INFRASTRUCTURE PPPs IN THE DEVELOPING WORLD: LESSONS FROM RECENT EXPERIENCE

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March 19, 2013
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I. INTRODUCTION

Infrastructure is a critical driver of economic growth and can significantly raise living standards. A review of infrastructure needs in the developing world suggests that the challenge is immense. The paper examines the potential role for public-private partnerships (PPPs) in meeting this infrastructure challenge. An analysis of data shows that PPPs have grown significantly in the developing world, but remain a relatively small share of total infrastructure and are concentrated in more prosperous developing countries. A review of experience generally finds that PPPs have met efficiency expectations, but have proven relatively less successful in terms of broadening access to infrastructure. The Latin American experience reveals a high incidence of renegotiations early in the contract period, raising bilateral dependency questions and institutional weakness issues. We conclude by drawing out lessons from the experience to date, particularly with respect to contract design and institutional capacities.

II. INFRASTRUCTURE IN THE DEVELOPING WORLD

a. Why Infrastructure Matters

Since Aschauer’s seminal study suggested that the rate of return of public infrastructure investment on productivity in the United States was 50 – 60 percent, economists have debated the nature and determinants of the relationship. Estimates vary. An early World Bank report on infrastructure projects financed by the institution between 1974-1992, for example, found a rate of return of 16% that was highly susceptible to domestic economic policies such as trade barriers. Nevertheless, a broad consensus has emerged: a review of 64 studies between 1989 and 2007 noted that two-thirds of authors found a positive rate of return.

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statistically significant relationship between infrastructure investment and economic growth or some other measure of economic development outcome (e.g., productivity).³

The potential impact of infrastructure investment in developing countries is even more evident from firm surveys on business conditions. Between one-quarter and one-half of manufacturing firms operating in the developing world reported the lack of adequate electricity infrastructure as a “major” constraint to business, compared to 16% of firms in OECD countries.⁴ Firms in South Asia reported an average of more than one electrical outage per day, lasting more than three hours, at an estimated cost of a startling eight percent of annual sales.⁵ The severity of the impact may not be surprising to those familiar with last summer’s power failure in India that left 670 million people without power for several days.⁶ Electricity and transportation inadequacies represent a major concern and cost driver in sub-Saharan Africa,⁷ apparent in the finding that inadequate infrastructure represents 10% of the cost of sales in Tanzania⁸ or the impact of weak transportation networks in Kenya on costs in land-locked Uganda. Poor roads, ports, and telecommunications infrastructure make logistics-related costs in Peru three times that of the OECD average.⁹

Economic output is not, of course, the sole product or goal of infrastructure investment. Infrastructure is a key means of raising living standards. Expanding access to safe drinking water to the 60% of people in Sub-Saharan Africa¹⁰ and 20% in Latin America¹¹ who lack access has obvious impacts on health and welfare. But infrastructure also has

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⁵ Ibid.
less apparent effects: mobile phones reduced grain producer price disparities in Nigeria and better roads in rural Ethiopia raised incomes by lowering costs of accessing fertilizer. Following from this relationship, infrastructure is also a determinant of income inequality. A study of 100 countries between 1960-1995 revealed that growth in infrastructure stock and improved service quality was associated with a three percent reduction in the standard measure of income inequality.

b. Infrastructure gap

Although infrastructure needs vary by country, the estimated gap in the developing world represents significant challenges. The most recent estimate for Africa peg infrastructure needs at $93 billion per year, or 15% of the continent’s annual GDP –more than double the current rate of investment. Just under half of the need is in the electricity sector, followed by water and sanitation, although with the exception of information and communication technology (ICT), Africa lags all other regions in the developing world even after adjusting for income. The Middle East and North Africa region will need to invest $106 billion annually (close to 7% of GDP), mainly in transportation and electricity. Meeting the infrastructure gap in Latin America and the Caribbean would require countries in the region to boost investment as a share of GDP from the current rate of 2% to 5.2%. After major investments in telecommunications two decades ago, the region lags in transportation and water infrastructure.

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12 Vivien Foster & Cecilia Briceno-Garmendia, eds, *Africa’s Infrastructure: A Time for Transformation* (Washington: The World Bank/Agence Francais de Developpement, 2010), Table 1.2 at 47.


14 “Needs” in this section refer to aggregate estimates based largely on demand factors (e.g., population, economic growth), rather than an accounting for specific projects or policy objectives such as meeting Millennium Development Goals. Term includes new construction and asset maintenance costs. All dollars $USD.

15 Foster and Briceno-Garmendia, *supra* at 58, 65.

16 Ibid.


20 Calderón and Servén, *supra* at 12.
represent the bulk of infrastructure needs in Asia, which total over $825 billion annually.\textsuperscript{21} China is driving over half of the infrastructure need while one-quarter of the need is in India.\textsuperscript{22} Across the developing world, electricity and transport make up over 80% of the infrastructure needs.\textsuperscript{23}

### III. OPTIONS FOR NEW INFRASTRUCTURE

#### a. Origins of traditional procurement

Early infrastructure was mixed between public and private provision;\textsuperscript{24} the early nineteenth century US turnpike system, for instance, was largely privately built and funded through user fees.\textsuperscript{25} That shifted dramatically beginning in the late 1800s through to the New Deal and Second World War, where skepticism about the ability of the private sector to deliver large-scale infrastructure projects, perceptions of fairness,\textsuperscript{26} and the strategic role of certain assets in the economy (e.g., electricity) affirmed public ownership and service delivery.\textsuperscript{27} Public provision is also explained by infrastructure’s unique characteristics. Large sunk capital costs, economies of scale, and network features limit the potential for competition, creating natural monopoly conditions.\textsuperscript{28} Infrastructure is also generally considered to be an imperfect private good in that it may not be entirely excludable or rival.\textsuperscript{29} That is not to say that the private sector was eliminated from the picture; under the traditional procurement model, the state contracts with the private

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\textsuperscript{24} World Bank (1994) at 22.


\textsuperscript{28} World Bank (1994), supra at 22-23.

\textsuperscript{29} Ibid at 23.
sector to build (and often design) the asset, which is ultimately owned and operated by the state.

b. Paying for infrastructure

In the developing world, investment in infrastructure by SOEs is funded through user fees, tax subsidies, and foreign aid. Foreign aid is the most variable, but can be a significant source of funding. For example, one-third of Africa’s existing infrastructure commitment is funded by foreign aid, and although it represents less than 1% of infrastructure investment in richer countries such as China and Thailand, foreign aid accounts for 13% and 54% of infrastructure investment in Vietnam and Cambodia, respectively. Total assistance to developing countries represents between 5-10 percent of infrastructure funding.

Tax subsidies for infrastructure are significant. Water utilities in Manila and Ho Chi Minh City, for example, do not recover operating expenses through user fees, let alone capital costs; two-thirds of African water and electricity utilities meet operating expenses but only one-fifth cover capital costs. While these examples are not necessarily out-of-step with the developed world experience – direct taxes and tax subsidies account for over 40% of the New York transit system budget – they pose fundamental problems in the developing world. The simplest explanation for tax subsidization in the developing world context – that they are necessary because people are poor – is unsatisfactory in light of a general consensus in the literature that tax subsidies are not actually targeted towards the poor. A study of the Honduras electricity market concluded that 80% of tax subsidies went to households that were not poor. Auriol and Blanc find that rather than charging high user fees to the wealthier market segment to fund service expansion to the poor and middle classes, Sub-Saharan African countries...

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30 Vivien Foster & Cecilia Briceño-Garmendia, supra at 65.
31 ADB 2005 at 40.
32 Noumba-Um, supra at 461.
34 World Bank and AFD, 2010 at 70.
36 World Bank (2005) at 125.
water and electricity utilities price those market segments below costs. Tax subsidies are therefore more problematic than simply concerns over potentially lost revenue, as the poor end up having to buy water in the informal market at ten times the price per unit of piped water paid by those with higher incomes. However, while market determined pricing strategies are more likely to achieve higher levels of cost recovery, the discussion below finds that access concerns are no means specific to state owned enterprises (SOEs).

c. Shifted focus towards alternative modes of infrastructure delivery

Although traditional procurement remains the most common model today, concern about the efficiency and performance of SOEs that have historically delivered infrastructure – coupled with a political shift in the 1980s towards privatization – has led to greater consideration of alternative forms of infrastructure delivery, financing, and ownership. A review by Trebilcock and Prado finds that SOEs, particularly those in developing countries, have often had the effect of redirecting funds away from more productive or welfare-enhancing uses. They note that poor SOE performance has imposed costs of between 5-12 percent of GDP. One examination of SOEs in Africa, for example, estimated the cost of inefficiencies such as overemployment, bill collection, system losses, and maintenance practices at $12 billion annually, resources that might otherwise target the infrastructure gap.

The fact that the infrastructure need is staggering is another reason that countries in the developed and developing world are looking to other models. Forgoing infrastructure comes at a cost of lost economic output. Calderón and Servén, for example, estimated that closing Latin America’s infrastructure gap could boost GDP growth by 2% annually, and as much as 3.1% in lower income countries in the region. That analysis, however,

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38 ibid.
39 David Parker and Catarina Figuerira, “PPPs in developed and developing economies: what lessons can be learned?”, in Hodge et al, eds, supra, at 527.
41 World Bank and AFD, 2010 at 74.
IV. PUBLIC PRIVATE PARTNERSHIPS (PPPS)

a. Definition

The fact that the private sector participates in some way in almost all public infrastructure projects has led to a “confusing lack of a common terminology” among business, academia, and government. Private participation in infrastructure can be viewed as a continuum ranging from traditional procurement (described above) to full privatization, where the private sector owns and operates the asset. Over 25 terms have been used to describe the models contained within this spectrum, some of which have been used so varyingly that they have lost the precision they may have once carried. For example, Delmon notes that the term “concession” has been used to describe significantly different arrangements, including operations and maintenance (O&M) contracts in France, build-operate in Russia, and full privatization in Chile.

Consistent with the OECD’s approach, this discussion defines PPPs as a model in which the private sector builds new or refurbishes and expands existing infrastructure, provides

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44 ibid at 79.
46 ibid at 14.
47 ibid at 8.
48 ibid at 9.
project financing, manages the asset and operates the service.\textsuperscript{49} In other words, the arrangement must involve “bundling” – or vertical integration – which is seen as the most “distinctive feature” of the PPP model.\textsuperscript{50} This often takes the form of a consortium that bring together project managers, construction companies, and financiers. PPPs recover costs through user fees, government payments, or both. Whether the asset reverts to the public sector at the end of the contract depends on the contract. Included in the PPP definition, for the purposes of this discussion, are concessions. While concessions technically differ in that they are seen to absorb more demand-side risk and often involve a payment to government for the contract, both models involve “bundling” and the literature does not differentiate between the two.\textsuperscript{51} However, full privatization is not considered here for three reasons. First, privatization involves a substantially different relationship between public sector and private provider. The public sector is a “disengaged” regulator under full privatization, but active contract participant under PPP.\textsuperscript{52} Second, the models carry distinct social and political ramifications. And third, a government’s purpose in proceeding with full privatization is not necessarily related to building or expanding infrastructure.

\textbf{b. Perceived advantages of PPPs}

In addition to overcoming poor SOE performance, PPPs are promoted on several grounds. The bundling aspect of PPPs incentivize the builder-operator to incorporate long-term operating cost considerations in the design and construction phases.\textsuperscript{53} Similarly, the private sector operator has incentives to mitigate cost overruns and “appraisal optimism” that has plagued traditional procurement.\textsuperscript{54} In other words, risks are better allocated between private and public sectors and costs are subjected to

\begin{itemize}
\item \textsuperscript{50} Ronald J Daniels & Michael J Trebilcock, “Private Provision of Public Infrastructure: An Organizational Analysis of the Next Privatization Frontier” (1996) 46 University of Toronto Law Journal 375 at 390.
\item \textsuperscript{51} OECD (2008), \textit{supra} at 23-23.
\item \textsuperscript{52} Grimsy and Lewis, \textit{supra} at 55.
\item \textsuperscript{54} Grimsy and Lewis, \textit{supra} at 72. The UK Treasury Department stated that 70% of traditionally procured projects were delayed.
\end{itemize}
market discipline.\textsuperscript{55} PPPs introduce a technical and managerial capacity to undertake a major capital redevelopment or expansion. The “ring-fencing” of PPPs is also beneficial as the revenues raised by the operation can be reinvested in expanded access or service improvements, rather than being redirected away from infrastructure.\textsuperscript{56}

As efficiency gains may require higher user fees, the shift to PPPs can represent a type of outsourcing of political risks.\textsuperscript{57} Raising user fees may be politically difficult, especially when infrastructure (like water pipes) are hidden from view.

Historically, PPPs have been viewed by some governments as a means of shifting spending off balance sheet or circumventing legislated budgetary limits.\textsuperscript{58} Clearly this is problematic as masking government liabilities does not reduce them,\textsuperscript{59} nor is it transparent.

c. The PPP choice

Much of the theoretical development underlying PPPs is in the context of bundling choices, particularly in the context of incomplete contracts. In Hart’s model, for example, bundling leads the firm to internalize the costs of operating the facility.\textsuperscript{60} But because the firm cannot be perfectly monitored, the firm can also choose to cut costs and lower service quality without resulting in liability. Traditional procurement, on the other hand, leads to higher future operating costs but no “corner cutting”. Hart finds that the PPP decision turns on the degree to which service quality can be specified in the contract (in which case bundling would be chosen) relative to physical infrastructure (traditional procurement). While Hart does not explain the relative difference required to make the

\textsuperscript{55} OECD (2008), \textit{supra} at 21.
\textsuperscript{56} Delmon, \textit{supra} at 15.
\textsuperscript{57} Daniels and Trebilcock, \textit{supra} at 410.
\textsuperscript{58} OECD (2008), \textit{supra} at 44.
\textsuperscript{59} Delmon (2009), \textit{supra} at 50.
decision, he predicted that prisons and schools are more suitable for traditional procurement, while hospitals’ operational risk warrants bundling.61

Daniels and Trebilcock amplify the incomplete contracts perspective in a case study of three major Canadian PPPs. The authors examined incentive effects associated with the bundling choice and concluded that the benefits of the bundling feature of PPPs may be overstated given the institutional incentives for a “de facto unbundling”.62 For example, the authors note that concerns about the loss of the operator’s technical capacity or reputational damage may not be sufficient to prevent governments from exercising ex post opportunism available through their legislative capacity to debase the value of the operator’s investment. This possibility would result in a higher risk premium embedded in the contract price, lead project managers to shrink the payback period to limit risk, or require government financial guarantees. These options involve a cost and the latter option partially unbundles the project.

d. PPP challenges in an unconstrained institutional setting

PPPs are more complex than traditional procurement, involving significantly more complex contractual terms and a different relationship between government and operator.63 The government must specify the firm’s obligations, which may range from simple criteria like output (e.g., build a bridge) to relatively more involved performance criteria (e.g., airport).64 This may be complicated further when infrastructure requires revenue forecasting, like a toll road. Contractual provisions must be clear enough to specify enforceable outcomes and to efficiently allocate risks, but sufficiently flexible to

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61 Interestingly, a survey of PPP equity providers in the UK suggested Hart’s prediction may be only partly valid. One financier stating that schools and roads represented the largest construction risk, but prisons (and defence) posed the most significant operational risk (i.e., “letting prisoners out accidentally”): Istemi Demirag, Iqbal Khadaroo, Pamela Stapleton, Caral Stevenson, “Risks and the financing of PPP: Perspectives from the financiers” (2011) 43 British Accounting Review 294 at 303.

62 Daniels and Trebilcock, supra at 422.


64 Daniels and Trebilcock, supra at 395.
allow private sector innovation and encourage goodwill between the parties.\textsuperscript{65} At the bid evaluation stage, the government must be able to discern viable and non-viable bids, rather than simply choose the best price. This is typically a long, involved and costly process. In the UK, where the PPP process has undergone refinement and standardization for years, transaction costs amount to 2.6\% of capital costs and negotiations take an average of three years to complete.\textsuperscript{66} After evaluating the bids and negotiating a contract, the government’s role turns to monitoring and enforcement. This process also involves responding to economic shocks or unanticipated demand side shortfalls.

V. PPP EXPERIENCE IN THE DEVELOPING WORLD

a. Patterns of PPP Activity

Across the developing world, private participation in infrastructure (i.e., beyond design-build) accounts for less than 20\% of infrastructure investment and thus remains a relatively small share of the total investment.\textsuperscript{67} That said, previous declarations\textsuperscript{68} following a decline in PPP projects in the late 1990s and early 2000s that the model may be on the wane were greatly exaggerated. Recent data shows that total investment committed through PPPs in the developing world reached $145 billion in 2011, a slight decrease from the year before, but double the level in 2004 in real terms (Fig. 1, Appendix).\textsuperscript{69} Two-thirds of the PPPs are in the electricity and transportation sectors (Fig. 2). Of the projects that involve private participation in infrastructure, over 80\% are PPPs, the remainder involving divestiture and management and lease contracts.

The most revealing data relates to regional and income group variations. PPP growth in the early-1990s was driven by Latin America. The region shifted away from PPPs in the

\textsuperscript{66} Delmon, \textit{supra}, at 9.
\textsuperscript{67} Noumba-Um, \textit{supra} at 461.
\textsuperscript{69} All calculations responsibility of author. PPP includes greenfield projects and concessions. All currency in 2011 USD, adjusted by US CPI. Data obtained from “Private Participation in Infrastructure Projects Database”, World Bank <http://ppi.worldbank.org>
middle of the decade and activity has remained flat ever since. This trend is attributed to several factors, including the Argentinian currency crisis and a series of project failures, an issue explored below.\(^70\) However, beginning in the early 2000s PPP investment in South Asia and East Asia and the Pacific reversed what would have otherwise been a decline in the number of projects (Fig. 3). Last year, over 70% of PPPs were in the energy sector. Examples include a $2.5 billion build-own-operate (BOO) electricity generation project in Latipur district, India\(^71\) and a $1.2 billion natural gas plant (BOO) north of Bangkok, Thailand.

Over the past two decades, the majority of PPP projects have taken place in developing countries with relatively higher incomes (Fig. 4). Just under 60% of total projects were undertaken in “upper middle” income countries ($4,036-$12,475 per capita; e.g., China, Chile, Botswana) and 37% in “lower middle” income countries ($1,026-$4,035 per capita; e.g., Morocco, Nigeria, India). Only 4% of projects took place in “low income” developing countries (less than $1,025 per capita; e.g., Bangladesh, Cambodia, Kenya).

This pattern suggests that countries that may need basic infrastructure the most are less likely to engage in PPPs. Of the low-income group, 23 of the 36 countries are located in Sub-Saharan Africa, a continent that lags in infrastructure development. The PPP bias towards relatively richer developing countries has been confirmed in number of studies. A statistical analysis by the IMF found that after adjusting for population, PPP concentration was more likely in larger markets with greater consumer demand and macroeconomic stability.\(^72\) A ranking of countries by their PPP environments explains the attraction towards wealthier developing countries as a function of their established legal, regulatory and institutional frameworks at the national and sub-national level, project experience, and investment and financing climate. The latter criteria look favourably at factors like government financial support for expanding low-income access

\(^{70}\) Andrés et al, *supra* at 31.
\(^{71}\) PPP data update note 84 (Sep 2012), World Bank <http://ppi.worldbank.org>
and the credibility of governments’ financial guarantees. From investors’ perspectives, Chile ranks highest in Latin America for PPP suitability, largely due to administrative expertise and experience, political stability, and strong domestic lending capacity.

Gujurat State, India, has surpassed Japan in terms of PPP favourability, a result of a strong sub-national PPP legal framework that sets out clear project selection criteria and is backed by the expertise of an investment board and dispute mechanisms. Although no similar ranking system is available for Africa – making the comparison difficult – countries in the low-income group that are examined are ranked far lower. Bangladesh, for instance, received low scores for bid transparency concerns, a lack of judicial process for resolving disputes, limited expertise and experience, and financing deficiencies.

Interestingly, recent evidence may pose a challenge to the market’s apparent dismissal of lower income segments. Devoto et al conducted a “nudge”-type experiment with a private water utility in Morocco where they went door-to-door to inform and encourage low-income families in urban Tangiers without a piped water connection to pay for a connection through an interest-free loan. Nearly 70% of those households took up the program, compared to 10% of households that did not experience active encouragement (i.e., control group). They concluded that “households have a relatively large willingness to pay for the convenience of a water connection at home.”

There is also evidence of bubble-led growth in PPP projects, where private capital is chasing “hot” markets. After $225 billion of private capital was poured into India’s infrastructure, there are recent signs of a slowdown driven in part due to losses from unexpected costs, poorly constructed infrastructure and overleveraged investment. A

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74 “Evaluating the environment for public-private partnerships in Latin America and the Caribbean: The 2012 Infrascope”. The Economist Intelligence Unit, 2012 at 22.
75 Asia-Pacific Infrascope, supra at 20-21.
76 Florencia Devoto, Esther Dufló, Pascaline Dupas, William Parienté, and Vincent Pons, Happiness on Tap: Piped Water Adoption in Urban Morocco” (2012) 4(4) American Economic Journal: Economic Policy 68 at 69-70. Loans were 3, 5, or 7 years and repayment was set at $15 per month.
77 ibid at 71.
similar phenomenon may be found in Latin America’s experience with PPPs in the early 1990s, where investor bullishness in the region was associated with projects being undertaken that were not viable from the outset.79

b. PPPs and total infrastructure investment

No concrete connection between PPPs and total infrastructure investment has been established. The shift to PPPs in Latin America, for example, was accompanied by fiscal austerity, resulting in lower total infrastructure investment.80 In this context PPPs simply offset state-led investment. However, data on the impact of PPPs on total infrastructure in other regions is not available and it is difficult to reach firm conclusions. However, a shift towards PPPs is not a sufficient condition for greater overall infrastructure investment.

c. Evaluating PPP performance

Much of the literature on PPP performance is based on the Latin American experience, largely because the region was the first to put private models to the test, data are available, and the World Bank – which also funds research in this context – played a central role driving the early shift to PPPs in the region.

Andrés et al assessed 181 infrastructure PPPs in the Latin American energy, telecommunications, and water sectors before and after the shift to PPPs. Importantly, their study modeled the counterfactual to determine how the PPP fared relative to continued operations by the public sector operator.81 Service quality rose across all three sectors, measured by frequency and length of service interruptions (energy), quality of telephone calls (telecommunications), and potability and service interruptions (water).82 Overall in the energy sector, the authors found that the average PPP performed better

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80 Andrés et al, supra at 13.
81 ibid at 57.
82 ibid at 90-184.
than the expected public sector operator, although the best public sector operator exceeded the average PPP operator.\textsuperscript{83}

Marin conducted a qualitative review of 65 international water PPPs and concluded that the shift to PPPs improved operational efficiency in terms of water losses, more reliable water service, and billing practices.\textsuperscript{84}

The two studies also found that PPPs led to increases in employment productivity through substantial reductions in employment. In the energy sector studied by Andrés et al, for example, a staggering one quarter of the workforce was reduced (again, relative to the counterfactual) in the transition period followed by an 18\% drop.\textsuperscript{85} However, in some cases firm sub-contracting offset part of the employment reduction.\textsuperscript{86} Marin echoed this finding. Employment in water PPPs in Latin America was reduced by between one-quarter and two-thirds at the beginning of the contract and similar outcomes were experienced outside the continent. The ratio of employees per thousand of customers (i.e., the labour productivity ratio) in the water PPP in Casablanca, Morocco, for example, were more than halved over a fifteen year period.\textsuperscript{87}

Examining the effect of PPPs on user fees is challenging because SOE underpricing is prevalent. The counterfactual is difficult to estimate. User fees in PPPs Sub-Saharan African water utilities fell in real terms in four countries and rose in another.\textsuperscript{88} The Andrés et al study that employed a counterfactual analysis found that prices rose in the energy and water sectors, but were mixed in the telecommunications sector.\textsuperscript{89}

\begin{footnotesize}
\begin{enumerate}
\item ibid at 186.
\item ibid at 116.
\item Andrés et al, supra at 90-184.
\item ibid at 44
\item Marin, supra at 96-97.
\item ibid at 110.
\item ibid at 110.
\item Andrés et al, supra at 90-184.
\end{enumerate}
\end{footnotesize}
d. Impact on PPPs on network access/coverage

The striking finding in terms of the impact of PPPs is the limited impact on improving access. The study of Latin American PPPs revealed no statistically significant deviations in either changes in electricity connections, total energy sales, or coverage from the counterfactual; The water sector experienced little to no change in the number of connections or coverage. While the telecommunications sector did see a boost in the number of connections, minutes and coverage, the relative effect only lasted through the transition period.90

Marin found that PPPs in the water sector expanded coverage by 24 million people, although network expansion was less than the original commitment. Further, while acknowledging data constraints, he found no evidence that service expansion was more effectively delivered by the private sector.91

Marin’s analysis indicated that state involvement was a determining feature of expanding access to water infrastructure. A successful PPP in Guayaquil, Ecuador provided free water connections to low-income residents, funded by a state tax on telephone bills.92 Similarly, Columbia’s water PPP model relied on municipal funding for service expansion.93

In many respects, these findings are consistent with the aggregate data pointing to a PPP preference towards richer developing countries. Just as higher income developing countries are seen by PPP operators as more favourable areas in which to invest, so too are higher income customers. The very poor, meanwhile, see relatively few benefits from a PPP and continue to rely on the relatively expensive informal sector.94 This suggests that the state must play a role in expanding access by specifying access improvements in contract terms or directly subsidizing access, or the private sector should learn from

90 Ibid.
91 Marin, supra at 64-65
92 ibid at 50.
93 ibid at 53-54.
94 Estache, supra at 3.
findings by scholars like Devoto et al and realize that low income consumers may represent untapped potential.

e. Contract cancellations
Data shows that over the past 20 years, 5% of PPPs have been cancelled. The figure is sensitive to sector and region. Marin’s survey of water PPPs revealed that between 1991-2007, about 10% of projects were terminated and another 10% reverted to the public sector after the contract expired, although not necessarily because of bad experiences.95 While there have been several high profile terminations, disputes between parties are, evidently, more likely to involve renegotiations.

f. Renegotiations
Gausch examined 670 PPPs (concessions) in Latin America and the Caribbean between 1985-2000 and found strikingly high rates of renegotiation, defined as a significant modification to the contract.96 Excluding telecommunications, which was largely privatized and beyond of our focus, 42% of projects were renegotiated. Nearly two-thirds of the renegotiations were operator-led, one-quarter government-led, and the remainder driven by both parties. This is particularly interesting in light of the concern expressed by Daniels and Trebilcock about potential ex post government opportunism through expropriation, taxation or regulation.

Renegotiations varied by sector, with 75% of water contracts renegotiated, followed by transportation (55%) and electricity (10%). On average, renegotiations took place just over two years after the contract was completed – either during the construction period or shortly thereafter.97 The renegotiation process took between 3-12 months to complete.98

95 Marin, supra at 118-119.
96 Gausch, supra at 80-81.
97 ibid at 35, 81, 83. About 85% of the renegotiations were made with four years.
98 ibid at 83.
The outcomes of renegotiation were more likely to favour the operator. In 60-70 percent of cases the operator was either able to delay or reduce investment obligations, while the operator extracted higher user fees or provisions that automatically triggered user fee increases in about 60% of modifications. Nearly 40% of renegotiations extended the concession period and about one-third resulted in a lower transfer made to the government. That said, the benefits of contract modifications did not exclusively flow to operators – lower user fees were extracted in about 20% of renegotiations.\textsuperscript{99} Unfortunately, the total value of the modifications relative to the contract value was not estimated, presumably because of data constraints.

The underlying triggers of renegotiations fall under four non-discrete (and overlapping) categories: overly aggressive bids by operators that were unlikely to be viable from the start, simple opportunism, lower than expected demand, and economic shocks. Several examples follow.

The winning bidder of an airport PPP in Lima, Peru promised to return nearly half of the projected revenue to the government in addition to making a significant infrastructure investment. Not long after winning the bid, the operator triggered a renegotiation, indicating it would not be able to deliver on the return while maintaining the infrastructure investment. The result was reduced investment obligations and government proceeds.\textsuperscript{100}

In 1993, the government entered into a 30-year PPP contract for water services in Buenos Aires, Argentina. The operator promised a 27% reduction in rates. Renegotiations took place in 1994 and 1997, where the operator secured an unscheduled 13% and 19% increase in user fees, respectively.\textsuperscript{101} The second renegotiation may have provided some benefit to government in the form of a shorter investment horizon.\textsuperscript{102} Between the pre-PPP period and 2002, rates rose 88%. Further, despite showing early promise, the

\textsuperscript{99} ibid at 18.
\textsuperscript{100} Gausch, supra at 47.
\textsuperscript{101} Marin, supra at 113.
\textsuperscript{102} Gausch, supra at 54.
operator failed to meet coverage targets. Gausch notes that the contract did not clearly specify how performance would be evaluated or the consequences of underperformance. The project was ultimately cancelled.

Government-led renegotiation overwhelmingly (80%) involved a newly elected administration seeking to extract modifications from the private operator. For example, the new mayor of Limeira, Brazil refused to allow previously contracted inflation-based increases in water rates, calling the previously negotiated agreement unfair. The courts were unwilling to enforce the provisions.

Finally, the underlying triggers of renegotiations are exacerbated by macroeconomic economic shocks. The Latin American and Asian financial crises of the 1990s and early 2000s added insecurity to already jeopardized projects in Indonesia and Argentina, and Mexico.

Contract modifications are by no means unique in the infrastructure sector, nor are they necessarily out of the ordinary among PPP projects generally. However, data are limited. An early report on the UKI experience noted that 22% of projects involved renegotiations, but the modifications were driven by public sector changes to contract scope. Engel et al (2011) found that six of 21 transportation PPPs in the United States between 1991-2010 were significantly renegotiated, with two additional projects facing potential renegotiations at the time the report was written. These renegotiations exclusively favoured the operator but on average took place over a longer time horizon –

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103 Marin, supra at 47, 113.
104 Gausch, supra at 53-54.
106 Gausch, supra at 60-61.
107 Gausch, supra at 52, 65, 68.
108 See e.g. “Construction Contract Modifications: Comparing the Experience of Federal Agencies with Other Owners” (Committee on Construction Change Orders, Building Research Board, National Research Council, Washington, 1986) at 31, which found that in value terms, annual contract modifications in public and private hospitals were in the 4-5 percent range.
seven years. Given the shorter time frame in which the Latin American renegotiations took place and the greater proportion of contracts that were renegotiated (i.e., 55% of Latin American transportation projects compared to 28-38% in the US), the experience points to underlying problems not explained by the nature of infrastructure or PPPs.

Fully satisfactory explanations for the high incidence of renegotiations are limited, and solutions vary. The incomplete contracting framework, which some authors have pointed to,\textsuperscript{111} does not seem to offer an adequate explanation because the contracts were renegotiated before construction was even complete.\textsuperscript{112} In other words, efforts to renegotiate the contract do not necessarily stem from an inability to specify contractual terms or long-term contingencies.

Reviewing the PPP experience in Chile, Engel et al (2009) found that administrations used renegotiations as a tool to subvert legislated spending limits. Operators made aggressive low bids, triggered renegotiations and extracted benefits from the process, but two-thirds of the costs associated with the contract modification were deferred towards future administrations or users. Through the renegotiation process, government administrations were able to secure more public works in the present. This led the authors to propose an accounting solution. However, as Chile represented 9% of the PPPs\textsuperscript{113} and there was little evidence in the findings by Gausch to support that conclusion for other countries, the authors’ analysis does not appear to explain the other renegotiations.

Andrés et al blamed poorly designed contracts that led to conflict between the government and operator from the start, and called for, \textit{inter alia}, “better contracts”.\textsuperscript{114} The authors recommended clauses that commit the parties from renegotiations within the first five years backed by financial penalties. But evidence suggests that strongly worded contracts are not sufficient to prevent problematic incidents of renegotiation. Engel et al

\textsuperscript{111} See e.g. Gausch, \textit{supra} at 71.
\textsuperscript{113} Gausch, supra at 82.
\textsuperscript{114} Andrés et al, \textit{supra} at 234.
(2009) showed that provisions written into PPP contracts capping the total value of contract modifications did not prevent contract modifications from exceeding the caps.\textsuperscript{115} As several authors have acknowledged,\textsuperscript{116} well-written contracts cannot overcome institutional weaknesses.

The PPP process is complex and tests institutional capacity at every stage. For example, rejecting overly-aggressive bids tests government credibility that it is acting prudently and not corruptly.\textsuperscript{117} Contract design requires the internal expertise to predict and allocate risks, and specify objective performance criteria that will not trigger disputes in the future. Monitoring requires professional capacity to ensure compliance and impose penalties while gaining the confidence of the operator that actions are independent and objective.\textsuperscript{118}

Gausch shows a strong negative correlation between the incidence of renegotiation and institutional capacity. A legal framework for regulation of the PPP, rather than simply contract-based regulation, reduced the probability of renegotiation.\textsuperscript{119} The existence of a regulatory body was also negatively correlated with renegotiations. Rate of return regulation – as opposed to cost-plus regulation – was also an attribute of contracts that were not renegotiated,\textsuperscript{120} likely because the latter method involves more government appraisal of performance and thus introduces more conflicts between the parties.

There is some indication that many countries in Latin America have responded to this PPP experience by improving their institutional capacities. The Economist Intelligence Unit notes that governments have taken steps such as introducing a legislative and regulatory framework that requires a value-for-money assessment (Mexico, Uruguay, Honduras), enshrines creditor rights (Mexico), mandates bid transparency and objective award criteria (Guatemala, Honduras, Columbia), expressly

\textsuperscript{115} Engel et al, \textit{supra} at 20.
\textsuperscript{116} Gausch, \textit{supra} at 142.
\textsuperscript{117} \textit{ibid} at 39.
\textsuperscript{118} \textit{ibid} at 135.
\textsuperscript{119} Guasch, \textit{supra} at 91.
\textsuperscript{120} \textit{ibid}.
limits or specifies objective criteria for renegotiations (Columbia, Chile), and sets accounting standards (Columbia). Other countries have created PPP units within their ministries of finance to boost the government’s capacity to evaluate bids and monitor contracts (Jamaica, El Salvador).

Legislation and PPP units have also sought to target weak institutional capacities of sub-national governments. Sub-national governments in Latin America are often responsible for water services, another factor in explaining the relatively high incidence of renegotiation in the water sector.

g. Renegotiations and contract theory

PPP contracts involve large investments in durable, transaction specific assets of the kind Williamson describes as raising a bilaterally dependent contractual relationship between the parties. The firm would be concerned that the government may use threats of expropriation or changes in tax or regulatory policies to obtain better *ex post* terms. On the other hand, the government is dependent on the firm’s technical knowledge required to operate the asset, the political ramifications of contract failure and the reputational damages in terms of government’s ability to attract foreign direct investment in the future, and the costs associated with tendering and negotiating another PPP.

Demsetz argued that *ex ante* competition for an infrastructure contract would eliminate the inefficiencies inherent in natural monopolies. However, Williamson noted that bilateral monopoly conditions have the potential to reduce the welfare gains achieved through *ex ante* “competition for the market” when the contract expires and is retendered or when circumstances resulting from unforeseen market conditions or technological change require renegotiation. The firm is able to extract advantages against

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121 Infrascope Latin America, *supra* at 20-33.
122 See e.g. *ibid* at 29; Richard Cabello, “Challenges for Sub-national Governments to Implement PPPs: the Brazilian experience”, International Finance Corporation, Presentation to PPP Conference (Nov 14-15, 2011) at 3.
competitors through asset specific investments, specialized human capital, and informational advantages.

As the Latin American renegotiations occurred early in the contract period, bilateral dependency conditions did not arise at the renewal juncture. This said, the length of PPP contracts (upwards of 30 years) may increase dependence and raise concerns when the contracts come up for renewal. Unexpected contingencies appear to capture some, but not all, of the circumstances under which the PPP renegotiations discussed above take place. Poor contract design combined with lower than anticipated demand and a financial crisis forced Mexico to renegotiate 52 toll road PPPs in 1997, ultimately costing the state upwards of $12 billion.\textsuperscript{126} But renegotiations involving apparently brazen opportunism such as the overly-aggressive airport bid in Lima, Peru did not result from unexpected events.

Underlying Williamson’s analysis is the assumption that parties are boundedly rational and opportunistic. The latter assumption, the author explains, means that “promises to behave responsibly that are unsupported by credible commitments will not, therefore, be reliably discharged.”\textsuperscript{127} This frames a firm’s opportunism in making an aggressively low \textit{ex ante} bid as a rational response to its expectation that the government is not able to make a credible commitment to refuse \textit{ex post} negotiation. The question then turns to the factors that make the government’s commitment credible. In part, credible commitments are a function of the transaction costs associated with contract cancellation. A second intertwined factor, however, may be institutional weaknesses, which constrain the government’s ability to effectively assert contract breach and enforce available remedies –especially when the contract is poorly specified or ambiguous. Institutional weaknesses may help to explain why the developing world PPP experience in particular has been plagued by opportunistic renegotiations early in the contract period.

\textsuperscript{126} Guasch, \textit{supra} at 52.
\textsuperscript{127} Williamson (1988), \textit{supra} at 68.
Renegotiations are problematic because they are not subject to the market disciplining effect of the bidding process, are subject to inefficiencies resulting from bilateral dependency, not to mention the transparency concerns of bilateral negotiations. Under “normal” bilateral dependency conditions, the firm’s attempts to “hold up” the government by threatening to withdraw service in exchange for higher rents (effectively attempting to capture the government’s transaction costs that would be incurred by government in choosing a different operator) is counterposed against the government’s threat to use legislative authority to expropriate, tax, or regulate the asset. But in the Latin American context, renegotiations took place before the asset was constructed, raising two (non-exclusive) possibilities. The first is that the government’s “counter threat” is not available to it when the firm triggered renegotiation, reducing their bargaining power. The second is that because the asset was not functional and may involve less technical expertise, the transaction costs of cancellation might be lower. In the airport example, the government’s decision to renegotiate suggests the transaction costs associated with cancelling and retendering the contract was greater than the expected outcome from the renegotiation process.128 This framework may in part explain Gausch’s findings that operators were more likely to benefit from the early renegotiation. Interestingly, Gausch found that contract renegotiations were less likely to take place in the energy sector because it was a more competitive infrastructure market,129 suggesting lower transaction costs for government in finding an alternative supplier.

Renegotiations, however, do not necessarily result in welfare losses. Aivazian et al argued that in contracts involving exogenous economic shocks or the emergence of new information, allowing contract modifications may result in inefficient outcomes because they encourage opportunism and reallocation of initially efficiently allocated risks. However, given unforeseen circumstances, contract modifications may also be efficiency enhancing because they may allow parties to reduce the transaction costs of contract enforcement or court-ordered restructuring.130 This implies that while the Latin American

128 This assumes the government was a rational actor (i.e., without the influence of corruption).
129 Gausch et al, supra at 81.
renegotiations resulting from simple opportunism are not efficiency enhancing but driven by economic shocks might be.

de Brux also focuses on efficient renegotiations in her examination of a Cambodian airport PPP. Rather than cancelling the project in the wake of a regional military conflict and Asian economic crisis, the French proponent and Cambodian government renegotiated the contract. The author claimed that the French firm (and other French interests) was expecting future business transactions and was concerned with reputational damage. This type of trading is also an example of Williamson’s (1983) argument that given incomplete contracts and asset specificity, parties use “hostages” to support trading relationships.

VI. LESSONS LEARNED

a. Performance and efficiency gains
The literature points to efficiency gains across sectors corresponding with the shift from SOE-run provision to PPP provision, both in terms of service quality and labour productivity. The effect of PPPs on infrastructure-sector employment is consistent with the evidence on overstaffed and poorly performing SOEs, as well as the introduction of better technologies. However, the fact that employment reductions trigger public concerns potentially fatal to PPPs has led several researchers to call for transition programs.

b. Mixed results in terms of increased access to infrastructure
PPPs have tended to be concentrated in relatively more prosperous developing countries, likely the result of a combination of institutional weaknesses and a perception of low levels of demand (willingness to pay) for infrastructure services in poorer developing

133 See e.g. Marin, supra, at 137-138; Gausch, supra at 49.
countries. Similarly, within developing countries PPPs have exhibited mixed results in terms of expanding access. Research suggests that while the number of people served grew in absolute terms, there is little difference when compared to a counterfactual public utility. That PPPs have not expanded access is not necessarily inconsistent with theory. Nevertheless, it raises several concerns. Expanding access to low-income market segments is a basic social policy goal. Moreover, insufficient expansion of access, combined with the PPP’s adoption of full-cost recovery pricing (i.e., rate increases on the middle class), is a recipe for PPP failure at the political level.

The research points to two conclusions. The first is that there is a significant role for government in expanding access. The government could ensure that PPP contracts include requirements or incentives for the operator to expand access. Alternatively (or additionally), the government could also subsidize access. The second, (more tentative) conclusion – largely driven by the research of Devoto et al – is that private operators may be underestimating low-income households’ willingness to pay for infrastructure services that have major effects on their quality of life.

c. PPP design issues

Setting aside institutional constraints, PPPs present a number of critical design issues. The planning stage is necessary to properly identify and efficiently allocate risks. Revenue forecasts (such as traffic estimates for toll roads) are important element of this planning process, and necessary for attracting bids. The PPP experience has demonstrated a large number of over-optimistic revenue forecasts, a particular concern when the contract misallocates the revenue risk to the government. One toll road PPP signed in 2002 by the Dominican Republic, for example, unnecessarily guaranteed traffic levels over the course of the agreement.

The bidding stage requires the government to determine award criteria, such as highest transfer, lowest user fees, or a mix of various factors, like concession period length and

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134 Parker and Figuerira, supra at 542.
135 Guasch, supra at 55.
service quality. Gausch suggests restructuring rates before introducing the PPP and choosing the operator that promises the largest transfer (paid annually to government), which he argues has greater “lock in” strength for both parties.\textsuperscript{136} Engel \textit{et al} suggest a present value of revenue auction. The government sets the user fee schedule and discount rate, and firms bid on the present value of user fee revenues. Under this approach, the government selects the lowest bid, and the concession ends when the revenue is realized. The arrangement addresses erroneous demand estimates by automatically extending the concession period such that the firm recovers the revenue it “bid”, limiting renegotiation possibilities.\textsuperscript{137} The authors acknowledge that the model is limited in that payments are made despite effort or quality. The model works best for projects involving upfront capital investment and limited variations in infrastructure performance (e.g., toll roads). Both approaches require the government to reject aggressive bids that do not have strong technical and financial characteristics.

There is general agreement that contracts should be focused on performance outcomes, rather than particular investment levels. This approach minimizes costly disputes and gives the firm flexibility to operate.\textsuperscript{138} Practically speaking, specifying the desired performance in objectively measurable terms is difficult, as is striking the appropriate balance between ensuring that the firm meets performance obligations and maintaining the long-term partnership.

d. Institutional Constraints

Introducing institutional constraints raises additional challenges to the effectiveness of PPPs. The planning, bid evaluation and negotiation processes are prone to institutional weaknesses, one of the reasons underlying the recommendation that countries establish specialized and experienced PPP units within government administrations.\textsuperscript{139} The professional expertise of the unit helps to ensure an equal footing with the operator in

\textsuperscript{136} \textit{ibid} at 99.
\textsuperscript{137} Engel \textit{et al} (2011), \textit{supra} at 18-20.
\textsuperscript{138} Grimsey & Lewis (2004), \textit{supra} at 95.
\textsuperscript{139} OECD (2008), \textit{supra} at 108.
negotiating complex PPP arrangements. In addition, the units act as a regulator internal to government, monitoring and overseeing PPP activities of other departments. PPP units also signal to the private sector a level of project management experience,\textsuperscript{140} important in light of findings above associating PPP investment in countries with more experience with such contracts. As noted above, addressing weaknesses in administrative capacity at the sub-national levels of government is also critical, given their responsibility for certain infrastructure sectors. National governments in Brazil, Mexico, El Salvador, Columbia, and Honduras have boosted sub-national institutional capacities to develop PPPs through increased coordination between administrative bodies and/or legislative frameworks.\textsuperscript{141} Gujurat State, India has established its own expert PPP unit and has enacted a legislative framework requiring competitive bidding, transparency, and award criteria.\textsuperscript{142}

Institutional weaknesses are prevalent when contracts are disputed or attempts are made at renegotiation. The Economist Intelligence Unit notes factors such as ambiguous terms surrounding the circumstances in which dispute resolution mechanisms are triggered (the Phillipines), lack of true independence in local courts (the Phillipines), weak arbitration mechanisms (Vietnam), contracts that are not standardized (Indonesia), delays in the judicial system (Gujurat State, India) and limited judicial capacity to resolve disputes (Bangladesh).\textsuperscript{143} Countries that have introduced credible alternative dispute resolution mechanisms (Dominican Republic), fair appeals or arbitration process (Costa Rica, India), and legislated limits on renegotiations (Columbia) garnered positive reviews.\textsuperscript{144} The fact that a legislative framework for PPP contracts is associated with fewer renegotiations speaks to the importance of the mechanism.\textsuperscript{145} Bilateral Investment Treaties (BIT), which have the effect of prohibiting governments from engaging in \textit{ex post} opportunistic behaviour like expropriation, are another way raising investor

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\item \textsuperscript{140} ibid at 110.
\item \textsuperscript{141} Infrascope Latin America, supra at 21-33.
\item \textsuperscript{142} Infrascope Asia-Pacific, supra at 31.
\item \textsuperscript{143} Infrascope Asia-Pacific, \textit{supra}, 20-21, 28, 31.
\item \textsuperscript{144} Infrascope Latin America, \textit{supra} at 24.
\item \textsuperscript{145} Gausch, \textit{supra} at 91.
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confidence. However, BITs are controversial in imposing limits on political sovereignty and regulatory autonomy.\textsuperscript{146}

The monitoring and enforcement of contractual commitments requires an independent regulator free of political influence and undue discretion.\textsuperscript{147} Technical and administrative expertise is necessary to collect information, conduct benchmarking evaluations, and rate performance. In this regard, high rates of turnover of experts and government interference with the regulator, such as through the appointments process raise concerns.\textsuperscript{148}

As indicated above, the contract renewal stage introduces bilateral dependency concerns. The firm has asset-specific investments and informational advantages over competitors, raising the possibility of uncompetitive contract renewal/rebidding outcomes. Incumbency advantages are intensified when coupled with limited administrative expertise in the negotiation process, deficient transparency and tendering requirements, and corruption.

\textsuperscript{147} Gausch, \textit{supra} at 51.  
\textsuperscript{148} Infrascope Latin America, \textit{supra} at 16-17.
Appendix (Figures)