example of the use of these techniques and will provide valuable experience for future toll road developers.
- *Supportive legal and policy frameworks.* As governments gain more experience with toll roads and other types of infrastructure concessions, the legal and policy frameworks for implementing toll road concessions should become more sophisticated and supportive.
- *Increasing sophistication of public and private partners.* Both private industry and public entities are gaining experience and sophistication in designing and implementing workable concession structures.
- *Improved access to capital.* As experience with successful infrastructure finance transactions grows, the ability of private toll roads to access a variety of financial sources and instruments should expand. For example, institutional investors may become more important sources of capital in the future, although certain regulatory hurdles and risk issues will have to be addressed for this to happen.

Inhibiting factors

As the body of experience with private toll roads develops, the volume of private toll road financings may be constrained by a number of factors:

- *Public resistance to tolling.* One of the greatest impediments to toll roads is the public's resistance to paying tolls, especially on existing roads that the public often perceives as already paid for through tax revenues. Public resistance to tolling has impeded or halted private toll road programs in environments ranging from Washington state (in the United States) to Argentina. Advances in electronic tolling should reduce public resistance associated with the inconvenience of having to stop to pay tolls. However, the concept of road pricing is still not widely accepted. Of particular concern to some opponents of tolling is the alleged inequity of charging the public, especially low-income passengers, to use a vital public facility.
- *Complexity of the concession process.* The time and cost required to establish the complex legal and policy framework required for a concession, implement the program, and close financing is a second important inhibiting factor. As discussed in the section on financing structures and sources, private toll road concessions involve highly complex legal and financial arrangements and are often difficult and time-consuming to finance. In many cases these costs may outweigh the benefits of private tolling, although increased experience and sophistication among public and private partners may reduce these costs in the future.
- *Unsupportive legal and policy frameworks.* The difficulty of developing private toll roads is often compounded by government's failure to integrate concessions with a broader regional or national transportation policy. For example, some governments fund high-priority roads with strong economics with public funds and leave low-priority roads with weak economics for concessions. Also, significant barriers to private toll road development persist in many countries. For example, in the United Kingdom the absence of legal authorization for charging tolls on existing roads has led to a program based on shadow tolls. In China, Mexico, and other countries the legal system may not provide adequate assurance to investors that they can obtain an objective settlement of contract disputes.

- *Private toll road failures.* Notable private toll road failures have made investors and governments cautious about pursuing such projects. For example, in Thailand's Bangkok Second Stage Expressway project the government failed to abide by an agreement to increase toll rates, causing losses for project investors. And, as mentioned, in the U.S. state of Virginia the Dulles Greenway, which has involved sophisticated private partners and techniques for structuring the concession and financing, is experiencing traffic levels substantially below the levels required to service debt.
- *Competition for financing.* Alternative investment opportunities, including power generation and other infrastructure projects, will compete with toll roads for capital. In addition, a large portion of private toll roads are planned in relatively risky developing country environments. Private toll roads will be able to attract capital only to the extent that they are able to generate competitive risk-adjusted returns relative to the alternatives. Although information on actual returns to toll roads is limited, experience to date suggests that the risks are extremely high.
- *Limited number of attractive projects.* Private tolling is unlikely to become a substantial portion of total highway funding simply because there is a limited number of roads, particularly new roads, with strong enough project economics to attract private financing without substantial government contributions.

Challenges ahead

The challenge to those who are working to expand the toll road industry will be to overcome these inhibiting factors, through such measures as:

- Developing broader public acceptance of tolling as a standard method of road finance, similar to user fees for water, electricity, and other public services.
- Developing standard concession models and financing arrangements that are relatively easy to replicate and tailor to specific projects in order to reduce the time and cost required to implement concessions.
- Improving the legal and policy frameworks for private toll roads by reducing barriers to concessions and encouraging governments to concession roads with strong economics, including existing roads.
- Educating governments and the public about project successes and potential pitfalls.
- Targeting projects and developing structures that generate attractive returns to private investors, while adequately addressing project risks.

Multilateral financial institutions, such as the World Bank and the EBRD, can play an important role in supporting private toll road development in developing countries. First, multilaterals are in a unique position to advise governments on the appropriate role of private toll roads in a national transportation plan. Secondly, multilaterals can help governments structure and implement complex toll road transactions by providing technical assistance and general advice. Finally, multilaterals can support private financings using risk guarantees and credit enhancements that have been used successfully in other sectors, such as power generation. Multilateral institutions will most likely have to play a critical role in this early stage of private toll road development if it is to grow into a larger, self-sustaining industry.

Notes

1. All toll lane users on SR-91 will be required to obtain a transponder that electronically debits their prepaid account as they pass under overhead antennae. The tolls are initially set at a minimum of $0.25 during off-peak periods and rise to a maximum of $2.50 during weekday rush hours.

2. For the purposes of this report the public sector refers to the host government for the project and does not include other public or quasi-public entities, such as multilateral financial institutions.

3. The EBRD is "lender of record" for both the A-loan and B-loan. The EBRD provides the A-loan from its own account and assumes full project risk. The B-loan is fully syndicated to international commercial banks that benefit from the EBRD's status as a preferred creditor.

4. Rule 144A, part of the Securities Act of 1933, permits qualified institutional buyers to issue, buy, and resell certain securities without filing formal registration statements or transaction reports.

5. The San Joaquin Hills toll road project in California, for example, uses private construction and toll collection on a publicly financed project.

Annex 1
Summary of Debt and Equity Terms

Summary of debt terms

Country, project	Debt rank	Source	Amount in US$ millions[a] (denomination)	Interest rate	Debt term
Chile, South Access to Concepción	Senior	Banco del Estado de Chile	13 (pesos)	UF + 8.5%[b]	8–10 years
Colombia, Buga-Tuluá Highway	Senior	Caja Agraria	7 (pesos)	TCC + 5.0%[c]	4 years
	Senior	Corfivalle, S.A.	3 (pesos)	DTF + 5.25%[c]	4 years
	Senior	Cofinorte	1 (pesos)	TCC + 5.5%[c]	4 years
	Senior	Institute de Fomento Industrial	4 (pesos)	LIBOR + 5.5%	5 years
Mexico, Mexico City-Toluca Toll Road	Senior	Lehman Brothers/IFC (underwriters)	208 (dollar-indexed)	11.25%	10 years
	Senior	Mexican Interacciónes de Bolsa (underwriters)	105 (pesos)		
China, Guangzhou-Shenzhen Superhighway	Senior	Banks	800 (dollars)	LIBOR + 1.4%	8 years
Malaysia, North-South Expressway	Senior	Foreign and local banks	796 (RM)	Malaysian base lending rate + 1.5%	8–10 years
	Senior	Local banks and employee pension funds	807 (RM)		
	Subordinated	Government	634 (RM)		
	Standby	Local banks	179		
Hungary, M1/M15 Motorway	Senior	EBRD A-Loan	58 (ECU)	LIBOR + 3%	15.5 years
	Senior	EBRD B-Loan syndicate	163 (ECU)		14.5 years
	Senior	Private placement	33 (HUF)		12.5 years
	Senior	Bank bond	33 (HUF)		5 years
	Senior	Serial bond	33 (HUF)		
	Senior	Local bank	33 (HUF)		12 years
United Kingdom, Dartford Bridge	Senior	Bank of America Syndicate	178 (pounds)	Confidential	11 years
	Subordinated	Consortium "loan stock"	53 (pounds)		16 years
	Subordinated	Consortium "loan stock"	60 (pounds)		18 years
United States, SR-91	Senior	Citibank	65 (dollars)	Confidential	14.5 years
	Senior	Kiewit Diversified Group (later sold to CIGNA)	35 (dollars)		24.5 years
	Subordinated	Orange County (California)	7 (dollars)		8.5 years

a. All nondollar amounts are converted at the exchange rate in the year of financial close.
b. UF is the inflation-indexed currency of Chile.
c. TCC and DTF are variable interest rate indexes used in Colombia.

Summary of equity terms

Country, project	Equity investors (country of origin)[a]	Type of company	Equity amount (US$ millions)	Profit/revenue sharing
Chile, South Access to Concepción	BELFI (Chile) Las Américas AFI (Chile) CMB Prime AFI (Chile) Assesorías Inversiones CMB (Chile)	Construction Investment fund Investment fund Private investors	9	None.
Colombia, Buga-Tuluá Highway	Ferrovial, S.A. (Spain) Conciviles (Colombia) Central de Seguros (Colombia) Corporación Financiera del Valle (Colombia) Instituto de Fomento Industrial (Colombia) Thomas Greg & Sons (Colombia)	Construction Construction Insurance Financial corporation Financial corporation Toll collection	16	All revenues in excess of 125 percent of base case traffic (specified in the bidding documents) are transferred to the provincial government.
Mexico, Mexico City-Toluca Toll Road	TRIBASA (Mexico) CIESA (Mexico)	Construction Construction	NA	None.
China, Guangzhou-Shenzhen Superhighway	Hopewell Holdings (Hong Kong) Guangdong Provincial Highway Construction Company (China)	Developer Local government	922 200	Hopewell receives 50 percent of profits for the first ten years of operation, 48 percent for the second ten years, and 45 percent for the last ten years. The Guangdong Provincial Highway Construction Company (controlled by the Province of Guangdong) receives the remainder of the profits.
Malaysia, North-South Expressway	United Engineers Berhad/PLUS (Malaysia) Employees Provident Fund and Government Social Security (Malaysia)	Construction Pension funds	583 192	None.
Hungary, M1/M15 Motorway	Transroute International (France) Banks (France and Hungary) Subcontractors to Strabag (Austria and Hungary) Undisclosed	Operation Commercial banks Construction Unknown	 79 9	None.
United Kingdom, Dartford Bridge	Trafalgar House (U.K.) Prudential Assurance (U.K.) Kleinwort Benson Ltd. (U.K.) Bank of America (U.S.)	Construction Insurance Investment bank Commercial bank	<0.002	All project cash flows are used to repay debt; there are no distributions to shareholders.
United States, SR-91	Kiewit Diversified Groups (U.S.) Cofiroute (France) Granite Construction, Inc. (U.S.)	Diversified construction Operation Construction	19	Consortium is limited to 17 percent base return on investment plus additional incentive return if passenger throughput targets are achieved; 50 percent of incentive return is shared with the state; 100 percent of return above base and incentive return is transferred to the state.

a. Lead sponsor listed first.

Annex 2
Critical Terms and Conditions of a Concession Agreement

The concession agreement is the principal contract governing a private toll road project. It should address the major terms and conditions described below, in addition to standard commercial contract terms. This annex summarizes selected terms and conditions; it is not intended to be a comprehensive listing of all the legal provisions required in a concession agreement.

Preamble

Listing of the parties to the contract and description of the project background.

Concession rights and obligations

An explicit recognition of the private sponsor's exclusive rights to design, build, finance, and operate the project during the concession period, including the legal authorization for the concession, the concession term, eventualities under which the concession term may be extended, any payments required from the concessionaire to the government for the concession rights, and the party that holds legal title to the facility over the life of the concession.

Representations and warranties

A description of each party's additional representations and warranties that are not addressed elsewhere in the contract. This includes a description of each party's understanding of the background, legal authorization, responsibilities, and commitments under the concession agreement.

In addition, this section may include a listing of covenants for each party. For the concessionaire these may include requirements regarding insurance, performance bonds, minimum equity contribution, and corporate structure. For the government this may include assistance in obtaining government approvals and permits.

Acquisition of right of way

The specific responsibilities of each party for funding, acquiring, and preparing the project right of way, including the risk of delays or cost overruns.

Development and construction

The specific responsibilities of each party for developing and constructing the project, including environmental compliance, permitting, design, financing, and construction.

The agreement should specifically address the risk borne by each party in the event of unplanned occurrences, such as delays associated with environmental compliance and permitting, unforeseen soil conditions, design change orders, and cost overruns. In addition, the agreement should address the eventuality that the concessionaire is unable to raise sufficient financing to complete construction of the facility on a timely basis. Finally, the agreement should address any rights and responsibilities of the concessionaire to modify or expand the facility in the future beyond the requirements of the initial concession.

Acceptance

The conditions under which the government will accept the completed facility and approve the commencement of operations.

Operations

The specific responsibilities of each party during the operating phase of the project, including toll collection, toll enforcement, road maintenance, police services, safety, and management and administration.

The agreement should specifically address the risk borne by each party with respect to technical failure of the toll collection system, ineffective enforcement of toll payments by users, poor maintenance practices, tort liability, and other operating risks. The agreement may also include requirements for the concessionaire to obtain insurance to cover certain risks.

Government financial support

Any mechanisms (such as minimum revenue guarantees, cash grants, in-kind contributions, loans), committed by the government to support the project, the magnitude and timing of the contributions, and the recourse of the concessionaire in the event the government does not honor its financial commitments under the agreement.

Foreign exchange risk

The specific rights of the concessionaire and any arrangements related to the conversion of local currency earnings into foreign currency. Issues that may be addressed include the right to convert local currency into foreign currency, the availability of foreign exchange at the time of conversion, the ability to transfer funds out of the country, and the exchange rate at which conversion occurs.

Construction of complementary facilities

Any specific facilities, such as connecting roads or interchanges, that the government is committed to provide, including dates by which construction is to be completed and the remedy in the event the government is unable to honor its commitment.

Limitations on the construction of competing facilities

The specific corridor, if any, within which the government is restricted from constructing competing facilities, expanding existing facilities, or granting concessions for such facilities.

Rights to develop ancillary facilities

Any specific rights of the concessionaire to develop space above or adjacent to the facility. The agreement should also specify that the financial returns generated from such activities are excluded from the financial regulation of the toll facility.

Financial regulation

The approach and enforcement mechanism for financial regulation. If toll rate regulation is used, the agreement must specify the maximum toll rate by type of vehicle, the index used to adjust toll rates, and the time period or threshold that must be met for a toll rate increase to occur. The agreement should also clearly describe the specific procedure for calculating and revising the toll rate schedule.

If rate of return regulation is used, the agreement must specify the basis for the regulation (that is, return on equity or return on total capital), the maximum rate of return allowed, and the detailed calculation used to determine whether the concessionaire has exceeded the allowable return ceiling.

Rate of return enforcement requires a detailed description of the items included and excluded from capital costs, operating costs, and revenues, as well as the method for calculating the return. (The treatment of taxes and reserve funds can be a particularly complex and important issue in this approach.) The rate of return calculation can have a dramatic effect on the revenues that the concessionaire is entitled to retain under a given rate of return ceiling.

Profit sharing, revenue sharing, and financial incentives

The specific conditions under which profits or revenues are shared with the government sponsor or any other entity. For example, if a maximum traffic or revenue ceiling is used with profit sharing above the ceiling, the agreement should specify the maximum traffic or revenue threshold for each year of the concession, the revenue sharing formula, and the procedure for calculating and transferring the government's share.

If incentive provisions are used, the agreement should specify the events that trigger the incentive payment and the magnitude and timing of the payments. For example,

if incentive payments are provided for improving the safety record or occupancy per vehicle on the facility, the agreement must specify the basis and procedures for measuring these variables and calculating an incentive payment based on the observed measurement.

Reporting and monitoring procedures

The reports that the concessionaire must provide to the government in order to monitor the financial and other terms of the agreement. The financial reports will depend on the approach to financial regulation, the form of any government support, and the structure of any profit or revenue sharing and incentive mechanisms. Under toll rate regulation financial reporting and monitoring may be limited to toll rate verification. Minimum revenue guarantees will require reporting revenues on a regular basis. Under rate of return regulation extensive reporting is required to monitor capital costs, operating costs, revenues, and rate of return. In addition, a procedure is required for the government to monitor and verify the data reported by the concessionaire, including arrangements for auditing and challenging the concessionaire's reports, if necessary.

Force majeure

The allocation of responsibility for force majeure risk, including the specific division of the risk, if applicable. For example, if the private sector is allocated natural force majeure risk and the government takes responsibility for political force majeure risk, then these risks must be defined specifically in the agreement, including the government's remedy in the event of a political force majeure event. The government remedy could take a variety of forms, including cash compensation or an extension of the concession term equal to the length of the disturbance.

Assignment of the concession

The terms and conditions under which the concession may be sold or transferred to a party other than the original concessionaire.

Termination of the concession

The specific conditions under which the concessionaire or the government can cancel the concession and the consequences of termination, including penalties and the substitution of a new concessionaire.

Default

A listing of the events that constitute default on the part of each party, their remedies, and the procedures for obtaining compensation. In some countries violations of the agreement may be addressed through standard contract and takings law. Alternatively, this section may include a listing of material adverse actions by each party and the consequences and remedies associated with such actions.

Dispute resolution

The procedures for settling disputes that arise under the agreement in a fair and timely manner. This section may include provisions for arbitration or mediation for certain types of disputes. Foreign concessionaires and investors may prefer disputes to be resolved in a neutral jurisdiction outside of the project country.

References

The project-specific information in this study is based on a variety of sources, including project concession agreements, offering memoranda for project securities, IFC investment memoranda, trade journals, other secondary sources, and telephone interviews with project sponsors, project financial advisers and consultants, and officials of multilateral financial institutions.

The discussion of legal issues in this study, including force majeure, tort liability, and political risk, is based on information provided by project sponsors and advisers. Detailed analysis of these issues by the authors of this study was not possible because of the confidentiality of many of the concession agreements and the limited scope of the study.

The general history information in this study is from secondary sources, including trade magazines, books, and research reports, as noted.

The statistics on the country and concession environment in each project country are from various reference materials, magazines, and Standard & Poor's Ratings Services.

Carr, Julie, and Rob Wright. 1996. "U.S. Toll Road Projects Have Mixed Experiences." *Project Finance International* (March 27).

IMF (International Monetary Fund). Various years. *International Financial Statistics.* Washington, D.C.

Klein, Michael, and Neil Roger, 1994. "Back to the Future: The Potential in Infrastructure Privatization" World Bank, Washington, D.C.

Meyer, John, and José Gomez-Ibañez. 1993. *Going Private: The International Experience with Transport Privatization.* Washington, D.C.: The Brookings Institution.

Reinhardt, William J. 1996. "1996 International Major Projects Survey." *Public Works Financing* (October).

USDOT (U.S. Department of Transportation). 1995. *Status of the Nation's Surface Transportation System: Condition and Performance.* Washington, D.C.