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The Rise and Fall of Brownfield Concessions

But Some Signs of Recovery After a Decade of Decline

James Leigland

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Public-Private Infrastructure Advisory Facility

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ACRONYMS AND ABBREVIATIONS

BOO	Build, own, operate
BOT	Build, operate, transfer
BROT	Build, rehabilitate, operate, transfer
PPI	Private participation in infrastructure
PPIAF	Public-Private Infrastructure Advisory Facility
PPP	Public-Private Partnership
RLT	Rehabilitate, lease, transfer
ROT	Rehabilitate, operate, transfer
SPV	Special purpose vehicle

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FOREWARD

Nothing better reflects changes in public-private partnerships (PPPs) in developing countries over the last decade than the precipitous decline in the use of brownfield infrastructure concession contracts-- long-term PPP arrangements whereby private companies manage and improve existing infrastructure systems, such as water distribution networks and roads. In the early 1990s, the development community had high hopes for these kinds of contracts because they offered a solution to the most difficult of all infrastructure problems—what to do with existing, but badly dilapidated, government-owned infrastructure assets that were difficult to fully privatize or close down. The use of these kinds of concessions, however, went into sharp decline with the Asian Crisis in 1997, and this dramatic drop in popularity was an important factor in the sharp downturn of the entire PPP market beginning at that time. Since then, the use of these kinds of concessions has remained at low levels even though other elements of the market have demonstrated increasingly strong performance. Modest increases in the use of brownfield concessions in 2006 and 2007 reflect changes in how these agreements are being structured in some sectors and suggest that some forms of brownfield concession may also finally be on the road to recovery.

This paper attempts to explain why some kinds of brownfield concessions do seem to be on the verge of extinction and how others have evolved into sturdier, more sustainable arrangements, sometimes by being blended with other forms of PPP to form hybrid structures. In some cases, however, these hybrid arrangements bring with them their own special challenges and risks, which need to be well understood by the parties involved if contracts are to be sustainable in ways that avoid conflicts of interest and other problems. We hope that this paper will provide useful insights into these issues for policy makers, development agencies, prospective private partners, and other stakeholders engaged in rehabilitating existing government-owned infrastructure systems in developing countries.

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EXECUTIVE SUMMARY

In 1990 brownfield infrastructure concessions suddenly captured the attention of development professionals with a sevenfold increase in number over the previous year. For public service providers as well as private operators and financiers brownfield concessions were an attractive option, embodying almost all the most beneficial qualities associated with public-private partnerships in infrastructure. Perhaps most important, they were seen as a solution to one of the most difficult infrastructure problems facing the developing world—what to do with badly dilapidated infrastructure service systems, such as water delivery facilities and roads, that could not be shut down or sold off.

The concept was simple: private companies would take over badly maintained government-owned infrastructure service systems, improve efficiency, make needed investments, and recover all their costs—plus make reasonable profits—over the long term (20–30 years) of the contracts. Best of all, because of greater operational efficiency, carefully targeted and managed investments, and more realistic pricing, these operators would deliver better services while still recovering costs. Thus the new arrangements would be largely self-supporting, in dramatic contrast to the huge budget deficits that had resulted from public subsidies for inefficient service provision.

But the track record of brownfield concessions is one of boom and bust (figure 1). Indeed, the sudden unpopularity of the brownfield concession almost single-handedly accounted for what is normally thought of as a sharp decline in private participation in infrastructure (PPI) following the Asian crisis. Data from the

PPI Project Database show that if brownfield concessions are excluded, the PPI market, buoyed by privatizations and greenfield projects, demonstrated few of the “crash” characteristics commonly associated with the aftermath of the

Asian crisis. Other forms of PPI barely registered the effects of the crisis, and all have long ago surpassed their precrisis investment highs.

Only brownfield concessions have never recovered. A 2006 surge in popularity pushed investment through brownfield concessions to about 40 percent of its 1997 peak. The surge (probably followed by another in 2007) suggests that some kinds of brownfield concessions may finally be poised for recovery.

What happened to brownfield concessions?

No single factor accounts for the rise or decline in the use of a PPI mechanism in all situations. In Latin America, for example, many of the most attractive opportunities for brownfield concessions were taken up in the early 1990s. After the Asian crisis public opposition to privatization may have combined with the eventual financial recovery of some governments to diminish the attractions of turning infrastructure service provision over to private operators.

But Latin America is also the source of some of the most compelling empirical evidence on other key reasons for the steep decline in the use of brownfield concessions in the late 1990s. A recent study of concession contract renegotiations in Latin America suggests that cash flow problems and low profitability were common in these arrangements (Guasch 2004). Using a definition of concession that includes some greenfield projects and divestitures, the study shows that concessions in Latin America had a high incidence of renegotiation—about 42 percent, with renegotiation happening on average after only 2.2 years of operation. The results tended to favor operators, mostly through improvements to cash flow and profitability.

A second study looked at the profitability of infrastructure concessions in Latin America

during the late 1990s, again using a broad definition of concession (Sirtaine and others 2004). The study suggests that, on average, projects became profitable only after about 10 years. Until then concession shareholders earned negative returns, even when such things as management fees, estimated accumulated capital gains, and potential investment markups were included. But this same study found that 40 percent of the concessions in the sample—and 50 percent of those in energy and transport—did not appear to have the potential to ever become profitable.

Problems with cash flows and long-term profitability were clearly among the most important reasons that brownfield concessions became so unpopular so quickly. These projects must be able to weather years of negative cash flows and constant uncertainty about long-term profitability. That so many contracts were renegotiated after only a few years, long before they could confirm their profitability, suggests that cash flow problems were probably critical in precipitating many renegotiations. Even if estimates of long-term profitability are positive, a project that early on generates cash flows too small to service debt is not viable without cash inflows from other sources or contract renegotiation to adjust existing flows.

Why so susceptible to problems?

The PPI Project Database confirms that brownfield concessions were far more likely to experience these kinds of contractual distress than other forms of long-term PPI. In 1990–98 the share of brownfield concessions that were canceled or became distressed was 41 percent higher than that for greenfield projects.

Why would brownfield concessions be more prone to problems with cash flows and profitability? The answer is simple: as business transactions, many brownfield concessions turned out to be far less profitable than expected. The assets were often in much poorer condition than expected and required more basic rehabilitation and investment before they could start generating higher revenue. Concessionaires and governments often wanted to start the investment programs as soon as possible, to

show early, dramatic results, but such investments often were not optimally targeted or timed because the operators lacked experience with the systems. And many of the real problems involved sector and policy issues (tariffs, labor productivity, corruption) rather than day-to-day operations.

Many operators of retail operations faced severe currency mismatch problems, with revenues in local currency and debt service payments in hard currency. In addition, many governments required brownfield concessions to pay debt service for outstanding loans used in initially developing the facilities. The need to pay off the initial investment on top of the new investment put more, and often unsustainable, pressure on cash flows.

On the other side of the ledger, revenues were often less than expected, particularly for retail service operations that were supposed to recover full costs. Raising tariffs to cover the full costs of operation turned out to be impossible, or at least wholly impractical, in many situations, particularly in poor areas. Indeed, full cost recovery for essential infrastructure services such as water supply and sanitation is rarely attempted even in developed economies.

Why weren't the problems better anticipated?

The potential for cash flow and profitability problems should have been apparent during project appraisal and design. Why did so many contracts reach financial closure before these weaknesses were noticed? The quality of preparation often seems to have been very poor, for several reasons.

First, governments, as well as donors and development agencies, often were unwilling to spend time or money preparing brownfield concessions—doing feasibility studies, examining the true cost of the services, assessing contracting options, and the like. For many of the contracts signed in the early 1990s all this work was assumed to be the responsibility of potential private partners—part of their normal due diligence—because if the project failed, it would be at their sole cost.

We now know that for existing, poorly maintained facilities, governments need independent, comprehensive assessments of the condition of the infrastructure so that they can identify the objectives and the investments needed in brownfield concessions and can evaluate bids on the basis of consistent operating and investment projections. Leaving such assessments to bidders who put different amounts of time and resources into feasibility studies and asset reviews, led to bids that were often difficult to compare or based on incomplete or inaccurate views of investment needs. Perhaps the first notable example of the problem of low-cost preparation was the Buenos Aires water concession—one of the first large brownfield concessions—signed in December 1992. A defining feature of the tender process was poor information.

Second, even where one party or another was willing and able to undertake full feasibility studies, the task often turned out to be far more difficult and expensive than expected. Management information and basic record keeping were often outdated or nonexistent. Historical performance data were sometimes inaccurate or unavailable, and the condition of the infrastructure, such as underground pipes, impossible to evaluate. Even customer records were often incomplete or missing. As a result, there was often no way to tell, for example, how many end users were connected to water systems, much less paying their bills.

Third, the preparation of brownfield concession projects was probably affected by several weaknesses now widely recognized in the project appraisal techniques used to help anticipate and avoid problems with cash flows and profitability. We now know that such techniques were often not used at all because expensive analysis was thought unnecessary in situations where remedial options seemed obvious. When the techniques were used by or on behalf of government partners, they often served to justify rather than independently assess projects. Other preparation techniques, such as economic cost-benefit analysis, seem to have been generally overwhelmed by bad data, complexities, public-

private funding options, and “political economy” issues.

Quantitative estimates of the financial costs and benefits of these projects were also often wildly inaccurate. In several studies of transport projects Flyvbjerg (2005) found massive underestimation of costs and overestimation of demand.

Fourth, the concessions often lacked settled regulatory or contractual arrangements for increasing tariffs or coping with unexpected changes. Bidders were often prepared to commit to concessions without such arrangements on the basis of government reassurances that such issues would be readily resolved. Often the rhetoric failed to match the reality, and concessionaires faced severe hurdles in securing, for example, a contractually mandated tariff increase.

What about risk mitigation?

The emergence of cash flow and profitability problems was supposed to trigger risk mitigation mechanisms agreed to at the outset. The most important risk mitigation instruments, structured as off-take agreements and project guarantees, were to be provided by state-owned enterprises, utilities, or the governments themselves. But the Asian crisis in 1997 forced many governments to recognize that they had an inaccurate understanding of how brownfield concession contracts, as well as other kinds of public-private partnerships, were supposed to work.

The contingent liabilities associated with the risk mitigation instruments had been ignored or misunderstood by the governments. Whether they knew it or not, the public sector retained massive contingent liabilities. But under the intense pressure of the Asian crisis, governments simply repudiated these obligations, forcing many projects into renegotiation or collapse. The PPI Project Database confirms that this happened more often with brownfield concessions than with any other form of PPI contract.

The future of brownfield concessions

Data for 2006 from the PPI Project Database suggest that some kinds of brownfield concessions are becoming more popular now because governments are more aggressively structuring the arrangements to reduce the risks for private partners. In toll road projects, for example, governments are reducing investment risk by providing capital grants or financing guarantees, and reducing demand risk by using shadow tolls or guaranteeing part of the revenue through minimum traffic assurances. The key challenge in using these contracting arrangements is to find ways of maintaining performance incentives for the private partners.

Some governments are adopting hybrid arrangements to mitigate risks. In high-risk sectors such as retail water distribution in Africa, projects that once would have been implemented through brownfield concessions are being unbundled. Private operators implement management contracts and receive compensation through a flat fee rather than from user fees. Operators issue and collect bills, fix leaks, or manage equipment. Governments and donors supply funding for capital investment and take on the

demand risk associated with user payment for services. Under such an arrangement (generally captured by the PPI Project Database as a management contract rather than a concession), the government assumes most of the investment and demand risks.

Conclusion

The brownfield concession is not an inherently flawed mechanism—its track record in developed countries is reasonably successful. But many of the conditions for success have proved difficult to achieve in developing countries, where preparation is especially time consuming and expensive and the assets are in particularly poor condition. But we now have a much better understanding of the risks and problems in dealing with existing, dilapidated infrastructure assets in developing countries. Brownfield concessions as structured in the early 1990s may be an endangered species, but the needs that drove their initial widespread use still exist, and refinements to the concession mechanism—along with new investment arrangements and hybrid contract forms—are emerging to deal with these problems.

THE BROWNFIELD CONCESSIONS CONCEPT

By the end of 2006, private participation in infrastructure projects in developing countries seemed to be recovering after almost a decade of decline following the Asian Crisis in 1997. In nominal terms, PPP infrastructure investments in 2006 were close to their 1997 peak, and the market had by then demonstrated increased investment in three consecutive years—something not seen since the early 1990s. The characteristics of the market restructuring that had taken place since the end of the 1990s were becoming fairly clear. Telecommunications had become the sector demonstrating the most dramatic recent increases in investment, “greenfield” projects had come to overwhelmingly represent the most widely used form of PPP vehicle for infrastructure investment, and management and lease contracts also appeared to be on the increase, often in tandem with increased government investment.¹

But perhaps the most telling lesson from the last decade has to do with the performance of brownfield infrastructure concession contracts. The PPI Project Database maintained by the World Bank and the Public-Private Infrastructure Advisory Facility (PPIAF) simply refers to brownfield concessions as “concessions,” and defines them as contractual arrangements whereby “a private entity takes over the management of a state-owned enterprise for a given period during which it also assumes significant investment risk.”² Capital investment, along with operating and maintenance responsibilities, is one important element of the definition. Pursuant to contracts that are normally long term in character, private

entities rehabilitate existing assets and, in some cases, also build add-ons to existing facilities, but all assets remain under government ownership or revert to government ownership at the end of the contract. So, under this definition, these contracts include arrangements like “rehabilitate, operate, transfer” (ROT), “build, rehabilitate, operate, transfer” (BROT), and other, similar mechanisms. A second important element of this definition is that the primary focus of the private partner’s responsibilities is on existing assets—this distinguishes brownfield concessions from the many varieties of “greenfield” projects, such as “build, operate, transfer” (BOT) arrangements (sometimes referred to as “greenfield concessions”). To clearly distinguish concessions involving mostly existing assets from those involving mostly new assets, this paper refers to the former concessions as “brownfield” and the latter as “greenfield.”

The PPI Database’s reservation of the term “concession” only for brownfield projects no longer is a widely used definition.³ But the database’s approach is understandable because it captures what in the late 1980s and early 1990s was seen to be an important, groundbreaking form of PPP, one that offered a solution to the severe problems associated with badly dilapidated retail infrastructure service systems, such as water delivery networks and roads, that could not easily be privatized or replaced. For a time, this kind of PPP arrangement was expected to become the signature contract of the PPI movement, but has now fallen largely into

¹ In this paper, “private participation in infrastructure” (PPI) and “public-private partnerships” (PPPs) in infrastructure are used interchangeably.

² For all of the definitions used in database, see the World Bank and PPIAF, Private Participation in Infrastructure (PPI) Project Database (ppi.worldbank.org).

³ It is difficult to find this narrow definition in use anywhere but in connection with the PPI Project Database. See, for example, the much broader definition used by the OECD (2007). The EBRD also uses a much broader definition: see <http://www.ebrd.org/country/sector/law/concess/core/index.htm>.

disuse in the developing world, at least compared to other forms of PPP.

In 1990, the brownfield infrastructure concession suddenly captured the attention of development professionals with a sevenfold increase in the number of such projects over the previous year. It was an undeniably attractive contract form, embodying almost all of the most beneficial qualities associated with PPPs for infrastructure: private companies would take over badly maintained, government-owned infrastructure service systems, improve efficiency, make needed investments, and recover all of their costs—plus make reasonable profits—over the long term of the contracts (20 to 30 years). Best of all, because of operational efficiencies, carefully targeted and managed investments, and more realistic pricing, these contractors would deliver services on a cost-recovery basis. Instead of the huge budget deficits that had resulted from public subsidization of inefficient service provision, these new arrangements would be largely self-supporting.

By the mid-1990s, these agreements were being widely promoted by sponsors, governments, and development agencies as win-win arrangements with plenty of benefits to spread around to everyone involved: government assets would benefit from private involvement, but not actually undergo privatization, so all assets would remain under government ownership.⁴ The assets would be rehabilitated at no cost to the government; private companies would make profits; customers would receive better, less expensive services. The many risks associated with these projects would in effect be minimized because, in the parlance of project finance, they would be “allocated to the parties best able to manage them.” The arrangement seemed almost too good to be true, and that turned out to be exactly the case. A decade after the onset of the

Asian Crisis, greenfield projects and management contracts are dominating the world of PPPs. In 2006, investment via brownfield concessions demonstrated only the second annual increase since 2007, reaching a level first achieved in 1993 (about 40 percent of the 1997 peak). The 2006 performance reflects major changes in how brownfield concessions are being structured in some sectors, and may signal a comeback of sorts for the mechanism.

In the sections that follow, recent research and anecdotal evidence are used to piece together reasons why the brownfield concession now seems to be an endangered species of PPP, how some kinds of brownfield concessions have evolved in order to survive, and what other types of arrangements may be serving as substitutes for these contracts. Note that the conclusion of this paper is not that this contracting mechanism is inherently flawed, but that the use of this particular form of concession in developing countries is much more fragile than many market participants assumed in the early 1990s and that a complex set of conditions must be in place for this kind of mechanism to be sustainable.

Section two reviews the global track record of brownfield concessions over the last 15 years. The evidence suggests that the precipitous decline in the use of these kinds of concessions beginning with the Asian Crisis was the most important single factor in the sharp decline of the entire PPP market, which began at that time.

Section three reviews the conclusions of recent empirical studies, which suggest that these kinds of concessions have experienced problems with profits and cash flows.

Section four looks at the project finance mechanism that underlies concessions and other forms of long-term PPP, and argues that despite the success of project finance in so-called developed countries, the mechanism is particularly vulnerable to the kinds of cash flow and profitability problems common in developing countries.

⁴ Private involvement without privatization was an attractive feature of these arrangements. See Pierre Guislain and Michel Kerf (1995), "Concessions—The Way to Privatize Infrastructure Monopolies," Note No. 59, Public Policy for the Private Sector, World Bank.

Section five turns to the brownfield concession mechanism as a particular form of project finance, arguing that for various reasons its use in the developing world was accompanied by an underappreciation of the risks that threaten profitability and cash flows of these deals.

Section six argues that an underlying cause of these problems was inadequate project preparation.

Section seven examines how other traditional forms of PPP functioned, relative to brownfield concessions, before and after the Asian Crisis.

Section eight reviews efforts by governments to reduce some of the risks facing private partners in brownfield concessions.

Section nine discusses efforts by private concessionaires to strengthen profits and cash flows generated by these projects.

Section ten assesses whether or not PPI data from 2006 suggests that brownfield concessions may be poised for some kind of recovery.

BOOM AND BUST

The 1997 Asian Crisis marked the end of a very brief golden age of the brownfield concession as a mechanism for facilitating private investment in government-owned infrastructure facilities.⁵ As Figure 1 indicates, the rise and fall of this mechanism were both sudden and dramatic. The use of brownfield concessions, as measured by associated infrastructure investments, reached its lowest point in 2003 and has demonstrated low levels of use since then, with a sharp increase in 2006. The 2006 investment total matches the level first achieved in 1993.

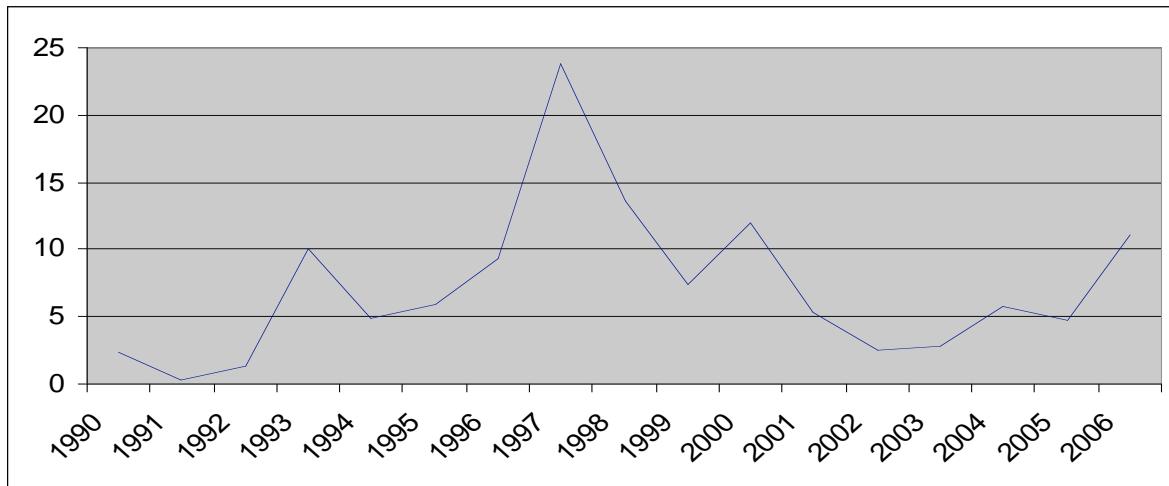
But it is not just the declining investment associated with brownfield concessions that is dramatic. As a PPI tool for generating infrastructure investment, these kinds of

concessions have nearly been eclipsed by other arrangements. Figure 2 shows the percentage of total PPI investment in facilities accounted for by brownfield concessions.

Finally, and perhaps most importantly, the declining use of brownfield concessions for investment in government facilities can now be seen to have been a key factor in the overall PPI market decline in such investments since 1997. As Figure 3 shows, without brownfield concession contracts, as defined by the PPI Project Database, the track record of PPI-related investments demonstrates few of the “crash” characteristics commonly associated with PPI over the last decade. In nominal terms, investment figures for 2006 are 67 percent higher than for 1997.

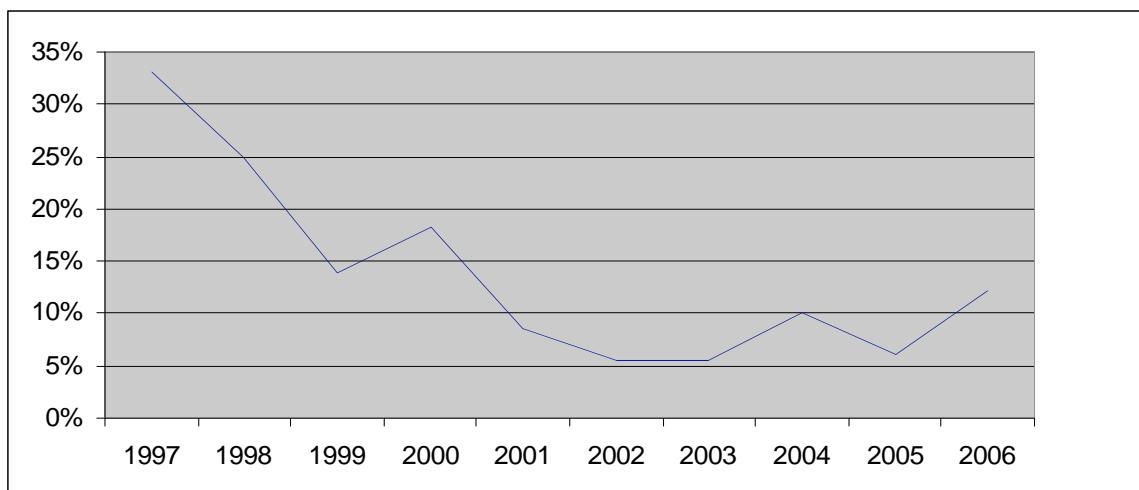
⁵ All investment figures in this note are nominal amounts representing millions of U.S. dollars. They include only capital investments in government-owned facilities or assets and exclude other forms of government revenue generated by PPPs, including licensing fees, lease payments, etc., which may or may not contribute to investment in infrastructure.

**Figure 1: PPI Investment in Government-Owned Facilities via Brownfield Concessions
(US\$ billions)**



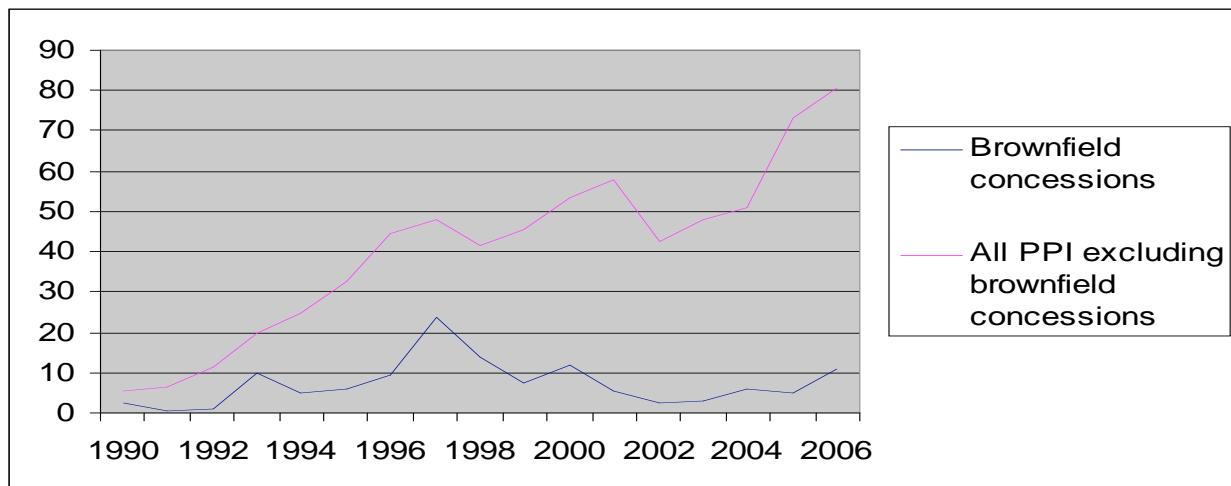
Source: World Bank and PPIAF, PPI Project Database.

**Figure 2: Investment in Government-Owned Facilities via Brownfield Concessions
As a Percentage of all PPI Investment in Facilities**



Source: World Bank and PPIAF, PPI Project Database.

Figure 3: Brownfield Concessions Versus Other Kinds of PPI
(US\$ billions)



Source: World Bank and PPIAF, PPI Project Database.

EMPIRICAL EVIDENCE OF PROBLEMS

No single factor accounts for the rise or decline in the use of a PPI mechanism in all situations. In Latin America, for example, many of the most attractive opportunities for brownfield concessions were taken up in the early 1990s. After the Asian Crisis, public opposition to privatization may have combined with the eventual economic recovery of some Latin American countries to diminish the attractions for government officials of turning infrastructure service provision over to private operators.

But Latin America is also the source of some of the most compelling empirical evidence available on other key reasons why the use of brownfield concessions went into a steep decline in the late 1990s. A recent study of concession contract renegotiations in Latin America by Guasch (2004) suggests that cash flow problems and low levels of profitability are common features of these arrangements. Using a definition of concession that includes some greenfield projects and divestitures, the study demonstrates that concessions in Latin America have registered a high incidence of renegotiation, about 42 percent, coming after only 2.2 years of operation. On average, the results of renegotiation favored operators, mostly with improvements to cash flow and profitability such as delays in investment obligations (69 percent), reductions in investment obligations (62 percent), tariff increases (62 percent), increased pass-through to tariffs of cost items (59 percent), changes in the asset base to impute rate of return (46 percent), and extension of the contract period to increase the present value of future cash flows (38 percent).

Another recent study by Sirtaine et al. (2004), looks at the profitability of infrastructure concessions in Latin America during the late 1990s, again using a broad definition of concessions to include more than just the

brownfield variety. The study suggests that on average, projects demonstrate profitability only after about 10 years. Up to that point, concession shareholders earn negative returns on their investments, even when adding in things such as management fees, estimated accumulated capital gains, and potential investment markups. But this same study found that 40 percent of the concessions in the sample did not appear to have the potential ever to become profitable, with that percentage increasing to 50 percent for concessions in energy and transport sectors.

The studies by Guash and Sirtaine suggest that lack of long-term profitability is not the only problem with these concessions. The other problem is the constant potential for cash flow crisis that most of these kinds of projects must live with over at least the first decade of their existence. Sirtaine estimates that over the history of these concessions, on average they have been unable to generate sufficient annual operating income, after taxes, to cover all of their financial obligations. Only by adding in what the authors refer to as “indirect forms of dividends” such as investment markups, transfer fees, and payments for capital appreciation paid at the end of the concession period can the concession make a profit. In other words, these projects must be able to weather years of cash flow stress before long-term profitability can be achieved. For some large international operators, that kind of stress may be tolerable, but only as long as profitability over the longer term seems likely and cash flows never become too negative. Sirtaine’s study suggests that many operators live through years of negative cash flows and constant uncertainty about long-term profitability. For smaller, local or regional operators, cash flow problems likely play a leading role in contract distress and cancellation. The fact that so many contracts are renegotiated after only a few years, long before the contracts can establish their profitability, suggests that

cash flow problems may be important in precipitating renegotiation.

Theoretically, profitability and cash flows are two different things. A business can be “profitable,” but if it does not have enough cash on hand to pay bills, it experiences a cash flow crisis that can collapse the enterprise. Such a crisis, rather than lack of profitability, is the most frequent cause of business distress and failure. For difficult and sometimes controversial infrastructure concessions, it is now clear that disturbances to cash flows are not

unusual. They include things like unexpected decreases in revenues (e.g., unwillingness or inability of customers to pay bills), unforeseen increases in investment needs, nonpayment of subsidy commitments by governments, or even delays in disbursements of loan funding. All of these developments can precipitate cash flow crises, particularly when large debt service payments are already straining cash balances. These cash flow stresses are well documented in connection with various types of concessions; for example, in the African rail sector (Pozzo di Borgo et al. 2006).

UNDERLYING PPP VULNERABILITY TO CASH FLOW STRESS AND PROFITABILITY PROBLEMS

The vulnerability of concessions to problems with cash flows and profitability is not too surprising. All long-term infrastructure PPPs involving significant levels of private investment suffer to some extent from such vulnerability. It may be useful to explain this vulnerability before addressing concessions specifically.

The project finance principles that underlie concessions as well as other forms of long-term infrastructure PPPs were well developed and highly successful long before the PPP boom of the 1990s. Project finance was already beginning to be used extensively on infrastructure projects in the 1970s, particularly after the viability of the approach was demonstrated in British Petroleum's North Sea Forties oil field project in 1972 (De Lemos et al. 2000). The mechanism has continued to enjoy success, but almost exclusively in the developed world. And this seems to be a key to understanding the declining use of the mechanism beginning with the Asian Crisis: its use in the developing world was compromised by serious misconceptions about underlying risks, perhaps because those structuring deals were overly optimistic in assuming that risk levels were closer to developed country standards than they turned out to be. When these risks materialized as serious problems, the basic PPP structure did not cope well.

One reason for this vulnerability is the natural tendency to try to maximize the debt-equity ratio in PPP project financing. Because these are risky projects, for many reasons, sponsors and operators needed a way to insulate themselves from the financial liabilities of their projects and to share substantial levels of risk with other parties. A project finance approach to capital financing makes this possible through the creation of special purpose vehicles (SPVs). An SPV is a separate corporate entity with a legal personality that allows the company to be fully responsible for its own assets and liabilities, thus

protecting the sponsor's balance sheet from those responsibilities. If the SPV defaults on loans, it is solely responsible for the consequences—the SPV's separate legal personality means that lenders have recourse to whatever assets it may own, including equity investments by the sponsors, but not to the sponsor's assets. This kind of limited recourse to the assets of sponsors and operators protects them from possible bankruptcy caused by the financial problems of their large infrastructure concession projects and shifts a significant share of project risks to lenders. Not only does the SPV mechanism encourage borrowing to fund projects, but some sponsors believe that the more money is borrowed, the more lenders must be cooperative in times of stress. As the chief financial officer of one private power generator put it recently in a conference with potential investors: "The legal ability to 'walk away' from a project that is significantly underperforming gives substantial leverage in renegotiating/restructuring funding arrangements" (Williamson and Moore 2006).

Debt service costs are prime factors in increasing the cash flow sensitivity of an enterprise. Debt has important cash flow consequences, because unlike dividends earned by equity investors, debt service payments (principal and interest on debt) must be paid according to preagreed schedules—they represent a constant, predictable drain on the cash of the enterprise. Dividends may be delayed as needed, for months or even years, in order to sustain the cash flow needed to allow debt service payments in support of growth-enhancing investments. This appears to have been common practice in the infrastructure concessions in Latin America referred to above. But debt service payments are more difficult to delay—normally they must be made in a timely fashion in order to avoid default on obligations to lenders. With most debt of this kind, default triggers payment acceleration whereby the total

amount owed becomes immediately payable. Default on obligations to one lender also often triggers “cross-defaults,” or defaults and acceleration on debts owed to other lenders. Almost immediately the amount owed to lenders will exceed the value of the SPV, making it vulnerable to a legal finding of bankruptcy and, theoretically, liquidation.

Some experts have argued that a variety of factors incentivized project sponsors or operators to use higher levels of debt in PPP projects than they would have otherwise—that “too much” debt was used in the early 1990s. Tax regimes typically favor debt over equity investment (with interest payments tax deductible, but not dividends). Regulators are reluctant to allow project companies to declare bankruptcy when long-term PPPs experience distress, out of fear of service disruption, but also because lenders may be antagonized and privatization programs discredited (Ehrhardt and Irwin 2004). Whatever the reason, high levels of debt clearly make it easier for concessionaires to extract favorable decisions from regulators (de Fraja and Stones 2004). Termination scenarios in concession contracts also tend to favor only lenders, rather than equity investors, with total compensation in cases of premature termination.⁶ Finally, higher debt-equity ratios may have also made some projects seem less expensive and thereby helped sponsors compete effectively for projects awarded competitively on a lowest-cost-bid basis.

Whether or not these particular incentives actually resulted in more borrowing than would have otherwise taken place is open to question, because borrowing must be negotiated with lenders who have an interest precisely in ensuring that “too much” borrowing does not take place. But other experts have argued that the early 1990s PPP boom did in fact fuel ever-larger shares of debt in project capital structures. More debt and less equity meant that sponsors could benefit from more projects, taking more

advantage of the boom in infrastructure development. Sometimes sponsors borrowed money to make equity investments, forcing their dividend revenue to cover debt service payments (Ehrhardt and Irwin 2004). Sometimes sponsors were permitted to count expected profits as their initial equity contributions. This sort of “in kind” equity could not provide financial support to the enterprise in the same manner as risk-bearing equity capital. Estache and Strong (2000) argue that obviously high-risk projects took on heavy debt burdens and made too much use of the riskiest kinds of debt, including short-term debt, floating rate debt, and foreign debt for projects generating local currency revenues.

To summarize, as a general rule the project finance mechanism encourages sponsors and concession companies to maximize borrowing as a financing tool in order to maximize equity returns and facilitate competitive, lowest-cost bidding, as well as control risks to their own balance sheets. Of course, many factors are considered in reaching optimal debt-equity targets for particular projects, and actual decisions on concession funding and risk management frameworks are the result of negotiations involving a number of key players—sponsors do not necessarily have advantages in the process that allow them unilaterally to determine the financing structure that best suits them. Lenders aim to be appropriately remunerated for their share of risks; they use required debt-equity ratios as a risk mitigation tool, and also attempt to share these risks with others. Above all, lenders try to ensure sustainable cash flow for debt servicing and often are willing to relax things such as debt service payment schedules if necessary to avoid cash flow crises. But in cases where the key players, including lenders, share mistaken assessments of risks, then “too much” borrowing can lead to debt service costs that are instrumental in pushing concessions and other forms of long-term infrastructure PPP into cash flow crises and the urgent need to restructure contracts and borrowing arrangements.

⁶ These termination scenarios are a matter of contract negotiation, but this kind of lender protection was a common feature of concession arrangements during the 1990s.

CASH FLOW VULNERABILITY PARTICULAR TO BROWNFIELD CONCESSIONS

The PPI Project Database confirms that brownfield concessions were far more likely to experience these kinds of contractual distress than other form of long-term PPP. In terms of numbers of projects from 1990–98, the percentage of cancelled or distressed brownfield concessions is 41 percent higher than that for greenfield projects, like BOTs (10.7 percent versus 7.6 percent). In terms of affected investment, brownfield concessions are three times as likely to experience these problems as greenfield projects (27.9 percent versus 8.6 percent). In other words, from 1990–98, above-average investment in brownfield concessions was many times riskier in terms of contract distress or cancellation than for other forms of long-term PPPs. And the more investment, the more risk when compared with other kinds of PPPs.

But why would brownfield concessions be more prone to problems with cash flows and profitability than other forms of long-term PPI?

Brownfield Concessions and Cash Flows

A factor that adds to the potential cash flow problems faced by concessions, as defined here, is the fact that they have access to fewer of the remedies for dealing with the problem than do other kinds of business enterprises or even other forms of PPP. This is because, as Guasch points out, cash flow is the only asset “owned” by a concessionaire, and only for the lifespan of the concession contract. Unlike a privatized business or a BOT project, a brownfield concession involves transfer only of the right to use the assets and operate the enterprise. Even in cases where contracts allow concession companies to own newly created assets, disposal of these assets to help with cash flow problems almost always must be agreed to by government partners and done in a way that does not compromise service quality. Of course, for any

public or private company, infrastructure assets (such as water pipes or rail or electricity lines) are usually difficult if not impossible to dispose of for cash.

This means that, practically speaking, there are no inventories, fixed assets, or intangibles to be sold to enhance liquidity or pledge for additional loans. More aggressive marketing strategies are rarely helpful in selling infrastructure services. Because service levels and quality are often stipulated in the concession contracts, these cannot be reduced without defaulting on contractual obligations. Many brownfield concessions begin with severe cost-cutting measures that governments may not be willing to take responsibility for, so it is often difficult to make additional reductions—for example, in the workforce—when cash crises occur after initial retrenchments have been made. And, of course, ultimate cash flow remedies such as selling the business or merging with another company are not available to infrastructure concession companies that do not own any company assets.

Privatized infrastructure service operations actually own their assets, so asset disposal and other cost-cutting measures can be done more readily. Greenfield projects, such as BOTs, involve new, more valuable assets, over which private partners sometimes have considerable control. In terms of asset disposal and cost-cutting flexibility, virtually every other form of long-term PPP is in a better position to deal with cash flow problems than brownfield concessions.

Brownfield concessions also tend to be at a disadvantage when it comes to the ability to increase normal operating revenues. Although not a defining characteristic, most of the brownfield concessions registered in the PPI database involve facilities that distribute services

(water, electricity, toll roads) to end users who pay via service fees—privatized facilities and greenfield projects are much less likely to generate most of their operating revenues in this manner. Price increases are the most powerful tools for strengthening brownfield concession cash flows, but they are unpopular during the early years of these projects and often encounter political opposition, even when they are permitted by contracts.

The tendency of brownfield concessions to involve retail service distribution means that they tend to be more sensitive to government regulation of tariff setting than most greenfield projects. Estache, Guasch, and Trujillo (2003) have argued that widely used approaches to the economic regulation of infrastructure services may have also contributed to the cash flow problems of concessions. Estache maintains that the “fixed-price” or “price cap” regulation of infrastructure services has allocated more risk to concessionaires, put more stress on cash flows, and increased the chances of project collapse. Under a price cap approach, regulated user tariffs are set in advance in real terms, typically for periods of five years. During each period, the regulated concession company bears the risk of all cost increases (except for that of general inflation). Every five years the tariff framework can be “reset” to account for intervening changes in service costs and demand. Price cap regulation is strongly associated with the renegotiation of concession contracts (Guasch 2004), and this may be because this regulatory approach increases risks for operators as well as pressures on cash flow.

The principal alternative form of regulation, cost-plus or rate-of-return regulation, allows price adjustments much more frequently, often allowing for more pass-through costs. Often referred to as “low-powered regulation,” this approach causes much less stress on cash flows and is much less strongly correlated with contract renegotiations. Pure forms of either of these two types of regulation are rare—price cap regimes usually allow for more frequent adjustments for inflation as well as some pass-through costs. But any regulatory regime that makes operators wait significant periods of time

before major tariff restructuring can be considered have proved to be problematic, particularly during the first five years of implementation.

Again, the dependence of many brownfield concessions on service fees paid in local currency by end users meant that exchange rate risk was a particular problem for such projects. Operators and sponsors often had to borrow in foreign currency to raise investment funds because so few of the beneficiary countries had domestic capital markets that could finance large projects. Price adjustments for exchange rate changes often encountered political opposition. Contractual provisions designed to mitigate this risk by indexing prices to inflation were difficult to enforce under the conditions of extreme exchange-rate volatility that occurred during the Asian Crisis.

Lenders can deal with cash flow problems by exercising step-in rights and arranging the transfer of a concession operation to a new private company. But for concession operators and sponsors, short of an infusion of more debt or equity, contract renegotiation to delay investments or increase tariff revenues are the principal ways in which cash flow problems are addressed.

Insufficient Return on Investment

In addition to cash flow sensitivity, concessions often simply lacked the ability to generate positive cash flow and profits. The study by Sirtaine et al., mentioned above, concludes that of the 50 percent of concessions that finally achieve some profitability after about 10 years of implementation, most do so only by supplementing normal operating revenues with things such as management and technical assistance fees and accumulated capital gains (which operators are eventually compensated for), as well as markups on investments. A hallmark of brownfield concessions in developing countries has been the fact that much more investment in assets is typically made than can be adequately supported by project revenues generated by subsequent improvements in infrastructure service delivery.

Too much non-revenue-generating investment.

A fundamental problem for many brownfield concessions was that the assets turned over to operators were in extremely poor condition, poorer than many of the parties to the transactions realized. Many governments became desperate enough to engage private companies in infrastructure service delivery only after assets were no longer capable of generating robust cash flows without massive investment or replacement. The decision to engage the private sector was almost never taken because assets could no longer generate surpluses for government—it was normally taken because these facilities operated in a state of constant cash flow crisis, with revenues not even covering operations and maintenance expenses, much less capital investment liabilities or obligations. One reason why asset disrepair was often underestimated was the fact that typically very little performance data was available on these systems, the status of asset repair, and even the age of assets. Information about how well they provided services, or even to whom services were provided, was often missing.⁷

In many cases operators knew what to fix, and in what sequence, only after months of operation. But meanwhile on many brownfield concessions operators were incentivized to make major investments as early as possible in the lifespans of these projects. This was done, often at the insistence of government partners, so that concessionaires could begin showing positive results as soon as possible. Sponsors and operators also wanted the maximum amount of time allowed under the contract to recoup investment costs from operating revenues. But this meant that most of the investment was made at a time when demand risk was high, and the project was generating much less revenue than it would be expected to do later, after investments had improved cash flows (Estache and Strong

⁷ This is now such a widely understood aspect of doing infrastructure PPPs that private companies are in danger of accusations of negligence if they take at face value government data on public enterprise performance. See the Lawyers' Environmental Action Team (2007).

2000). Finally, to make matters even worse, the most visible problems with infrastructure service provision, such as the poor condition of assets, inadequate management, generally poor service, etc., often were manifestations of more profound problems that brownfield concessions were not designed to directly address, such as lack of sectoral and institutional reform and corruption. In hindsight, it was a fundamental mistake to assume that these kinds of concessions—or any kind PPP contract—could solve such problems.⁸

Inadequate revenue. The other side of the problem of investments generating too little operating revenue had to do with the fact that revenues were simply not robust enough in many infrastructure sectors to support investment without some kind of subsidization. We now know that proponents of the brownfield concession mechanism, as it was used in developing countries, were unrealistic in their expectations that user fees could cover the full costs of operations and investments. User fees represented a largely untapped source of revenue—something new like this was necessary if a government was going to turn over operation (but not ownership) of a service system to a private company and expect the company to improve and run the system without any government financial support. The brownfield concession mechanism was largely associated in the early 1990s with projects involving distribution of infrastructure services to end users who would pay for the services via fees. Over two-thirds of the concession-related investment commitments made in 1997, the peak year for concessions, involved projects of this kind.⁹

Many infrastructure services possess a high degree of what economists refer to as “excludability,” i.e., the degree to which a

⁸ This is one of the key lessons learned in a recent assessment of the characteristics of well-performing water utilities. See Baietti, Kingdom, and van Ginneken 2006, p. 25.

⁹ This is an estimate by the author, based on a review of projects included in the PPI Project Database.

potential user can be excluded from access to the services for not meeting conditions set by the supplier. In the early 1990s, mainstream economists were advocating the use of excludability to ensure that “prices be based on the most economically efficient way to recover total costs” (Israel 1992, p. 27). Subsidies, and even cross-subsidization, were discouraged as being costly and inefficient. Even as the Asian Crisis was beginning to unfold, experts on concession contracts were still making the same basic arguments in favor of cost-covering tariffs, and against subsidies and cross-subsidization (Kerf et al. 1998, p. 34). But as has now become evident, cost recovery in many infrastructure sectors, particularly water, has not been attempted, much less achieved. Even high-income countries routinely subsidize water costs (Foster and Yepes 2006). The promotion of full cost recovery from user fees, as a fair and practical solution, was fundamental in helping to make the brownfield concession concept seem workable. A legacy of this kind of overselling is the large number of anti-privatization critics who continue to equate PPPs with full cost recovery, private operator profits, and exploitation of the poor.¹⁰

The Failure of Risk Mitigation

Whatever the vulnerability of brownfield concessions to cash flow and profitability problems, these and other risks associated with these projects should have been identified, allocated to whomever was best positioned to manage them, and appropriately mitigated when the time came. The Asian Crisis and the international aftershocks that followed demonstrated the failure of risk mitigation for a variety of PPPs, but particularly for brownfield concessions. The PPI Database statistics cited at the beginning of section 3 indicate that by 1998, these kinds of concessions had experienced far higher levels of distress and collapse than any other forms of PPP. These economic shocks

caused severe cash flow problems for companies, including infrastructure SPVs, which were massively overleveraged, often with foreign currency debt (Pomerleano 1998). As the crisis unfolded it underscored all of the above-mentioned weaknesses and problems, including the fragility of the concession mechanism and inadequate returns on investment, as well as debt that under the circumstances turned out to be “too much.”

The materialization of these risks was supposed to trigger risk mitigation mechanisms, the most important of which were those provided by state-owned enterprises and utilities or the governments themselves, principally in the form of off-take agreements and project guarantees. But the crisis also forced many governments to realize that their understanding of how PPP contracts were supposed to work was not accurate. In the early 1990s, many governments were convinced to use these mechanisms because it seemed that they could turn over all responsibility for infrastructure provision to private partners who would cover all costs and accept all related business risks. The nature of governments’ contingent liabilities associated with these contracts was often completely ignored or misunderstood (Pomerleano 1998). Governments in fact retained considerable contingent liabilities for these operations, via off-take agreements and outright guarantees, as well as under routine early-contract-termination scenarios. But under the intense pressure of the Asian Crisis, many governments simply repudiated these obligations.

A managing director of Moody’s Investors Service notes that this repudiation was most clearly evident in Asia, where

“... structures set up to mitigate these economic risks unraveled almost as soon as they were put to the test. Counterparties who had accepted risk repudiated that risk when it occurred. Legal systems simply proved unable to enforce the contracts as agreed. Regulatory approvals that had been held out as straightforward proved anything but when projects moved to the operations stage. And, above all, the political will that had been so

¹⁰ Some private sector operators still fan the flames of this debate by arguing for the necessity of “full cost recovery” and the elimination of cross-subsidies in developing countries, even in sectors such as water supply (Martin 2005).

apparent getting the projects financed evaporated when the projects needed support in a time of crisis" (Marshella 2001, p. 31).

The off-take agreements, guarantees, and other legal protections were the risk-mitigation mechanisms that were supposed to provide sponsors, operators, and lenders with at least some protection from many of the other problems outlined in earlier sections of this paper. Instead, the economic crisis led to hundreds of project defaults, renegotiations, restructurings, and rating downgrades. Anecdotal evidence suggests that many projects continued as partially restructured arrangements,

but with unhappy private partners tolerating what they perceived to be less than satisfactory profits and cash flows rather than face penalties for default and early termination.

The failure of these backstop mechanisms meant that most private players no longer viewed brownfield infrastructure concessions—as they had been developed and implemented in the early 1990s—as a viable project type in these countries. The precipitous postcrisis drop in the use of brownfield concessions registered by the PPI Project Database seems to be, in large part, a reflection of the private sector's new perspective on these projects.

A CRITICAL UNDERLYING PROBLEM: POOR PROJECT PREPARATION

The failure of risk mitigation became apparent only as a result of the fallout of the Asian Crisis. Cash flow vulnerabilities of the brownfield concession mechanism and the potential for inadequate returns on investment, however, should have been apparent much earlier. Why were so many of these contracts completed before these weaknesses were noticed? A large part of the answer seems to be that the preparation of these projects, from conceptualization, feasibility assessment, structuring, and negotiation was incomplete or of very poor quality.

Low-Cost (and Low-Quality) Preparation

One result of the notion that their problems were being handed over to private companies for solution was that governments (as well as donors and development agencies) often were unwilling to spend time or money preparing brownfield concessions, doing feasibility studies, assessing PPI contracting options, etc. In many of the contracts signed in the early 1990s, all of this work was assumed to be the responsibility of potential private partners; part of their normal due diligence, because if the project ultimately failed, it would be at the sole cost of the private partners. But for existing facilities that often were over 50 years old, governments needed independent, impartial assessments of the condition of the existing assets in order to be able to identify the objectives of brownfield concessions and evaluate bids. By leaving such assessments to bidders who spent different amounts of time and resources on feasibility studies and asset reviews, bids were often difficult to compare or were simply based on incomplete or inaccurate views of infrastructure investment needs. Sometimes the intense competitive pressures of lowest-cost procurement forced bidders to reduce preparation costs as much as possible in order to win the project, hoping to be able to identify

problems and adjust the contract after a period of implementation. Occasionally, bidders purposely underbid for projects, assuming that contracts would later have to be renegotiated. Without independent assessments done by or on behalf of governments in preparing the early brownfield concessions the bidders and government officials had different opinions about how much investment was going to be needed to turn service delivery into a commercial proposition.

Perhaps the first notable example of the low-cost preparation problem was the Buenos Aires water concession—one of the first large brownfield concessions—signed in December 1992. According to Alcazar, Abdala, and Shirley (2000), a “defining feature” of the tender process was poor information. Because of a perceived need to accelerate the procurement process, the government collected very little prebid information on the condition of the service system, and officials refused to take any responsibility for the quality or accuracy of the information provided to bidders. The winning bidder used the first four pages of the bid document to describe the serious lack of information made available for bidding purposes. The poor quality of the information made the information content of bids unreliable and may have led bidders to prepare bids under the assumption that they would be allowed to renegotiate their contract as new information came to light. The concession agreement stated that the operator would assume all information risks, and that “claims based on defects of information provided will not be allowed” (Aguas Argentinas S.A. Concession Contract 1993, p. 8). In fact, the operator did eventually make such claims based on what they said was new information about the condition of the assets. A protracted series of contract renegotiations ensued.

Buenos Aires was not an isolated example of this approach to project preparation. By the time

a 30-year brownfield concession contract was signed for water services in Nelspruit, South Africa, in 1999, the Buenos Aires approach to preparation was still being intentionally copied, in the interest of cost and speed (Kotze, Ferguson, and Leigland 2000). No formal feasibility studies or asset reviews were done by or on behalf of the municipality. Prospective concessionaires were told to base their bids exclusively on their own due diligence. The eventual contract specified that the arrangement was entered into on a “voetstoots” basis (an Afrikaans term meaning, “as is”), with the municipality taking no responsibility for information regarding the “nature, condition, fitness of purpose, merchantability or suitability of any existing asset” (Nelspruit Concession Contract 1999, p. 74). A series of renegotiations, not dissimilar to the ones in Buenos Aires, followed.

Another notable aspect of low-cost preparation, particularly in the early 1990s, involved the willingness of public and private partners to accelerate deal closure by delaying agreement about things like regulatory or contractual arrangements for increasing tariffs or coping with unexpected changes to the concession. Bidders often were prepared to commit to concessions in the absence of such arrangements based on reassurances from governments that such issues would readily be resolved. Often, the rhetoric failed to match the reality and concessionaires faced lengthy hurdles in, for example, securing contractually mandated tariff increases.

Difficulties in Undertaking Feasibility Studies
Even in cases where one party or another was willing and able to undertake full feasibility studies to accurately determine the condition of infrastructure assets to be concessioned and the key elements needed to make a concession viable, the task often turned out to be difficult if not impossible. As noted above, not only were the assets dilapidated and neglected, but management information and basic recordkeeping was also often nonexistent. Historical performance data was inaccurate or unavailable. The condition of underground pipes was impossible to evaluate. Even

customer records were incomplete or missing—there was often no way to tell how many end users were connected to water systems, for example, much less how many were paying their bills.

Many private operators now agree that because of the poor quality of government information on the condition of these service systems, experience actually running the facilities being taken over is the only reliable way of generating reliable information about the condition of assets and the need for investment, as well as the willingness and ability of customers to help pay costs. Investments can be planned and implemented more prudently and sometimes reduced through a combination of efficiency gains and demand management. For example, the potential for exploiting efficiency gains as an alternative to solutions involving capital investment seems apparent among African water utilities (Estache and Kouassi 2002). PPP water projects in Maputo, Mozambique, and Zambia’s Copper Belt have demonstrated the value of arrangements whereby private operators gain insights about investment needs while operating the facilities via management contracts or other arrangements that do not require operators to make large investments while assuming unknown risks.¹¹

Shortcomings of Cost-Benefit Analysis

It is likely that the preparation of concession projects was likely also affected by several limitations in the way in which project appraisal techniques were applied to anticipate and avoid problems with cash flows and profitability.

First, quantitative techniques for assessing financial and economic costs and benefits of

¹¹ This idea is not at all new, but it raises procurement issues regarding how to structure the initial competition for the management contract, and how to handle the involvement of the incumbent operator when enough information finally becomes available to bid out longer-term contracts involving significant capital investment. For an early summary of some of these issues, see Klein 1998.

prospective projects were in many cases simply not used. A government's decision to grant a brownfield concession, and the view that no practical alternative existed for solving problems with existing, badly maintained facilities, often made it appear unnecessary to undertake sound quantitative analysis of financial, much less economic, costs and benefits or comparisons of PPP options as compared to traditional public options for project financing and management. This was particularly true in cases where the private sector was expected to carry out project preparation as part of their normal due diligence. To the extent that techniques were used by or on behalf of government partners, they often served to justify rather than evaluate projects.¹² To the extent that such techniques were actually used by bidders, the analysis may in some cases have served the needs of opportunistic bidding—allowing the preferred bidder to win the project with an unrealistically low bid, with the expectation that contract terms could be renegotiated later. In any case, for projects like the Nelspruit water concession mentioned above, the assumption was that because the model was informed by an earlier, successful concession such as the Buenos Aires project, no real cost-benefit analysis needed to be carried out by, or on behalf of, the municipality.

Second, Bourguignon (2006) conjectures that when economic cost-benefit analysis was applied in the preparation of these projects, the techniques may have been overwhelmed by a combination of bad data and the complexities of mixed public-private funding options, as well as so-called “political economy” issues such as

poor governance and the behavioral responses to controversial projects by beneficiaries and bureaucrats. Bourguignon speculates that the inability to cope with these problems accounts for the declining use of cost-benefit techniques in infrastructure project appraisals since the 1980s—the techniques simply became associated with unrealistic evaluations and failed projects and stopped being used extensively.

Third, Flyvbjerg (2005) documents the huge mistakes routinely made in the estimation of financial costs and benefits associate with infrastructure projects. In a survey of 58 rail projects, he found that costs were underestimated by an average of 45 percent and demand forecasts overestimated by an average of 51 percent. Flyvbjerg concludes that such consistently large mistakes in cost-benefit estimations cannot be attributed exclusively to faulty techniques, but can only be explained by things like “optimism bias” and “strategic misrepresentation.”

In retrospect, it seems likely that many brownfield concessions were not viable to begin with, but were nevertheless accepted as win-win solutions by many politicians and policy makers, as well as some representatives of donor organizations and international financing institutions. In the rush to confirm that already approved concessions were cost-effective solutions to huge infrastructure problems, analytical techniques were overwhelmed with project complexities, coopted to rubber-stamp political decisions, or simply not used at all.

¹² In his seminal studies of transit forecasting conducted in the late 1980s, Wachs found “nearly universal abuse” of this kind (1990).

PPP ALTERNATIVES TO CONCESSIONS

Overview

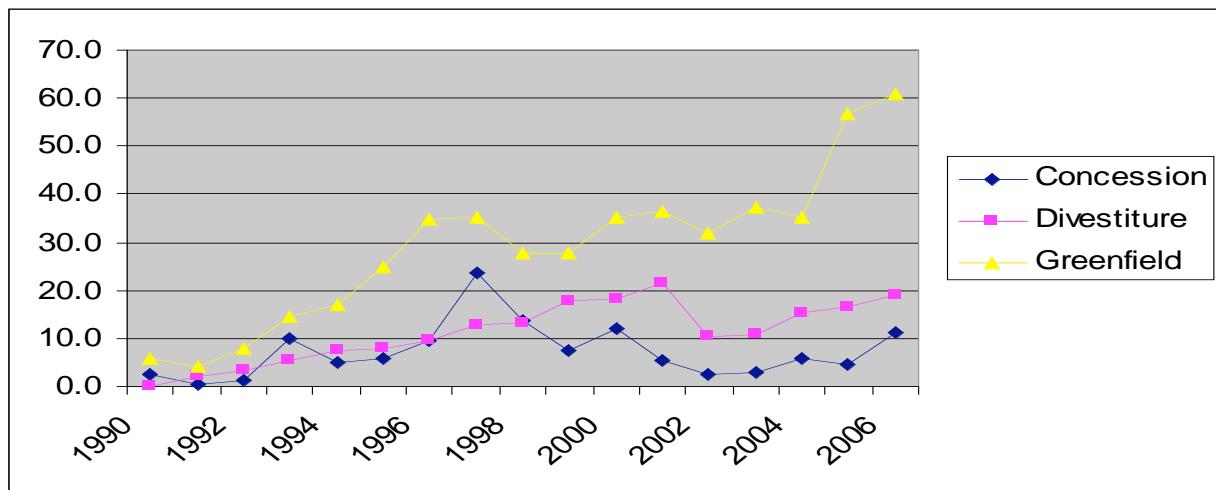
The Asian Crisis underscored for lenders (and everyone else) that the risks associated with brownfield concessions, which they shared along with sponsors and operators, had not been correctly assessed. By 2000, Estache and Strong had concluded that a key reason why infrastructure concessions had become less common since the Asian Crisis was because lenders had increased the price of such debt in order to be compensated for their revised perception of the risks associated with these deals. Lenders also began requiring more and stronger security features, as well as larger shares of sponsor equity.

Security features providing some recourse to sponsors and operators were already being used in the early 1990s, including sponsor support agreements (e.g., to top-up operating revenues) and technical support agreements (whereby lenders could call in technical support—at sponsors' expense—when they thought it necessary). Various covenants were used to protect lenders by forcing shareholders to bear responsibility for financial underperformance. "Permitted distribution" tests precluded dividend distributions unless financial performance tests were met. "Additional indebtedness" tests restricted debt-financed activities as a way of keeping projects from risking cash flow problems by overleveraging (Forsgren et al. 2006). After the Asian Crisis, all of these kinds of features were strengthened and more consistently used at the insistence of lenders.

Sponsors of course did not respond to lenders' concerns by compensating with more equity investment—the Asian Crisis also underscored more clearly than ever before the risks inherent in contract structures that are highly sensitive to cash flow problems. Problems with regulatory bias also remained in many markets, and these added to the already strong reluctance of sponsors and operators to increase equity levels in these projects.

As Figure 4 illustrates, even before the Asian Crisis, other forms of PPI, particularly greenfield projects, were already generating significant levels of investment in infrastructure facilities. After 1997, as investments associated with brownfield concessions began to decrease, these other forms of PPI took on even larger roles in such investments. Greenfield projects, involving construction of new facilities, have generated far more investments since 1990 than either of the other two major forms of PPI. Divestiture, involving full or partial sales of existing facilities, is of course better known as a way of generating revues from the sale of assets (and sometimes the licensing of privatized facilities) rather than for infrastructure investment. Briefly, during the mid-1990s, revenues from sales and licensing far exceeded investment in facilities. But beginning in 1998, the latter has exceeded the former by about 7 percent, demonstrating at least that this mechanism is emerging as a way to stimulate infrastructure investment as much as it is a mechanism for generating revenues that can be used for any government purpose.

Figure 4: Investment in Facilities by PPP Contract Type—1990–96
 (US\$ billions)



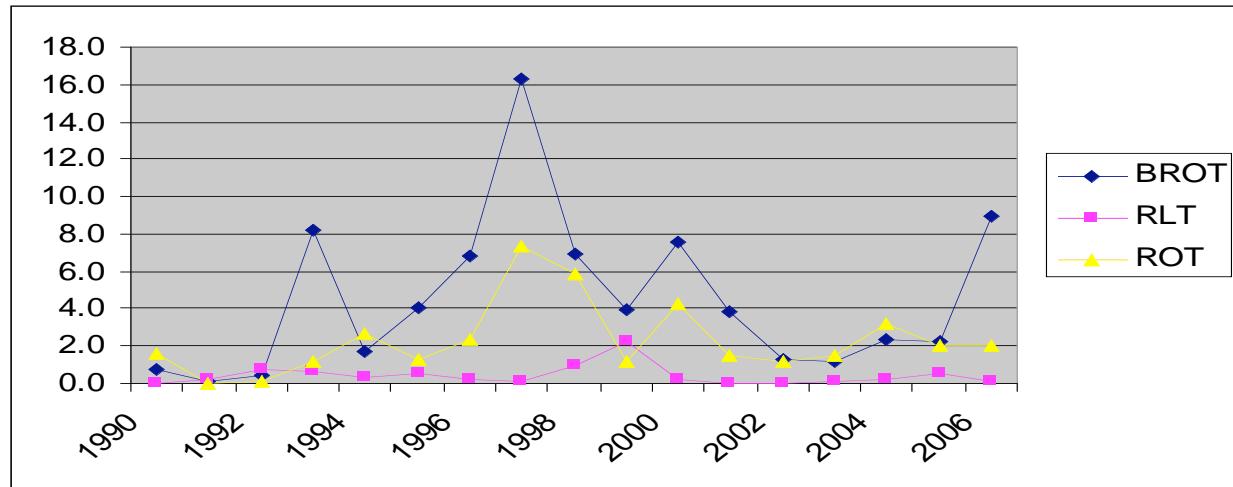
Source: World Bank and PPIAF, PPI Project Database.

Brownfield Concessions

Figures 5 and 6 tell the story of brownfield concession investment since the early 1990s. Of the brownfield subtypes, BROT peaked in 1997 at over twice the total annual investment in facilities generated by the next most widely used subtype. These were the classic brownfield concessions, involving the construction of some new infrastructure assets to improve or extend existing facilities, in addition to rehabilitation. As noted earlier, three-fourths of the investment in government facilities associated with brownfield concessions involved the distribution of infrastructure services to end users who paid for operating costs via fees.

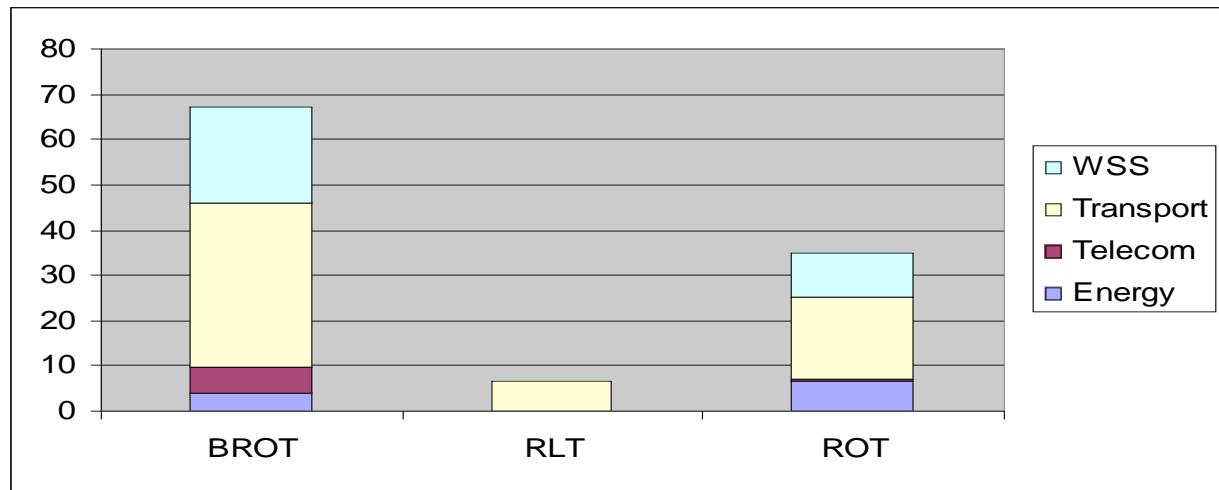
Figure 6 indicates the sectoral focus of these brownfield projects, largely transport, followed by water and sanitation. Of the various transport subsectors, brownfield concessions were most closely associated with toll roads (78 percent of brownfield transport concessions). In the water sector, 87 percent of brownfield concessions involved distribution, arguably the riskiest activity for an operator. With the decline in facilities-related investment illustrated in Figure 5, the toll roads and water distribution systems dramatically lost a major source of investment after the Asian Crisis, particularly for system extension.

Figure 5: Investment in Facilities by Brownfield Concession Subtype—1990–06
(US\$ billions)



Source: World Bank and PPIAF, PPI Project Database.

Figure 6: Sectoral Investments by Brownfield Concession Subtype—1990–06
(US\$ billions)



Source: World Bank and PPIAF, PPI Project Database.

Divestiture

From 1990 through 1998, divestiture of infrastructure facilities primarily served its traditional purpose of generating government revenues from sales or licenses. Over that period, these kinds of revenues were 56 percent higher than associated investment in facilities. But beginning in 1999, the emphasis reverses; from 1999 to 2005, investment numbers are 35 percent higher than sales revenues. Partial divestiture, for example via a sale of shares

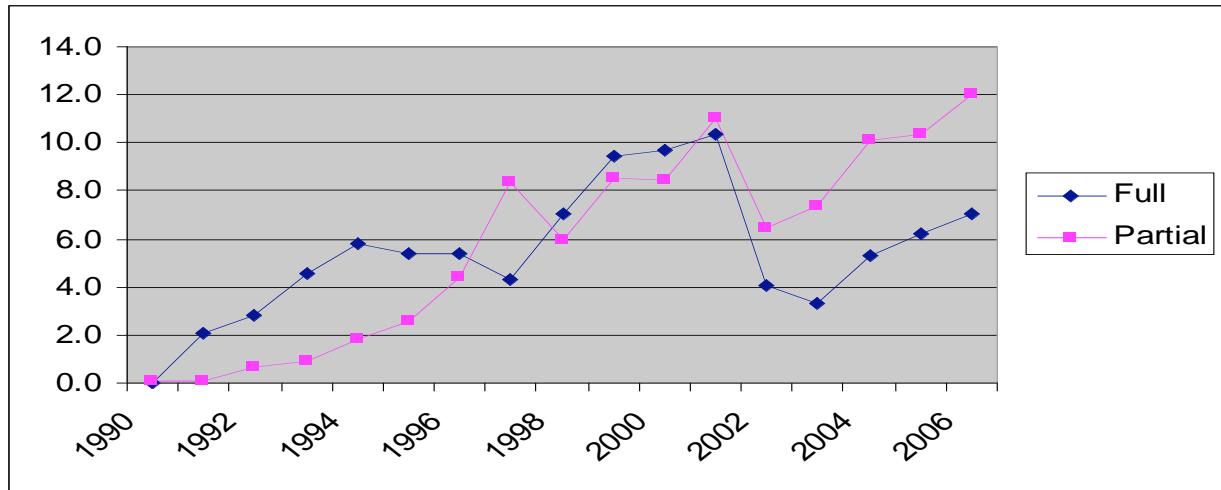
representing a minority stake in a state-owned enterprise, just edges out full divestiture as a mechanism for generating facilities investment over the 1990–05 period (see Figure 7). Partial divestiture implies continuation of some government ownership and often a retention of some control (through regulation if not via share ownership). As such, partial divestiture takes full advantage of the attributes that have long been viewed as making it an alternative to brownfield concessions, because it is a

reasonable way of involving the private sector in investment and management of existing facilities that remain to some extent under governmental ownership and control (Kerf et al. 1998). This is particularly true in partial share sales involving strategic equity partners. The question regarding whether to sell or concession an existing facility is not an uncommon one addressed as the PPI options for facilities are considered. This is especially true in the case of facilities for which government ownership is not considered a strategic necessity. In some cases, facilities are

offered for either sale or concession via the same procurement process (Leigland 2000).

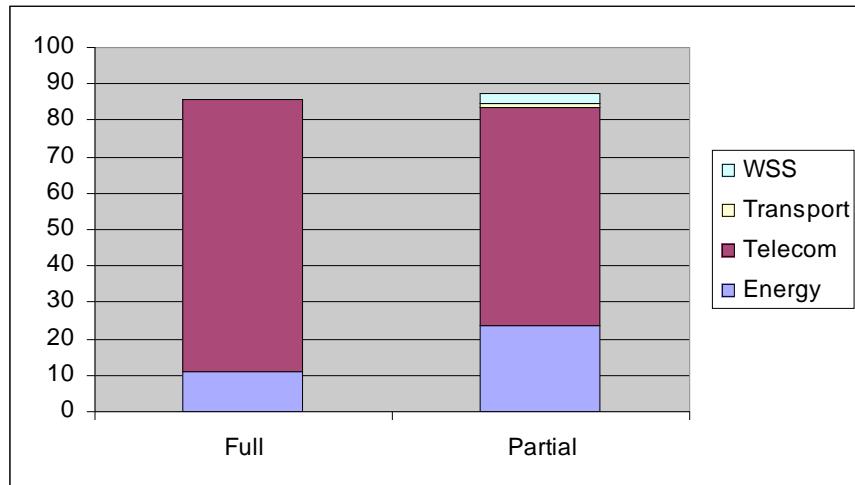
Figure 8 illustrates the focus of divestiture on telecommunications (60 percent of which involves mobile telephony in the case of partial divestiture). In energy, 92 percent involves electricity, and about a third of that involves generation only. Virtually no water or transport facilities benefit from investments related to divestiture, although water-utility-share sales increasingly are being discussed in East African countries such as Uganda and Kenya.

**Figure 7: Investment in Facilities by Divestiture Subtype—1990–06
(US\$ billions)**



Source: World Bank and PPIAF, PPI Project Database.

Figure 8: Sectoral Investments by Divestiture Subtype—1990–06
(US\$ billions)



Source: World Bank and PPIAF, PPI Project Database.

Greenfield Projects

Figure 9 indicates that “merchant” projects have been the most powerful greenfield generators of facilities investment since 1997 when both “build, own, operate” (BOO) and BOT projects began to decline with the Asian Crisis. The PPI database defines merchant projects in the following way:

A private sponsor builds a new facility in a liberalized market in which the government provides no revenue guarantees. The private developer assumes construction, operating, and market risk for the project.¹³

This subtype of PPI lost pace only marginally after the Asian Crisis and has proved to be far more resilient since then, when compared to any other form of PPI arrangement.¹⁴

This is not particularly surprising considering the fact that such projects involve conventional private investment and do not rely for sustainability on government-implemented risk mitigation techniques such as off-take agreements and project revenue guarantees. Thus the failure of such risk mitigation measures during the Asian Crisis had virtually no impact on merchant projects.

Figure 10 indicates that most merchant project investments have been in telecommunications (with most of that investment going into mobile telephony), with a small fraction going into energy, typically in the form of merchant power projects.

About three-fourths of facilities investment generated by BOO projects has gone into energy; 86 percent of that has gone into electricity, almost all of which (96 percent of the electricity total) has involved generation. BOO of course is the “public-private partnership” option normally thought of as involving

¹³ World Bank and PPIAF, Private Participation in Infrastructure (PPI) Project Database (ppi.worldbank.org).

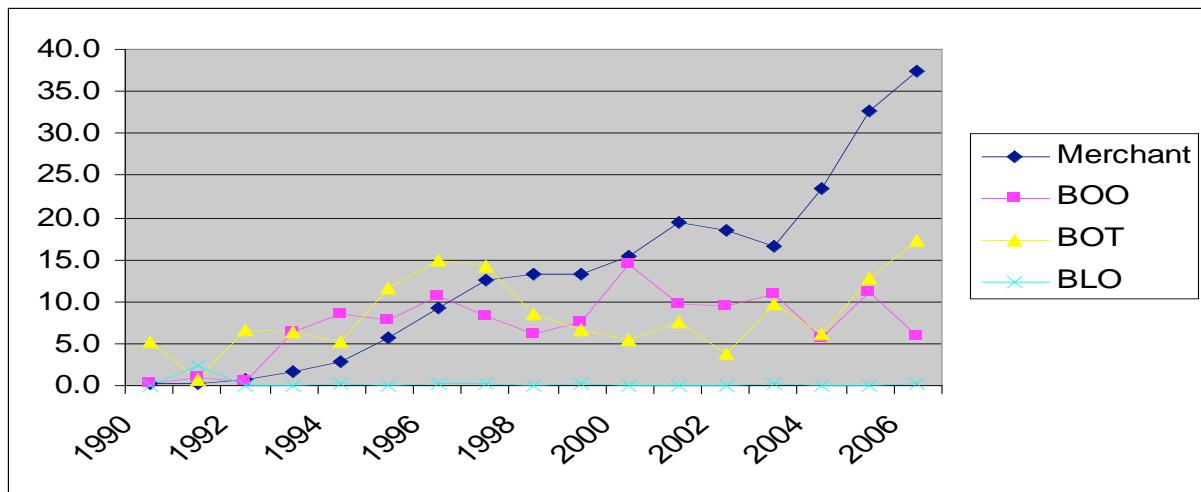
¹⁴ Although merchant plants are included in the PPI Project Database as an important form of “private participation in infrastructure” (or PPI), they are not classifiable under most definitions of “public-private partnership” because of the absence of risk sharing between private and government partners.

the most extreme degree of private involvement, and is virtually indistinguishable from other forms of conventional private investment, including merchant projects, except that it normally involves government support via guarantees or offtake agreements. Again, as with divestiture, BOOs generate virtually no investment in water or transport facilities.

As Figure 10 indicates, unlike BOOs, BOT projects suffered a decline with the Asian Crisis and only in 2006 regained their 1997 peak

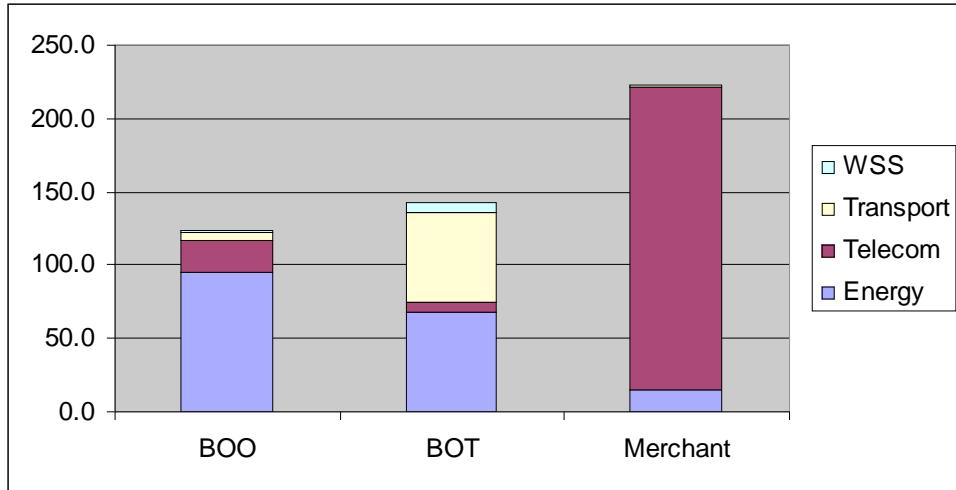
investment levels. Most BOT investment has been in energy, with 88 percent in electricity generation. Transport follows, with several subsectors benefiting, including toll roads (57 percent), ports (18 percent), and rail (17 percent). In other words, energy and especially transport facilities involve assets that governments want eventually to be transferred back to their control. Again, water and sanitation register very small amounts of BOT-related investment.

**Figure 9: Investment in Facilities by Greenfield Subtype—1990–06
(US\$ billions)**



Source: World Bank and PPIAF, PPI Project Database.

Figure 10: Sectoral Investments by Greenfield Subtype—1990–06
(US\$ billions)



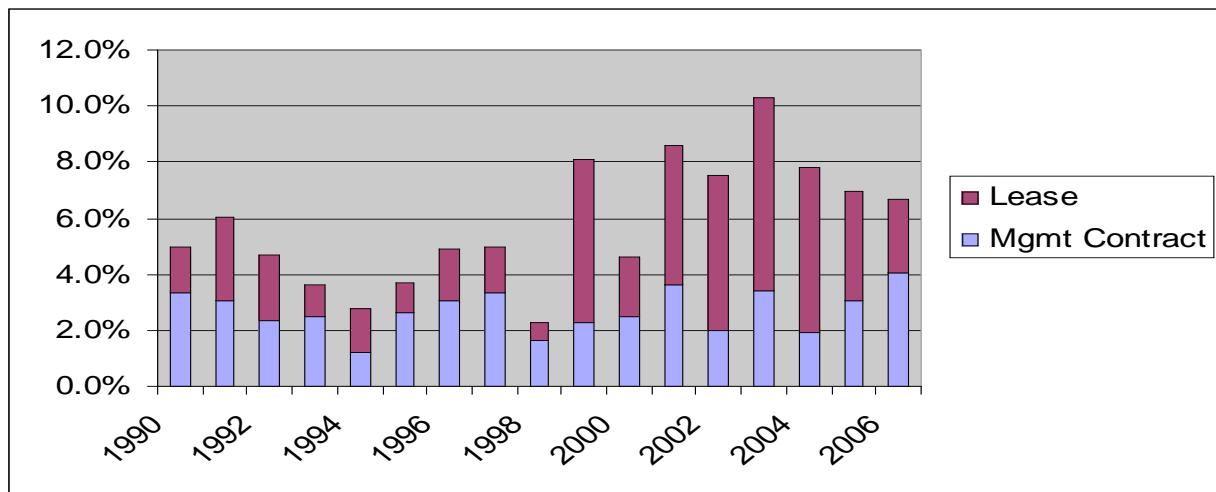
Source: World Bank and PPIAF, PPI Project Database.

Leases and Management Contracts

Figure 11 indicates some growth since the Asian Crisis in the use of nonequity contracts such as management contracts and leases (Figure 12 indicates the sectoral distribution of such contracts). But they still play limited roles in the overall PPI picture, probably because they lack associated investment by private partners. The same is true for corporatization and commercialization efforts, now increasingly used, for example, in the African water sector as an alternative to PPP mechanisms such as brownfield concessions. Management efficiency can be improved,

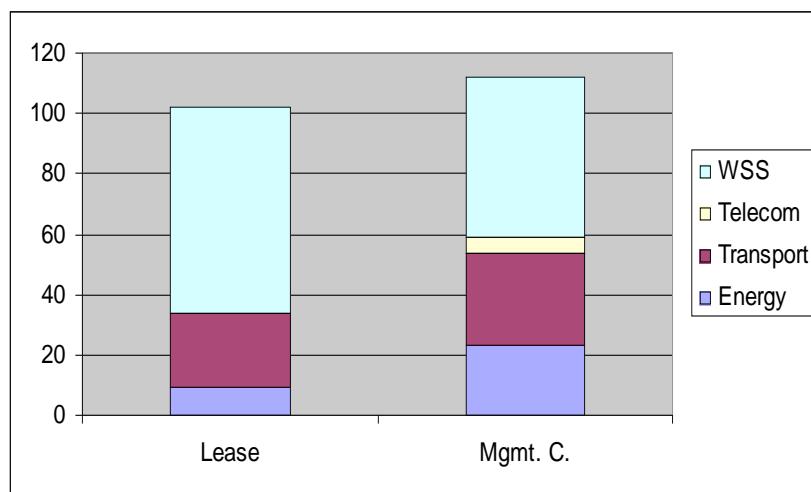
but usually not enough to generate the cash flows needed to back borrowing for capital investment. There is, however, a possibility that efficiency levels are so low in some regions and sectors that with significant efficiency improvements revenue flows would increase enough so that much of the currently estimated borrowing needs would disappear (Estache and Kouassi 2002). There also seems to be increasing use of management or lease contracts in tandem with capital investment programs funded and implemented by governments and donors. These contracts are discussed in the next section.

Figure 11: Lease/Management Contracts as a Percentage of All PPI Projects—1990–06
 (numbers of projects)



Source: World Bank and PPIAF, PPI Project Database.

Figure 12: Sectoral Distribution of Lease/Management Contracts—1990–06
 (numbers of projects)



Source: World Bank and PPIAF, PPI Project Database.

HOW GOVERNMENTS ARE REDUCING PRIVATE PARTNER RISKS ON BROWNFIELD CONCESSIONS

Traditional brownfield concessions will avoid extinction to the extent that they can satisfy the risk-reward requirements of potential private partners. Those requirements have changed over time, and in some cases have been accommodated by adjustments to the basic brownfield concession model.

The Changing Nature of the Private Sector's Risk-Reward Requirements

The Asian Crisis sharpened investors' understanding of the risk-reward ratios associated with different government infrastructure sectors, largely because it brought into clearer focus the cash flow implications of risks associated with brownfield concessions. In any sector, the risks are now viewed as particularly high for projects involving contractual commitments by private partners to assume either or both of the following risks:

- **Investment risk** associated with investment in badly maintained government assets, particularly when the condition and performance of assets is not well documented.
- **Demand risk** associated with the willingness or ability of end users to pay for infrastructure services, particularly where the willingness to pay is volatile, governments are unwilling to entertain the idea of subsidies for lowest-income users, and the possibility is strong that regulatory processes may be subject to political capture.

Projects that combine these characteristics, such as water concessions involving investment in existing facilities and the provision of retail distribution services to end users, represent the riskiest end of this continuum of projects, and

the least likely to be implemented over the near term.

At the other end of the risk-reward spectrum are projects involving one or more of the opposite characteristics that effectively eliminate (or reduce) these risks: (1) the construction and use of new assets, as opposed to taking over existing assets; and (2) the provision of wholesale as opposed to retail services, with payments made by governments backed by government-guaranteed offtake agreements. Thus, stand-alone greenfield independent power producer (IPP) projects, backed by take-or-pay offtake agreements, represent lower-risk projects than, for example, retail electricity distribution projects. It is not surprising that IPPs now account for three-fourths of all energy projects involving significant private sector investment.

Cellular telephony further illustrates how the risk-reward calculus works. The fact that these are mostly retail operations is more than made up for by the profits resulting from the popularity of the service, the widespread willingness to pay for the full cost of service, and the fact that infrastructure investment is relatively low compared with other infrastructure sectors. In fact, the potential rewards of investment in cellular telephony so outweigh the risks that private operators and their financial backers are increasingly willing to pursue such projects on a merchant basis where possible, without government mitigation of risks. By not sharing project risks with government partners, operators are not obligated to share returns, and can avoid the uncertainty sometimes associated with revenue or regulatory support from government partners.

Government Assumption (or Sharing) of Investment Risk

In order to deal with the risks associated with private investment in badly run-down government assets, governments are responding

by becoming financiers of brownfield concessions or otherwise reducing the costs and risks of borrowing for private concessionaires. Some of the ways in which this is done include the following:

- **Government implementation of capital projects.**

Government (often with the help of donors or multilateral lenders) may assume the investment risk associated with a project by sourcing the financing and managing the improvements. In such a situation, the private partner may enter into what normally would be considered a lease or management contract to operate the facility. Sometimes the role of the private partner is extended to include the identification of investment needs and management of the use of the investment funding.¹⁵ A recent example of this approach in Africa is the management contract for water services in Ghana. The management contract involves operations and maintenance by the contractor, but is paralleled by a \$120 million capital investment program. The contractor prepares and submits a “Suggested Capital Investment Report,” which the government may or may not accept as guidance for capital investments. Sometime before the expiry of the five-year management contract, the government intends to competitively bid out a long-term lease contract, presumably to manage rollout of the larger investments and operate the expanded system (Ghana Management Contract 2005). Another recent example of this approach is the Kenya Power and Lighting Company electricity distribution management contract signed in 2006, paralleled by a multidonor investment program focusing on the country’s electricity transmission and distribution

network.¹⁶ With this approach, the challenge is to manage the private partner’s incentives so that investments are cost-effective.

- **Government provision of capital finance.**

A variation on this theme, which has been used frequently with brownfield rail concessions in Africa, involves sourcing of investment funding by governments, who then lend to the concessionaires, or in some cases make capital grants. This kind of funding can be sourced as relatively inexpensive sovereign loans from bilateral donors or international financing institutions. Concessionaires usually benefit from below-market interest rates, longer repayment periods, and, sometimes, grace periods. All of this can substantially improve project cash flows, especially in the early years of these concessions when investments often are at their highest levels and concessions most in danger from cash flow crises. In the 1990s, this kind of on-lending was usually done with a markup to the concessionaire. As commercial lending for brownfield concessions began to diminish after the Asian Crisis, the markups were slashed, and in some cases have disappeared entirely (Pozzo di Borgo et al. 2006). In effect, this kind of government involvement amounts to project subsidization and can easily distort the economics of the respective projects. This same kind of mechanism can operate in cases of partial divestiture, where governments may make shareholder loans to enterprises that are managed by strategic equity partners. India has made notable use

¹⁵ Note that without substantial direct investment by the private partner in such deals, these contracts are usually classified in the PPIAF-World Bank PPI Project Database as management or lease contracts, rather than concessions.

¹⁶ A third noteworthy example of this approach is the Dar es Salaam 10-year lease contract signed in 2003 and canceled in 2005. The fate of this contract underscores the fact that government financing of capital improvements, in parallel with private management of operations (including billing and collection), maintenance, and new construction does not relieve private partners of all project risks and responsibilities.

of capital grants to cover significant percentages of construction costs.

As governments begin to assume or share project investment risks they also begin to experience conflicts of interest. Can governments act simultaneously as financiers interested in the financial sustainability of projects, and regulators charged with protecting the interests of users? Will a government allow a concession company, in which it has invested substantial amounts of capital, to go into bankruptcy? Professional economic regulators are charged with balancing the interests of different stakeholders, but the independence of such regulators from political capture has turned out to be much less easy to secure than hoped (Eberhard 2007). It is clear that when concessions involve government finance, renegotiation is more likely (Guasch 2004). This may be because operators correctly realize that renegotiation in such situations has a better chance of success because of the conflicting interests of government partners. Finally, the use by private companies of debt for which governments ultimately are responsible also raises questions about efficiency incentives for private partners, not to mention the possibility of excessive profits for concessionaires.

More (or Guaranteed) Remuneration for Private Partner Assumption of Investment Risks

In addition to sharing investment risk, governments are also finding better ways of remunerating concessionaires for taking on risks related to investment.

- Remuneration for capital improvements.** One example of this involves guaranteed remuneration for unamortized investment when the concession comes to an end. Sirtaine et al. (2004) argue that fair remuneration for capital improvements at the end of the contract term is essential in making such arrangements profitable. The promise to do this has long been a standard feature of brownfield concessions. For

example, such a commitment was an important element in the 1997 Manila water concession contracts, in which the government promised concessionaires “expiration payments” at the end of the contract period equal to the net present value of the unamortized investments. But the Asian Crisis raised uncertainty in the minds of investors about the willingness and ability of many governments to make good on potentially large commitments of this nature.¹⁷ This kind of concern, in turn, raises the possibility that concessionaires might slow down the pace of asset investment during the last years of a contract. Governments and multilateral lenders found a new way to deal with this problem in the Kenya-Uganda rail concession, which closed at the end of 2006. The end-of-contract payment commitments by the two governments were backed by guarantees made available by the World Bank. Guarantees of this kind may become more widespread, but require sophisticated monitoring of asset amortization over the lifetime of the contract, which in the Kenya-Uganda case was done using a specially designed “conceded assets account” (Matsukawa and Habeck 2007).

- End-of-contract payments for the use of government assets.**

In some cases governments may be willing to reduce the pressure on concession cash flows and at the same time improve or at least rationalize remuneration for investment risk by changing the fee structure of the project. Fees are often used in brownfield concessions to reflect the cost to the government of providing assets for use by the concessionaire. These kinds of fees are usually structured as lease payments and often reflect the debt service costs to

¹⁷ In fact, in the Manila case the government never expected to make these expiration payments. Government officials intended to bid out the project again, after the first contracts terminated, and have the new concessionaires make the expiration payments to the previous contractors (Dumol 2000).

government associated with the assets involved. But concessionaires often complain that such fees unfairly saddle them with investment risks that should remain with governments, because the original loans were too expensive, the investments were not cost-effective or efficiently managed, and the assets created by the investment often do not generate the expected revenues needed to pay off the loans. In some cases, governments are waiving such fees in favor of a payment made by the concessionaire at the end of the contract for the amortized value of assets transferred to private operation by governments, and used to help make profits for the concessionaire. The conceded assets account mentioned above in the case of the Kenya-Uganda rail concession also serves this function on that project. Payments by the concessionaire at the end of that contract are expected to be more than offset by government payments for the unamortized value of assets provided by the concessionaire.

- **More reasonable approaches to profit sharing.**

But fees may also be intended simply to allow governments to share in the overall financial benefits of concessions. In this case, fees might be better linked to profitability than just revenues, which frequently is the case and often puts significant pressure on project cash flows. Governments may also consider setting fees after a careful assessment of their other sources of financial benefits from concessions, such as taxes, which often generate more revenue for governments over the lifetime of a concession than do fees (Pozzo di Borgo et al. 2006).

Government Assumption (or Sharing) of Demand Risk

Governments can do several things to reduce the demand risk faced by private partners handling retail distribution of infrastructure services.

- **Government pays for bulk services, but manages distribution.**

First governments can manage retail distribution themselves, and make regular payments (sometimes referred to as “unitary” payments) to private partners for the provision of bulk services provided via greenfield infrastructure projects. Performance penalties or bonuses are easier to manage with this form of remuneration. This is of course the IPP model used extensively in the electricity sector. Its use in the water sector may also be on the increase, with greenfield water and sewage treatment plants selling to single government customers, who back their commitments via “take or pay” arrangements (Marin and Izaguirre 2006).

- **Government pays for distribution, managed by private partner.**

Second, private partners can manage retail distribution, and even billing and collection, but are remunerated via government payments based on (1) availability of services irrespective of usage (i.e., government takes on all demand risk), or (2) usage, as in the case of “shadow tolls,” based on the volume and composition of traffic, but not paid by motorists (here, demand risk is shared by public and private partners).

- **Private partner manages distribution, paid for by end users, but government mitigates demand risk.**

Third, private partners can also receive remuneration principally via user fees, backed by a government commitment to “top up” with subventions when demand falls below preagreed levels. If demand exceeds estimates, private partners may be expected to share revenue surpluses with government. See Vassallo (2006) for a detailed discussion of various mechanisms used by governments to mitigate traffic risk in highway concessions.

Two issues arise when governments consider assuming or sharing of demand risk. First, such risk sharing can weaken private partner

incentives to maintain customer satisfaction with services provided. Alternate means of incentivizing quality and reliability of service are usually incorporated into these agreements. Second, although greenfield projects involving bulk supply and guaranteed government off-take agreements are effective ways of generating private sector investment, the benefits of the investment can be wasted if government service provision is compromised by weak institutions, policies, and procedures. One of the original reasons for using the brownfield concession mechanism was precisely the need to strengthen management of operations as well as increase investment. Because of this, in some countries the use of greenfield projects is matched with other arrangements to improve service delivery.

Government Ownership and Control of Project Preparation

With end of the 1990s, many governments in developing countries have followed the lead of countries such as the United Kingdom, Australia, South Africa, etc., in establishing specialized units for developing, supervising the development of, or monitoring the

implementation of concessions and other PPP projects that present significant contingent liabilities for government owners. The sort of low-cost project preparation that was characteristic of brownfield concessions in the early 1990s is largely a thing of the past, at least in most countries with PPP experience over the decade. Many governments now require the use of technical feasibility studies, PPP option assessments, and rigorous cost-benefit analysis before government agencies may proceed with PPPs such as concessions. In addition, the kinds of considerations mentioned above regarding government assumption of risks associated with investment and service delivery can raise even higher the stakes for government involvement in PPP arrangements, particularly if government must supply financing for implementation. New kinds of private partners and new ways of making money from concessions (discussed below), also require much more government attention to contract compliance monitoring, accounting, and reporting.¹⁸ For a review of how PPP units incorporate these features, see PPIAF (2007).

¹⁸ A relatively well-established state of the art in government assessment and management of these kinds of issues is now widely available from PPP units in countries such as Ireland, Scotland, Australia, Canada, and South Africa. Much of this guidance material is available from Internet Web sites. South Africa's PPP guidelines, one of the most extensive and sophisticated approaches to government regulation of PPP project preparation in the developing world, can be downloaded from <http://www.finance.gov.za/organisation/ppp/PPP%20Manual/default.htm>.

PRIVATE SECTOR ACTIONS TO STRENGTHEN PROFITS AND CASH FLOWS

As governments act to make risk-sharing arrangements on brownfield concessions more attractive to potential private sponsors and operators, private players are also changing their approaches to these projects to strengthen their cash flows and remuneration.

More Due Diligence, Less Opportunistic Bidding

First, of course, fewer of the large international service providers are bidding frequently on brownfield concessions. The intentional underbidding of projects with the expectation of renegotiation later no longer appears to be a widely used technique for dealing with inherently risky projects. Potential private partners are now more frequently willing to propose “negative” concessions when they bid (involving fees or other support paid to the concessionaire by governments, rather than the other way around as with traditional brownfield concessions). In some recent cases, even the use of lower-risk lease or management contracts, combined with donor funding for capital investment, have not evoked positive responses from potential private partners as they once might have.¹⁹

Maximizing Remuneration from Available Sources

New kinds of concessions, some involving limited involvement by private partners in distribution (described above) highlight the possibility that sponsors and operators will more carefully explore all available sources of remuneration associated with these projects.

- **Technical assistance fees.**

Technical assistance, a common feature of brownfield concession projects, is used to help transfers skills between expatriate and local staff of the concession company. Such fees are usually treated as costs, changed under separate management or technical assistance contracts. As such, they reduce the profits of the concession company, but have the effect of transferring cash to the concession shareholders, and as a result may boost a project’s effective overall profitability. In the railway sector, such costs normally account for less than 1 percent of the concession company’s turnover, and decline quickly over time. But in some cases technical assistance costs have been significantly higher. In the Abidjan-Ouagadougou rail concession in West Africa (Sitarail), these costs have accounted for 5 percent of turnover (Pozzo di Borgo et al. 2006).

- **Transfer pricing.**

Similarly, when concessionaires build new repairs and maintenance, they often use related businesses to undertake the work or source the equipment, rather than use public competition to find the lowest cost provider. The resulting transfer prices represent income for the larger group of companies of which the concessionaire may be a part. Like technical assistance fees, such transfers are treated as costs and therefore reduce the concessionaire’s income, even though their real impact is more like that of a shareholder

¹⁹ In late 2004, the Zambian government issued a prospectus for a PPP lease arrangement for the operation of Lusaka’s water distribution company. The lease was to be paralleled by a donor-funded investment program, which would also pay for operating costs in the early years of the contract (Government of the Republic of Zambia 2004). But the project attracted little interest from private sponsors and operators and was later abandoned in favor of a performance contract between the utility and the government.

dividend.²⁰ In fact, Sirtaine et al. (2004) concluded that management fees and investment markups may be essential in most cases for concession to become profitable in fact, if not in a strict accounting sense.

Transfer pricing and technical assistance fees have long been a concern of government owners of concession projects. Sirtaine et al. suggest that audits focusing on transfer pricing issues have been standard features of more developed PPP markets such as Latin America. But Pozzo di Borgo et al. imply that they are used much less frequently in regions like Africa where monitoring efforts are weak and the kinds of information that concessionaires must routinely report often are not specified in contracts. As sponsors and operators continue to struggle to make traditional brownfield concession profitable, these kinds of audits are likely to become more routine requirements of concession contracts.

Concessionaire Self-Selection: Better Matching of Needs, Skills, and Opportunities

Another way to maximize remuneration for risks as well as risk mitigation is for would-be concessionaires to aim for the most lucrative matchups between their own skills, experience, and situation and the opportunities for making money on different projects. Private firms that can find these matchups are winning contract awards and weathering stresses associated with cash flow and profitability stresses.

- Local and regional sponsors and operators.**

Ettinger et al. (2005) document the emergence of local and regional investors and operators in all forms of PPP projects. But their strongest involvement has been in concessions, where they have accounted for 54 percent of concession-related investment in 1998–2004. These kinds of players are

²⁰ The Sitarail case demonstrates this impact on overall profitability: categorizing the technical assistance as a cost results in average annual return on equity at just over 9 percent. Categorizing it as profit increases return on equity to 31 percent (Pozzo di Borgo et al. 2006).

particularly active in South Asia and Sub-Saharan Africa, and historically have been most prominent in transport sectors. The researchers speculate that as concession-type projects become smaller, these kinds of private partners are able to satisfy project financing needs by taking advantage of the deepening capital markets in developing countries. Some local and regional operators have built on their experiences as minority partners (often as construction contractors) with developed country investors in PPP projects. Finally, as local firms, many of these operators and investments may be better positioned than firms from developed countries to deal with political economy issues affecting PPPs in developing countries. But Ettinger et al. also caution that all of the implications of the involvement by these kinds of players are not yet clear. In particular, consumers in these countries are often concerned that local firms may be more likely to be involved in corrupt activities because of their close connections to government.

- Companies seeking control over distribution chains.**

Other new kinds of operators and investors are likely classifiable as subsets of the general category of local and regional companies described above. One type identified by Pozzo di Borgo et al. (2006) is a company or group of companies trying to capture a dominant position in vertical distribution chains of productive and transport sectors. In other words, they want to control a significant part of the distribution chain to capture overall benefits that would outweigh poor rates of return associated with operation of any specific activities in the chain. Tariff discounts or other benefits for affiliated companies operating elsewhere in the chain might be one advantage of this approach. So a rail concession might be part of a bigger distribution chain that would include agricultural production, freight forwarding, seaport operations, shipping lines, etc. Low rates of return for the concession would be tolerable as long as cash from other

operations was available to forestall cash flow crises. Obviously, concerns about this role would include potential undue market and pricing power in the transport logistics chain, and profit transfers from one subsidiary to another.

- **Construction management companies.** Another new kind of concessionaire, again an important subset of new local and regional operators, is characterized by a company or group of companies with a focus on a single sector or subsector, such as rail or ports, but whose interest lies in the financial benefits associated with managing large investment programs—especially those financed by governments or donors

rather than through cash flows. In many cases these probably are local companies that began their PPP careers as construction subcontractors to international firms on larger brownfield concessions or greenfield projects. As operators, these firms may be willing to rely heavily for their remuneration on consulting fees charged to concession SPVs and transfer pricing for equipment and investments, particularly in the form of investment markups, as described in the section above. This interest of these kinds of concessionaires in managing large projects raises questions about what keeps the size of these investment projects in check.

SIGNS OF RECOVERY IN 2006?

In 2006, infrastructure investment associated with brownfield concessions demonstrated its sharpest increase since the 1990s, more than doubling the level of 2005. The 2006 figure brings total investment to a level first achieved only in 1993, but may nevertheless prefigure a recovery of sorts for the mechanism. This is because the kinds of brownfield concessions concluded in 2006 reflect the changing nature of investor risk-reward requirements outlined above. Figure 13 illustrates this by comparing the sectoral distribution of concession-related investment in 1997 with that of investment in 2006. The sharp increase in private-sector risk aversion is strongly apparent in 2006.

Very little investment is registered in water and sanitation and virtually none in energy (where private operators and sponsors continued to focus on less risky greenfield IPPs backed by off-take agreements). No concession-related investment in telecommunications is registered here because private companies were optimizing returns and minimizing uncertainty by focusing on merchant projects (more of this kind of investment was committed to in 2006 than in

any previous year). Not surprisingly, most of the brownfield concession investment in 2006 was in the transport sector, principally roads and airports. Airports are well known as strong commercial opportunities for private concessionaires, with the number of projects limited in the past largely by governments' unwillingness to turn over facilities to private partners, which are both strategic and capable of generating at least some revenues for government owners. Globalization and heightened security concerns have underscored the need for more investment in and professional management of such facilities, even in developing countries.

Toll roads, even those generating revenues via user-pay arrangements, are also widely recognized as having long-term commercial value in many developing countries, particularly as toll road concessions have been strengthened by government sharing of financing and demand risks (Fitch Ratings 2007). Cost coverage mechanisms such as availability payments, capital grants, and shadow tolls have been cited as principle factors in the growing private sector involvement in toll roads in the developing world (Queiroz and Izaguirre 2008).

Figure 13: Sectoral Distribution of Investment—Brownfield Concessions: 1997 and 2006
 (US\$ millions)

Subsector	Segments	1997	% of total	2006	% of total
Electricity	Distribution	3,048	22.2%	22	
	Distribution, generation, transmission	268		0	
	Generation	1,678		0	0.2%
Natural Gas	Transmission	600	2.7%	0	
	Distribution	0		0	0.0%
Airports	Runway & terminal	242	1.1%	4,394	
	Terminal	8		0	41.7%
Railroads	Fixed assets & freight	188	6.1%	0	
	Fixed assets, freight, passenger	79		400	
	Freight	1,100		0	3.8%
Roads	Bridge	81	29.4%	0	
	Bridge & highway	49		1,558	
	Highway	6,487		2,364	37.2%
Seaports	Channel dredging & terminal	214	4.1%	70	
	Terminal	721		706	7.4%
Water, sewerage	Potable water treatment plant	206	34.5%	7	
	Water utility with sewerage	7,045		998	
	Water utility without sewerage	529		19	
	Sewerage collection & treatment	0		11	9.8%
	Totals	22,542	100%	10,548	100%

Source: World Bank and PPIAF, PPI Project Database.

CONCLUSIONS

In many respects, the sharp decline in the global PPP market, registered by the PPIAF-World Bank PPI Project Database beginning in 1997, reflected problems with a single PPP mechanism, the brownfield concession contract. If the data on brownfield concessions is removed from the database, PPP-related investments in government infrastructure facilities demonstrates none of the “crash” characteristics commonly associated with PPI over the last decade. In nominal terms, investment figures for 2006 were 67 percent higher than for 1997. In the early 1990s, the development community hoped that the brownfield concession would become the signature contract of the PPI movement, embodying virtually all of the most beneficial qualities associated with public-private partnerships for infrastructure. But the Asian Crisis triggered a precipitous decline in the use of brownfield concessions, which to date have recovered only to levels first achieved in the early 1990s.

No authoritative studies have been done showing how the mechanism was promoted in the developing world in the early 1990s, but anecdotal accounts suggest that it may have been oversold to (and by) governments who saw it as a win-win solution to some of the most intractable and highly visible infrastructure problems they faced. But those same characteristics that made the mechanism almost too good to be true also made the resulting project arrangements highly vulnerable to cash flow stresses and profitability problems.

The brownfield concession is not an inherently flawed mechanism—the track record of this contract form in developed countries is reasonably successful. The mechanism, however, is more fragile than many market participants assumed as the PPP boom began in the developing world during the 1990s. The projects must be carefully prepared, and a host of reliable risk management mechanisms need to be in place for the arrangement to be sustainable. Many of these conditions for success have proven to be difficult to achieve in developing countries. Brownfield concessions will continue to be used in the relatively narrow set of circumstances where it now appears that these contracts can be sustainable in the developing world. A decade after the onset of the Asian Crisis, the brownfield concession may seem like an endangered species of PPP, but the needs that drove the initial widespread use of this mechanism—those intractable and highly visible problems with existing infrastructure service systems—still exist. Governments and their private sector partners are responding with new contracting arrangements that add concession-type features to other traditional PPP options such as management contracts, leases, and even partial privatizations. To a large extent, the challenge in assessing the ongoing track record of brownfield concessions will be to ensure that monitoring and data collection categories are flexible enough to capture these evolving contract forms. An important objective of this kind of monitoring work will be to learn lessons about the liabilities and risks associated with these hybrid arrangements in time to pass useful guidance on to practitioners.

REFERENCES

- Aguas Argentinas S.A. Concession Contract. 1993. Concession Agreement entered into between the Argentine State and Aguas Argentinas S.A., April 28, 1993.
- Alcazar, Lorena, Manuel A. Abdala, and Mary M. Shirley. 2000. "The Buenos Aires Water Concession,=." Policy Research Working Paper No. 2311, The World Bank, Washington, DC.
- Baietti, Aldo, William Kingdom, and Meike van Ginneken. 2006. "Characteristics of Well-Performing Public Water Utilities." Water Supply & Sanitation Working Notes, No. 9, The World Bank, Washington, DC.
- Bourguignon, Francois. 2006. "Rethinking Infrastructure for Development," Closing Remarks, Annual Bank Conference on Development Economics, Tokyo, Japan, May 30.
- De Fraja, Gianni, and Clive Stones. 2004. "Risk and Capital Structure in the Regulated Firm." *Journal of Regulatory Economics* Vol. 26, No. 1 (July): 69–84.
- De Lemos, Teresa, Martin Betts, David Eaton, and Luis Tadeu De Almeida. 2000. "From Concessions to Project Finance and the Private Finance Initiative." *The Journal of Project Finance* Vol. 6, No. 3 (fall): 19–37.
- Dumol, Mark. 2000. *The Manila Water Concession: A Key Government Official's Diary of the World's Largest Water Privatization*. Directions in Development, World Bank, Washington, DC.
- Eberhard, Anton. 2007. "Matching Regulatory Design to Country Circumstances." Gridlines Series, no. 23, May, PPIAF, Washington, DC.
- Ehrhardt, David, and Timothy Irwin. 2004. "Avoiding Customer and Taxpayer Bailouts in Private Infrastructure Projects: Policy Toward Leverage, Risk Allocation, and Bankruptcy." Policy Research Working Paper 3274, The World Bank, Washington, DC.
- Estache, Antonio, J. Luis Guasch, and Lourdes Trujillo. 2003. "Price Caps, Efficiency Payoffs, and Infrastructure Contract Renegotiations in Latin America." Policy Research Working Paper No. 3129, The World Bank, Washington, DC.
- Estache, Antonio, and Eugene Kouassi. 2002. "Sector Organization, Governance, and the Inefficiency of African Water Utilities." Policy Research Working Paper No. 2890, The World Bank, Washington, DC.
- Estache, Antonio, and John Strong. 2000. "The Rise, the Fall, and ... the Emerging Recovery of Project Finance in Transport." Policy Research Working Paper No. 2385, The World Bank, Washington, DC.
- Ettinger, Stephen, Michael Schur, Stephan von Klaudy, Georgina Dellacha, and Shelly Hahn. 2005. "Developing Country Investors and Operators in Infrastructure." Trends and Policy Options Series No. 3, PPIAF, Washington, DC.

- Fitch Ratings. 2007. "Global Toll Road Rating Guidelines." Global Infrastructure and Project Finance, Criteria Report, March 6. Available at www.fitchratings.com.
- Flyvbjerg, Bent. 2005. "Policy and Planning for Large Infrastructure Projects: Problems, Causes, Cures," Policy Research Working Paper 3781, The World Bank, Washington, DC.
- Forsgren, Kurt, Paul Calder, Robert Bain, Ian Greer. 2006. "Global Infrastructure Assets and Highly Leveraged Concessions Raise New Rating Considerations." *Standard & Poor's Rating Direct*, Sept. 14, Standard & Poor's, New York.
- Foster, Vivien, and Tito Yepes. 2006. "Is Cost Recovery a Feasible Objective for Water and Electricity? The Latin America Experience." Policy Research Working Paper 3943, The World Bank, Washington, DC.
- Ghana Management Contract. 2005. Management Contract for Ghana Urban Water between Ghana Water Company Ltd. and Vitens Rand Water Services BV and Aqua Vitra Ltd., October.
- Government of the Republic of Zambia. 2004. "PSP in Lusaka Water and Sewerage Company: Prospectus." Prepared by C. Ricketson Consulting Ltd., September.
- Guasch, J. Luis. 2004. "Granting and Renegotiating Infrastructure Concessions: Doing It Right." WBI Development Studies, The World Bank, Washington, DC.
- Guislain, Pierre, and Michel Kerf. 1995. "Concessions—The Way to Privatize Infrastructure Monopolies." Note No. 59, Public Policy for the Private Sector, The World Bank, Washington, DC.
- Israel, Arturo. 1992. "Issues for Infrastructure Management in the 1990s." World Bank Discussion Paper 171, The World Bank, Washington, DC.
- Kerf, Michel, R. David Gray, Timothy Irwin, Celine Levesque, and Robert R. Taylor. 1998. "Concessions for Infrastructure—A Guide to Their Design and Award." Technical Paper No. 399, World Bank, Washington, DC.
- Klein, Michael. 1998. "Rebidding for Concessions." Public Policy for the Private Sector, Note no. 161, November, World Bank, Washington, DC.
- Kotze, Roelf, Andrew Ferguson, and James Leigland. 2000. "Government Facilitation of Public-Private Infrastructure Projects: Lessons from South Africa." *Journal of Project Finance* Vol. 6, No. 1 (spring): 61–70.
- The Lawyers' Environmental Action Team, the Legal and Human Rights Centre, the Tanzania Gender Networking Programme, the Center for International Environmental Law, and the International Institute for Sustainable Development. 2007. Amicus Curiae Submission in Case No. ARB/05/22 before the International Centre for Settlement of Investment Disputes between Biwater Gauff Ltd. and United Republic of Tanzania." March 26.
- Leigland, James. 2000. "Concession or Sale: PPPs to Solve South Africa's Airport Problems." *The PFI Report*, November: 13-15.
- Marin, Philippe, and Ada Karina Izaguirre. 2006. "Private Participation in Water: Toward a New Generation of Projects?" Gridlines series, no. 14, PPIAF, Washington, DC.

- Marshella, Tom. 2001. "Debt Financing of Projects in Emerging Economies: Lessons from Asia." *The Journal of Project Finance* Vol. 7, No. 2 (summer): 30–34.
- Martin, Lloyd. 2005. "Public-Private Partnerships in the Water Sector of the EECCA Region: Update and Recommendations for the Improvement of Service Delivery." Paper presented at the Conference of EECCA Ministers of Economy/Finance, Environment and Water, OECD Task Force for the Implementation of the Environmental Action Programme for Central and Eastern Europe, Caucasus and Central Asia Yerevan, Armenia, November 17–18.
- Matsukawa, Tomoko, and Odo Habeck. 2007. *Review of Risk Mitigation Instruments for Infrastructure*. Trends and Policy Options Series No. 4, PPIAF, Washington, DC.
- Nelspruit Concession Contract. 1999. Concession Agreement entered into between Nelspruit Transitional Local Council and the Greater Nelspruit Utility Company Ltd., April 21, 1999.
- OECD. 2007. "Concessions." Directorate for Financial and Enterprise Affairs, Competition Commission, Global Forum on Competition, April 20.
- Pomerleano, Michael. 1998. "Corporate Finance Lessons from the East Asian Crisis." *Public Policy for the Private Sector*, Note No. 155, October, The World Bank, Washington, DC.
- Pozzo di Borgo, Pierre, Alain Labeau, Raphael Eskinazi, Julien Dehornoy, Alan Parte, Marouane Ameziane. 2006. "Sub-Saharan Africa: Review of Selected Railway Concessions." Africa Transport Sector, Report No. 36491, The World Bank, Washington, DC.
- PPIAF. 2007. "Public-Private Partnership Units: Lessons for Their Design and Use in Infrastructure." World Bank and PPIAF, Washington, DC
- Queiroz, Cesar, and Ada Karina Izaguirre. 2008. "Worldwide Trends in Private Participation in the Road Sector." Gridlines series, PPIAF, Washington, DC.
- Sirtaine, Sophie, Maria Elena Pinglo, J. Luis Guasch, and Vivien Foster. 2004. "How Profitable Are Infrastructure Concessions in Latin America? Empirical Evidence and Regulatory Implications." PPIAF Trends and Policy Options, The World Acronyms and abbreviations Bank, Washington, DC.
- Vassallo, Jose M. 2006. "Traffic Risk Mitigation in Highway Concession Projects: The Experience of Chile." *Journal of Transport Economics and Policy* Vol. 40, Part 3, September: 359-381.
- Wachs, Martin. 1990. "Ethics and Advocacy in Forecasting for Public Policy." *Business and Professional Ethics Journal* Vol. 9, Nos. 1 & 2: 141–157.
- Williamson, Mark, and Tony Moore. 2006. "International Power: Capital Structure and Project Finance," Presentation at International Power Investor Conference, London, September 19.

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