International Transport Forum

Public Private Partnerships for Transport Infrastructure

Renegotiation and Economic Outcomes

Roundtable Report

OECD

Public Private Partnerships for Transport Infrastructure

Renegotiation and Economic Outcomes

Roundtable Report

Please cite this publication as:
ITF (2017), *Public Private Partnerships for Transport Infrastructure: Renegotiation and Economic Outcomes*, ITF Roundtable Reports, OECD Publishing, Paris.
http://dx.doi.org/10.1787/9789282108130-en

ISBN 978-92-82-10812-3 (print)
ISBN 978-92-82-10813-0 (PDF)

Series: ITF Roundtable Reports
ISSN 2519-8777 (print)
ISSN 2519-8785 (online)

Photo credits: Cover © Photo courtesy of San Diego Association of Governments (SANDAG)

Corrigenda to OECD publications may be found on line at: *www.oecd.org/about/publishing/corrigenda.htm*.

The International Transport Forum

The International Transport Forum is an intergovernmental organisation with 57 member countries. It acts as a think tank for transport policy and organises the Annual Summit of transport ministers. ITF is the only global body that covers all transport modes. The ITF is politically autonomous and administratively integrated with the OECD.

The ITF works for transport policies that improve peoples' lives. Our mission is to foster a deeper understanding of the role of transport in economic growth, environmental sustainability and social inclusion and to raise the public profile of transport policy.

The ITF organises global dialogue for better transport. We act as a platform for discussion and pre-negotiation of policy issues across all transport modes. We analyse trends, share knowledge and promote exchange among transport decision-makers and civil society. The ITF's Annual Summit is the world's largest gathering of transport ministers and the leading global platform for dialogue on transport policy.

The Members of the ITF are: Albania, Armenia, Argentina, Australia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Chile, China (People's Republic of), Croatia, Czech Republic, Denmark, Estonia, Finland, France, Former Yugoslav Republic of Macedonia, Georgia, Germany, Greece, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Korea, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Mexico, Republic of Moldova, Montenegro, Morocco, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom and the United States.

International Transport Forum
2, rue André Pascal
F-75775 Paris Cedex 16
contact@itf-oecd.org
www.itf-oecd.org

ITF Roundtable Reports

ITF Roundtable Reports present the proceedings of ITF roundtable meetings, dedicated to specific topics notably on economic and regulatory aspects of transport policies in ITF member countries. Roundtable Reports contain the reviewed versions of the discussion papers presented by international experts at the meeting and a summary of discussions with the main findings of the roundtable. This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of International Transport Forum member countries. This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Acknowledgements

We would like to thank the participants of the Roundtable, on whose discussions this publication is based.

For the comments on the draft version of Chapter 1, we thank in particular Robert Poole, Jonathan Gifford, Jan-Eric Nilsson, Michael Burnett, Porter Wheeler, Patrick Harder and Lisardo Bolanos.

We thank Eduardo Bitrán, Sebastián Nieto-Parra and Juan Sebastián Robledo for permission to use their data on PPPs in Chapter 2. Authors Fischer and Galetovic gratefully acknowledge the financial support of Instituto Milenio "Sistemas Complejos de Ingeniería" and also wish to thank Amanda for her helpful research.

The research and drafting of Chapter 4 were supported in part by the International Transport Forum and the George Mason University Center for Transportation Public-Private Partnership Policy. The Center receives support from the Office of Transportation Public Private Partnerships of the Commonwealth of Virginia. Porter Wheeler provided insightful comments. Morghan Transue substantially edited the manuscript and Susan Woods provided invaluable administrative support. The authors would like to express their gratitude to the valuable comments from participants at the ITF Roundtable. This chapter represents the views of the authors, who are responsible for any errors or omissions.

The authors of Chapter 5 are grateful to Alex Jett for his support with the PPI Database, Francesca Guiso for assisting with the data analysis, and Conor Healy for sharing digitalised data on disputes. The findings, interpretations and conclusions expressed in this chapter do not necessarily reflect the views of the board of the executive directors of the World Bank, nor the governments they represent.

Table of contents

Tables

Figures

Executive summary

Background

Public Private Partnerships (PPPs) are complex financing structures involving substantial transaction costs, with the legal documentation alone often consisting of several hundred pages. Despite the care taken in preparing PPPs, renegotiation is a common occurrence and can have an impact on value for money. It is not clear, however, whether this reflects the impossibility of any contract to foresee every eventuality or is usually the result of more mundane explanations.

At this ITF Roundtable held in October 2014 in Washington, D.C. renowned experts from 12 countries reviewed the outcomes and risks most often associated with renegotiation in practice. They also examined alternatives available for addressing uncertainty and incompleteness in contracts, elements for maximizing the chances of renegotiation delivering net welfare benefits, and the economic welfare impacts where termination and bankruptcy is preferred to renegotiation.

Findings

While contracts can never cover all eventualities, they can cover a very wide range. Foreseeable risks can be allocated between the contracting parties. Unforeseen risks can be mitigated through contractual procedures for dealing with changed circumstances. One of these mechanisms is renegotiation.

When renegotiations occur, it is crucial is that the spirit of the contract is maintained. If the contracting parties are allowed to renege on promises given at contract signature, the purpose of the PPP contract is defeated. The experience of India and the state of Florida in the United States show that it is possible to avoid renegotiations in the early years after signing. The general experience in Latin America and elsewhere has been different.

Some PPPs and traditional procurement contracts can be subject to similar forms of strategic behaviour from bidders. Selection with the lowest bid as the principal criterion can lead to over-aggressive bids, unsustainable offers and, ultimately, renegotiation. The real possibility of bankruptcy, demonstrated through contract terminations, is thus essential to the market discipline and efficiencies that PPPs are expected to bring.

In some cases, renegotiation of a PPP can benefit all sides. Government-led or unsolicited proposals from existing concessionaires to extend or bundle old contracts with new ones can resolve difficult co-ordination and planning issues, for instance. Since other forms of private capital involvement exist, the governments can explore comparative advantages and weaknesses of these instruments in relation to PPPs when they seek large-scale financing of transport infrastructure from capital markets.

Policy insights

Use renegotiation of PPPs only in exceptional cases

Preventing renegotiation is as important as renegotiating it properly. Routine renegotiation of PPPs signals a weakness in contracts or tolerance toward opportunistic behaviour. Renegotiation clauses create the risk of strategic bidding which ought to be countered by a clear policy which reserves renegotiation for exceptional circumstances and establishes contract termination (and ultimately bankruptcy) as the default.

Use an independent jury to assess whether the outcome of a PPP is what parties might have been expected to negotiate had they foreseen a change that has occurred.

Selecting jury members can be challenging and the judgement of a jury may be subject may be questioning or even judicial review. However, establishing such a procedure increases transparency and the likelihood of mutual agreement on revised terms.

Consider to task an independent body with determining when renegotiation of a PPP is legitimate

A supervisory board or regulatory agency separate from the contracting authority with the power to determine, or to advise on, whether a renegotiation is in order can be a worthwhile safeguard.

Include reputation and demonstrated competence in selection criteria for a PPP

The application of the lowest bid as the principal selection criteria for contracts, PPPs can be subject to over-aggressive bids and unsustainable offers that can ultimately require renegotiation.

Compare advantages and weaknesses of PPPs versus other forms of private capital

Numerous ways of bringing private capital into an infrastructure project exist and governments would do well to explore their comparative advantages and weaknesses in relation to PPPs when they seek large-scale financing of transport infrastructure from capital markets.

Chapter 1

Overview of discussions

Dejan Makovšek and Stephen Perkins, International Transport Forum, Paris

Bjorn Hasselgren, KTH Royal Institute of Technology, Stockholm, Sweden.

Public Private Partnerships (PPPs), sometimes referred to as P3s, are complex financing structures involving substantial transaction costs, with the legal documentation alone often consisting of several hundred pages. Despite the care taken in preparing PPPs, renegotiation is a common occurrence and can have an impact on value for money. It is not clear, however, whether this reflects the impossibility of any contract to foresee every eventuality or is usually the result of more mundane explanations

This chapter provides a summary of the Roundtable discussion on Public private partnerships for transport infrastructure: Renegotiations, how to approach them and economic outcomes. *PPP renegotiations are defined and their incidence and causes are analysed. How to approach a renegotiation is discussed and the various conclusions reached are resumed.*

The use of public private partnerships (PPPs) for investment in transport infrastructure has a long history, spreading rapidly through Latin America in the 1980s and to the United Kingdom in the 1990s. There are many forms of PPP, ranging from the project finance type (e.g. Design, Build, Finance, Maintain, Operate [DBFMO] contracts) to concessions in economic regulation, with the line between partnership and outright privatisation somewhat blurred. PPPs sought to bring efficiency incentives from private sector management into network industries (power transmission, water supply, road and rail infrastructure provision) that bear the hallmarks of a natural monopoly and which were traditionally managed by the state in many places.

To enable private participation in these industries, a solution needed to be developed for the aptly named 'time inconsistency problem' (Helm, 2009). This refers to the often observed short-termism in the behaviour of governments, who are inclined to serve short-term voter expectations before long-term welfare maximisation. For example, the state can choose to spend less on infrastructure maintenance and renewals, as the effects of reduced service quality will not be immediately visible, to release money for spending on short-term priorities. It can choose to build cheaper infrastructure, without consideration for higher maintenance cost later on, when the relatively poor-quality infrastructure is in operation. Paying for higher costs in the long term will be a problem for future governments (but many of the same voters). If finance from capital markets is to be attracted to public infrastructure investment it needs to be insulated from such opportunistic behaviour.

PPP contracts embrace within a single agreement both the construction of the infrastructure and either its operation by the private partner or the private partner's responsibility for the asset remaining available for use during the operational period. The logic is that a competitively tendered combined contract will be the best way to secure both the efficient construction and use of the asset, in particular by avoiding excessive operational, maintenance and upgrade costs arising from, on the one hand, over-engineering in the construction phase or, on the other hand, poor quality construction. In this way the public sector can best secure its service objectives – i.e. the reason for wanting the infrastructure – at a cost which represents value for money.

The core principle behind the PPP is the creation of a contractual bubble – a framework of contracts that is intended to shield the private investor from opportunistic behaviour and inconsistency due to government change, as well as to protect the public sector from opportunism by the private party. In theory, if the private investor sticks to the letter of his PPP contract, cost recovery and a risk-adjusted return on investment is likely.

PPPs bring efficiency incentives to transport infrastructure through competition for a contract. As infrastructure provision often has the characteristics of a natural monopoly, there is rarely sufficient competition in the market for infrastructure services. Actions that erode the benefits of competition would also largely invalidate the economic rationale for the choice of the PPP in the first place and this often leads to public criticism of the contracts. Thus, in principle, upholding the initially agreed contracts is paramount.

No party to the contract can hope to have perfect foresight over the long life of an infrastructure asset or over the life of a contract spanning several decades. It is possible even for very well-written contracts that, in exceptional cases, objective circumstances outside of the provisions of the initial contract arise which may work against the initial purpose of the contract. In such cases, renegotiation may be necessary. Empirical data (Guasch et al., 2014) indicate that renegotiations are not exceptional.

Given the imperative of upholding contracts for efficiency and the daily reality of frequent renegotiation, the two main questions for this overview are: What are the primary reasons for

renegotiations? And more importantly, do they generally uphold the spirit of the contract when they happen or are they more often motivated by interests other than efficiency?

PPP renegotiations defined

Over its lifetime, the contractual relationship between PPP partners may be subject to many changes. Not all can be defined as contract renegotiations. Renegotiation involves reopening the contract and making changes to its provisions. Adjustments that simply follow the provisions of the contract are not renegotiation. Table 1.1 (Guasch et al., 2014), provides examples of both situations. Many changes to contracts under traditional procurement contracting can similarly be deemed as renegotiations.

The renegotiation examples cited involve explicit cases. It should be stressed though, that renegotiation can also be implicit or tacit. This is the case when the public or private side does not enforce the provisions of the contract, without actually opening the contract or any formal renegotiation taking place.

Table 1.1 **The difference between contract renegotiations and adjustments in line with the contract**

Renegotiations	
Change in risk assignment and/or in the conditions of the contract	Reduction in the level of service quality provided (e.g. airports, from IATA A to B). Deferral or advancement of investments by several years. Extension of the contract term. Reduction of the guarantee requirements for the private side (financial bonds). Increase in the level of guarantees provided by the public side (to pay lenders). Delays to a reduction of tariffs (tolls). Reduction of fees for the public side. Changes in any of these conditions to avoid bankruptcy of the operator.
Change in project scope (if this was not covered in the contract).	Public side requests for additional investments. Private side proposals for additional investments. Grant of additional land for development serviced by the infrastructure. Requests from the public side for additional interconnections with public (untolled, road) network.
Adjustments	
Adjustments in line with the contract provisions	Adjustments to tariffs in line with a formula set in the contract or indexed by inflation. Activation of triggers, which make predefined investments become mandatory. Payments to the operator provided for in the contract.

Source: Guasch *et al.,* 2014.

Incidence of PPP renegotiations

The most detailed accounts available for the incidence of renegotiation in PPPs are for Latin America and the Caribbean, compiled by the World Bank. From 1990 to 2013, more than 1 700 PPP projects reached financial closure in that region. Table 1.2 summarises the data on the frequency of renegotiation, although the available research is very limited for some regions. Renegotiation is most frequent in Latin America and the Caribbean but it is by no means limited to developing countries.

Table 1.2 **Renegotiations of PPPs in different regions**

Region / country	Sector	% of renegotiated contracts	Source
Latin America and Caribbean	Total	68%	Guasch *et al.* (2014)
	Electricity	41%	
	Transport	78%	
	Water	92%	
India	All sectors	0%	Guasch *et al.* (2014)
US	Highways	40%	*Engel *et al.* (2011)
France	Highways	50%	Atthias and Saussier (2007)
	Parking	73%	Beuve *et al.* (2013)
UK	All sectors	22%	*NAO, 2003
UK (Scotland)	All sectors	51%	*CEPA, 2005

Note: (*) These studies include samples, which may not be representative of the population at the time of sampling.

The results in the table above should be treated with caution. They show that PPP renegotiation exists on many continents but they cannot be used to infer the average frequency of PPP renegotiations in different locations or sectors. The primary problem remains the lack of data on renegotiations and their nature. Of the studies cited, the World Bank data (used in Guasch et al., 2014) and the Beuve et al. (2013)[1] study may be deemed most representative. The other studies cover only a sample of PPPs. The Engel et al. (2011) study covered only 20 United States road projects, while Gifford et al. (2014) note that, in the period 1986-2013, a total of 512 PPP projects reached financial closure in the United States, most of them highways. The NAO (2003) and CEPA (2005) studies treat 37 and 64 United Kingdom projects respectively, while the United Kingdom reported 451 operational Private Finance Initiative (PFI) projects by 2002. The Athias and Saussier (2007) study treats highway projects from a mix of countries but does not cover a sufficient proportion of projects to conclude that the results are representative for all or any of the represented countries.

As can be gathered from the studies of Guasch et al. (2014), Bitran et al. (2012) and Gifford et al. (2014), the outcomes of renegotiations, in terms of increase of initial costs or other changes, can differ significantly between jurisdictions with their different sets of legal systems. Bitran et al. (2012) in the table below presents the frequency and impacts of renegotiations in Chile, Peru and Colombia. The impacts in Colombia in particular have been large in terms of added cost and extended scope of projects.

Table 1.3. **Summary statistics on renegotiations in Chile, Peru and Colombia: 1993-2010**

	Chile	Colombia	Peru
Total road concessions	21	25	19
Mean initial value of contract	246	263	166
Mean initial term (years)	25.2	16.7	22.1
Mean concession length (km)	114	195	383
Mean concession years elapsed	12.5	9.0	4.6
Renegotiated road concessions	18	21	11
Total number of renegotiations	60	430	53
Mean number of renegotiations per concession	3.3	20.5	4.8
Mean time of first renegotiation (years)	2.7	1.0	1.4
Mean fiscal cost of renegotiations *	**47**	**266**	**28**
Mean fiscal costs / initial value (percentage)	**17**	**282**	**13**
Mean added term (years)	0.9	6.3	0.8
Mean added length (km)	0	54.6	0
Number of renegotiations / concessions year elapsed	0.2	1.9	0.9

Note: (*) Constant USD December 2009, million.
Source: Bitran *et al.*, 2012.

In contrast, impacts of changes to the contracts in the United Kingdom generally appear to be quite limited. NAO (2008) reports the monetary impact of changes to contracts for the year 2006 in their survey of 171 PFI projects (from all sectors). They amounted to a 1.1% increase in unitary charges for the projects in question. Unfortunately, a more comprehensive view on the impact of changes over the life of the projects is not available. The majority (82%) of changes involved GBP 5 000 or less. Nearly all changes originated with a request from the public sector rather than from the private sector contractor or as a result of a change in law.

There have been infrequent cases of high-impact renegotiations with significant consequences for budgets, such as the Channel Tunnel Rail Link. The contract to build the line to London and take over running of the Eurostar international train services was awarded to London & Continental Railways Limited in 1996, with the government providing grants totalling GBP 1.8 billion for the construction of the rail infrastructure and its use by domestic train services. Renegotiation in 1998 and resale of the failing concession in 2009-10 resulted in net taxpayer support, largely as a result of debt service obligations, rising to a total of GBP 10.2 billion through 2070 at 2010 prices, according to National Audit Office estimates (ITF, 2013).

However, this has to be seen in the context that a number of PPPs have been approved as the preferred option following public sector comparators which showed only a marginal advantage for PPPs, sometimes dependent on the discount rate used. Thus even a relatively small deterioration in value for money during the execution phase could have been material in the original decision to use a PPP as the project delivery vehicle (Burnett, 2012).

To provide some perspective, it may be useful to note that renegotiations, as initially defined, are pervasive in traditional procurement as well. In the context of cost overruns in road projects, for example, changes in the scope of the project during construction, "scope creep", is often identified as the primary cause of cost overruns (Makovšek, 2013). A straightforward comparison of ex post cost or benefit deviations against the initial contractual commitments with renegotiations in PPPs is

unfortunately not available[2]. There are, however, indications that PPPs, at least in some industrialised countries, have superior performance as far the construction phase is concerned in terms of on-budget and on-time delivery. The table below shows the example for Australia. The superior performance suggested is subject to caveats[3].

Table 1.4. **Average cost overruns in PPPs and traditional projects in Australia**

Projects	Budget approval	Contractual commitment
Number of observations	43	40
Traditional projects	19.7%	18.0%
PPP projects	7.8%	4.3%
Difference (Traditional – PPP)	11.9%	13.7%

Source: Duffield *et al.*, 2008.

There is little data on tacit renegotiation, but the limited research available suggests this could be an issue even in countries with the most complete regulatory environments. The National Audit Office in the United Kingdom for example, reported that over 15% of the 171 PFI projects sampled at the time did not have their contract managed on a full-time basis (NAO, 2008). Of course, there is often a recurring problem – i.e. when is tacit renegotiation involved and when is it just inadequate contract administration and management.

In summary, the available research appears to show that renegotiations are not uncommon in PPPs (or with traditional procurement contracts). Their frequency in some countries suggests that they are not the result of rare changes in external conditions in these countries; and for the very largest renegotiations, their sheer size suggests that either renegotiation was not entirely the result of unforeseeable circumstances or a PPP was not the appropriate choice for project delivery. The reasons for renegotiations are explored in some detail below.

Reasons for renegotiation

Examples of the causes of PPP renegotiation

The research presented in the discussion papers for the Roundtable, which will be presented in the following chapters, showed that the nature of renegotiations is to some extent country or region specific. In Latin America and the Caribbean, Guasch et al. (2014) and Bitran et al. (2012) note that most renegotiations take place very early after financial close, during or even before the construction phase. This trend is especially prominent in the transport (and water/sanitation) sector, where 78% of PPPs get renegotiated, on average, 0.9 years after financial close.

The mean fiscal cost of renegotiations reported in Table 1.3 for Chile, Peru and Colombia shows that the scope of the projects was significantly increased by renegotiation. Bitran et al. (2012) further show that this relates mainly to increase in scope during construction, although a significant part also relates to changes in conditions during operation. A substantial share of these changes is financed through a transfer of obligations to future governments (e.g. concession extensions) and users (e.g. tariff increases).

As noted by Engel et al. (2014), most of these renegotiations were by mutual agreement, without conflict between the parties. This is true for 83% of renegotiations in Chile, 98% of the cases in Colombia and in all cases in Peru but, given that most renegotiations are by the agreement of both parties, which party actually initiated the renegotiations is perhaps unimportant. This situation is consistent with opportunistic behaviour by both parties to the contract. Engel et al. (2014) suggest:

- Firms competing for projects can make loss-making offers, expecting to recoup their losses though renegotiation; while
- Renegotiation can be used by government to increase expenditure beyond agreed fiscal spending limits.

This situation is not much different from some of the weaknesses observed in traditional procurement procedures that PPP contracts are supposed to overcome. Opportunistic behaviour of the government in that context is termed strategic misrepresentation[4] (Flyvbjerg et al., 2002) and manifests itself in scope creep during project execution. Opportunistic behaviour on the contractor's side manifests a well-known functional relationship between the distance of low (winning) bids from the average of the other bids and the magnitude of later cost overruns, recovered through renegotiation (Williams et al., 1999; Jahren and Ashe, 1990).

An additional element that appears to work in favour of bidder opportunism is the absence of an institutional framework that provides guaranteed service provision in the case of operator bankruptcy, for example, by a government department operating services on its own account. As noted by Guasch et al. (2014), governments in Latin America are not generally inclined to cancel contracts (only about 5% of contracts get cancelled on average) or allow operator bankruptcy.

This is mirrored by a converse situation in the United States, where operator bankruptcies are not uncommon. Gifford et al. (2014) note that the United States institutional framework helps protect the public sector from private opportunism by guaranteeing service provision, even if the private entity files for bankruptcy. In the United States the bankruptcy framework primarily serves to protect debtors, aiming to help companies survive liquidity crises. As mentioned in Cirmizi et al. (2012), the framework usually allows the debtor to keep control of the company during the bankruptcy event and even allows the debtor to acquire additional debt to restructure the company. In the United States, the companies tend to stay in control while trying to survive. Conversely, in the European Union, the institutional framework is more lender-friendly and the court takes full control in the case of bankruptcy.

While each situation is project-specific, the procedure in case of concessionaire failure is partly addressed in the terms of the concession. Expenditures for operations and maintenance are normally given precedence under concession and bond provisions but it depends on how project (or other) revenues are pledged. Bondholders and creditors have certain rights under project-specific Trust Indenture[5] and under state-specific bankruptcy laws. The law differs significantly between states in the United States. In general, the rights of lenders and others to the cash flow apply to net income flows after adequate funding for operations and maintenance has been reserved. Lenders often have step-in rights but the public agency (usually the owner) often has the right to transfer the concession and over-ride step-in rights to keep the facility operating. Of course, there may be judicial rulings sought in order to resolve disagreements about what all these terms mean.

The incidence of renegotiation in the United States appears to be low, but there is no comprehensive research available to provide detailed statistics. Gifford et al. (2014) focussed specifically on cases where changes to the contract did occur. Of the six cases studied, only three could be regarded as renegotiations, whereas three were bankruptcies. In the United States case studies, there is also no clear-

cut direction or dominant reason for renegotiation. External shocks initiated several of the renegotiations; in particular the 2008 financial crisis affected travel demand and consequently toll revenues. Complexity in agreements made it difficult to write a "nearly complete" contract in two cases and the evolving institutional experience might have played a role. Simple inferences, identifying one single driver as responsible for renegotiations, were not confirmed.

In Portugal, the economic crisis prompted much of the national highway programme to be renegotiated. Portugal's PPP projects were remunerated by availability payments, and the toll motorway network was extended to regions with low demand. This became very difficult to sustain with the onset of the economic crisis and worsening public accounts. Systematic renegotiation suspended new projects and led to an overall reduction of public payments, reducing the Internal Rate of Return (IRR) by cuts in payments for Capital Expenditures (CAPEX) and Operational Expenditures (OPEX)[6] (Guasch et al., 2014).

In India, no renegotiations have been allowed by the government to date, years after many of the several hundred PPP projects went into operation. Reportedly, there have been many requests for renegotiation by the private parties, possibly due to over-aggressive bidding. The standard road sector PPP contract developed in India provides for a range of foreseeable changes in conditions that can be accommodated without renegotiation. In order to minimise moral hazard in the bidding and project specification processes, renegotiation is reserved for very exceptional circumstances.

In the United Kingdom, NAO (2008) reports in their survey of 171 PFI projects (from all sectors) for the year 2006, that:

> "One in five projects responding to our survey stated that work requested as a change since they became operational had been considered for inclusion in the original deal. In just under a half of these cases, work was taken out of the original deals for reasons of affordability, including changes or additions to assets, ranging in value from GBP 70 000 to GBP 17 million. It is likely, however, that these projects will have paid more to introduce this work after they were operational, partly because of a lack of competitive tension once the incumbent contractor was in place and partly because the original design may not have incorporated the extra work."

As already noted, however, the impact of these changes was limited (a 1.1% change in annual charges). In addition, 90% of these changes resulted from a handful of projects. Even if the trend was the same year-on-year during, for example, 20 years of operation, it would be difficult to suggest that most renegotiations in the United Kingdom result from the opportunistic behaviour of either party. It is clear, however, that such reasoning cannot be simply translated to all shape and size of project. Major projects will always run the risk of attracting opportunistic behaviour on either side and a few renegotiations on that scale can lead to massive budgetary impacts (e.g. the Channel Tunnel Rail Link).

NAO (2008) provides practical examples of changes in PPP contracts reported in their survey for different sectors of the economy (Table 1.5). The table presents two types of changes – examples of changes in broader policies (which would affect all projects) and examples of localised change (linked to the specific project). Perhaps some of the changes leading to renegotiation could have been anticipated and a nearly complete contract could have been written. But over the decades that a PPP contract might last, not everything can be anticipated.

Table 1.5. **Examples of contract changes in PFI projects in the United Kingdom**

Sector	Examples of policy change	Examples of localised change
Hospitals	Agenda for Change – updating the terms and conditions of NHS staff transferred to the private sector. Payment by Results – hospitals may need to alter bed numbers to reflect changing demand.	NHS Trust needs to change the cleaning and isolation regimes in response to infection control issues. Hospital staff request new data points and sockets for an office.
Schools	A move to electronic whiteboards requires new infrastructure. Changing food standards for school dinners require different service responses.	Head teacher wants to reorganise a classroom or to introduce air conditioning.
Prisons	National Offender Management Service – integration of prisons and probation services leading to a change in service level requirements and key performance indicators in existing PFI contracts.	CCTV cameras are needed to combat poor behaviour or vandalism. Existing prison buildings are extended to increase capacity in light of higher demand for prison spaces.
Roads	New road widening or traffic management scheme. New road surfacing standards.	Safety study indicates that the layout of a junction needs improving. Changes to signs or safety fencing.
Social housing	Carbon emission policies require upgrading of insulation.	Installation of additional electricity sockets in existing houses.
Waste	Changes to statutory targets for recycling and composting.	Alterations to deal with expansion of local waste recycling. Accommodating advances in technology.
Street lighting	Energy saving policies require changes to lighting units.	Adding Christmas decorations and advertising to lamp posts.

Source: NAO, 2008.

There is less information available for other countries on the exact nature and reasons for renegotiations, but given this brief overview, there is a multitude of reasons from clearly objective to highly subjective motivations. Not all renegotiations are the manifestation of opportunistic behaviour. De Brux et al. (2011), from a large sample of French car-park sector contracts, found a relationship between the frequency of renegotiation and the probability of contract renewal; the sooner the renegotiation after contract signature, the lower the probability for contract renewal. This finding, subject to caveats, suggests that renegotiations between the contract parties could be co-operative (without disbenefit to the users). In this specific case the occurrence of later renegotiations suggests they may have been the result of the objective need to alter the contract. Conversely, early renegotiations, immediately after the contract signature, suggest potential strategic behaviour by one or the other party, which did not benefit their relationship.

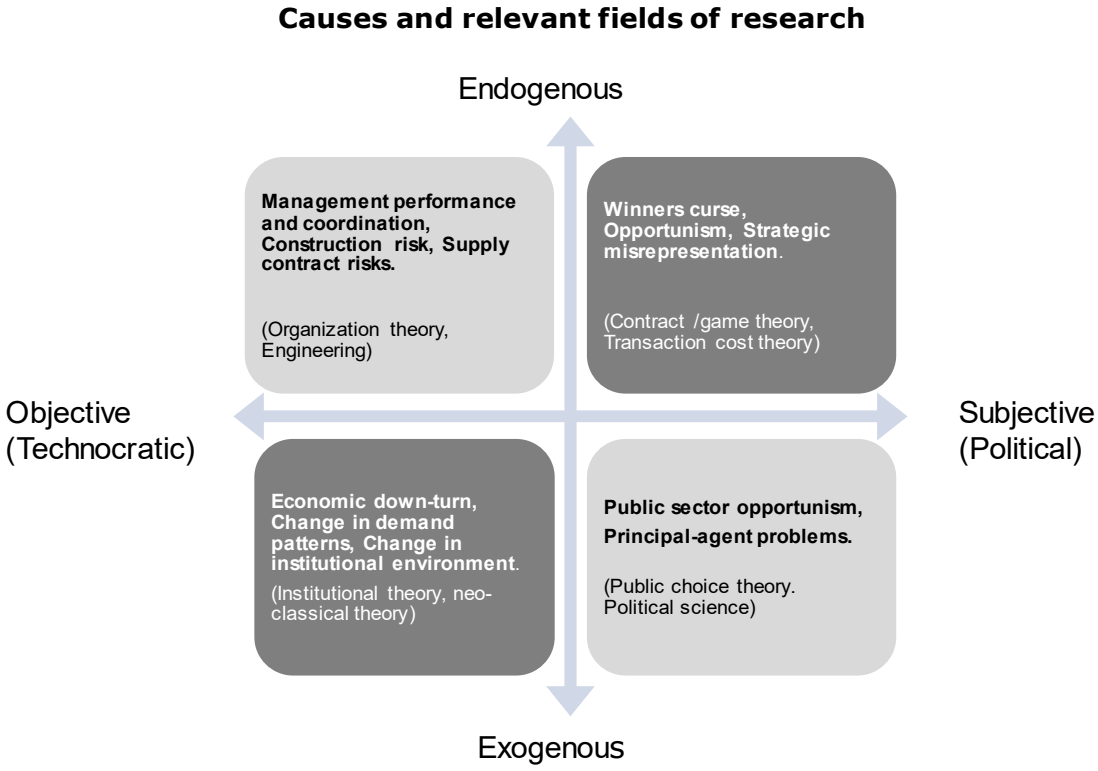
De Brux et al. is one of only a handful of studies that investigate whether renegotiations are an adaptation to unpredicted changes in external conditions, aiming to improve outcomes for both parties to the contract. The principal difficulty faced by such studies is availability of data (or the willingness of contractual parties to disclose it). Although much remains to be understood about the nature of renegotiations, it may be useful to situate the different types of renegotiation and their causes in a logical framework. This is the subject of the next subsection.

Conceptualisation of PPP renegotiation causes

The discussion so far has revealed the many different arguments for PPPs as a collaborative structure between the private and public sectors and suggested reasons why renegotiations might arise. In this section an attempt is made to group these arguments and causes into a figure with four fields. Any attempt at formalisation is subject to simplification but provides a better overview of the issue at hand.

In the figure below the endogenous and exogenous factors (as seen in relation to the specific PPP project under consideration) are crossed with objective and subjective (or alternatively more technocratic/more political) factors. In practical terms, endogenous reasons pertain to triggers for contract change coming from within the project (e.g. materialisation of a construction risk), while exogenous reasons refer to triggers coming from outside of the project (e.g. economic recession). Objective/technocratic triggers include problems in organisational or management capacity and experience, while the subjective/political aspect pertains to the strategy of each party to the contract. The subjective part of the figure pertains to deliberate behaviour while the objective part does not. The idea is that renegotiation is rooted in one or more of the four fields in the figure. Each of the quadrants also identifies the relevant field of economic theory dealing with the issue.

Figure 1.1 **Causes of renegotiation – four different categories**



The **upper left quadrant** covers causes relating to the business and management aspects of PPP projects. These are technocratic to a high degree and can be seen as objectively identifiable. How is the management structure of the project organised? Does it provide for clear management of the project or is

it blurred and imprecise, allowing for ambiguities as regards responsibility and costs? Is the management competent? Is it able to co-ordinate the partners in the special-purpose vehicle set up to finance and construct the project? Is the project well designed from an engineering point of view, or is it designed in a way that will likely lead to inefficiencies and higher than expected costs? This quadrant basically refers to the private-sector knowledge base to manage and deliver projects well, which is one of the economic rationales behind the introduction of PPP structures.

Burnett (2013) has highlighted several NAO and other reports in which contract management failings have been referred to. Reasons for seeking renegotiation include the fact that the PPP project team has not succeeded in setting up a sufficiently clear-cut organisational structure to allow for cost-efficient performance in the project. Other reasons could be that a less than optimal engineering solution has been arrived at, leading to higher than necessary or expected costs. These inefficiencies are the responsibility of the private partner. One example is the 2007 bankruptcy of Metronet, holder of two of the three London Underground PPP contracts (NAO, 2009).There may be other causes, related to lack of experience on the public side, leading to problems with project execution once underway. Gifford et al. (2014) cite some relevant examples in the United States. These might include the failure of the public sector to specify technical or functional criteria for the construction of the asset included in the PPP structure.

The **lower left quadrant** represents the exogenous technocratic (objective) factors that can lead to PPPs failing to perform as expected. Here the macroeconomic environment is important, manifested as, for example, traffic/revenue risk. The 2007-08 economic downturn falls into this quadrant. Over the longer term, public policy and changes in consumer preference can alter the modal split, changing the attractiveness of travel by car compared to public transport, for example. This can also affect the demand for the services to be provided by PPP projects.

Situations such as these may speak against transferring risks to the private sector, in particular if the private sector can do little to manage them or is no better at prediction than the public sector. Where such risks are transferred to the private sector, substantial risk premiums are likely to be incurred. Traffic demand risk is no different in nature. The private sector can do little to manage it in some cases[7] and some studies show that the private sector is generally no more accurate in predicting future traffic than the public side (Button and Chen, 2014). In addition, at least for the road sector, the studies of Flyvbjerg et al. (2005) and Naess et al. (2006) have suggested that traffic levels are systematically underestimated; thus using the private sector as a "detector" of public sector misrepresentation is a costly method, without clear merit.

In general, if the risk allocation between the private and the public side is adequate, then renegotiations due to exogenous events will normally not occur, as their risks are clearly dealt with ex ante and are borne by the public sector. The exception will be a situation where the solvency of the state is threatened, as happened in Portugal in 2008.

This points to the importance of the institutional setting in the specific jurisdiction where the PPP is situated. A strong institutional environment might make the initial allocation of risk and the way challenges to the contract are handled predictable. A weaker institutional environment, on the contrary, might lead to major uncertainty in respect of these aspects of PPPs. Institutional theory therefore is important as the exogenous causes of renegotiations are analysed.

The **upper right quadrant** involves issues related to the imperfect and perhaps asymmetrical information available to each party to the project and their strategy for maximising their payoff. This points to the subjective and often more political nature of causes of renegotiation. Private sector

opportunism, such as aggressive bidding with the expectation of ex post renegotiation, is one strategy. The public sector might be opportunistic as well by colluding with the private partner to get a project through hurdles for project approval, or by concealing relevant information from the private side on the risks of the project.

The criteria on which contracts are awarded, and consistent behaviour in awarding contracts to bids that promise more than can realistically be delivered, can drive similar behaviour, even without the strategic intent to game the system. This is termed the "winner's curse", implying that the only way to get a contract is to make an unsustainable bid. Mechanisms have been devised to counter this, one possibility being to select the second, rather than highest, bid in closed-envelope auctions. An alternative is the average bid approach. While this technique has been used in Italy, Belgium, Switzerland, Taiwan, Japan and other countries (De Carolis, 2009), its welfare properties are unclear[8].

More often, however, information asymmetries make it feasible for bidders to game the system in different ways. One strategy is back-ending, promising more in the later years of the contract after break-points that provide for renegotiation without serious penalties. This affected some passenger rail franchises awarded in the UK, for example[9].

Finally, the **bottom right quadrant** is concerned with the behaviour of the public side in PPPs and whether government actions represent the best interests of all voters, including future ones. Governments with a more long-term perspective behave differently from those with a short-term perspective (Olson, 1993; Persson and Tabellini, 2002). Politicians may commit to PPPs ex ante, knowing that the contract will be opened and adjustments will be needed. The purpose of the PPP in this case may be to transfer the fiscal burden of the investment to the next government, or to bypass budgetary spending restrictions.

Engel et al. (2014) find evidence for this in Latin American road PPPs. The public sector may behave opportunistically by trying to adopt policies that compromise the business model of the private partner. An example of such behaviour is the case of State Route 91 East-West freeway in southern California, described by Gifford et al. (2014). Here, the state decided to build competing infrastructure parallel to the SR91 PPP toll road to relieve congestion in spite of a non-competition clause in the PPP contract to protect toll revenues. After the private partner blocked the action in court, the state eventually bought back the PPP expressway in order to be able to expand the network as it wished, which could be considered a renegotiation. Many policy changes, however, may not have an opportunistic element and are an inherent risk element of any long-term PPP contract (belonging more to the bottom left quadrant).

Principal agent aspects might also be especially difficult in public sector settings. The involved actors (the legislature, individual politicians, executive government and its agencies) might relate to each other in many different ways following a wide spectrum of aims and objectives, sometimes consistent and sometimes inconsistent with each other. This, of course, introduces a number of possible situations where the relation to the private sector parties and the PPP project might be extremely difficult to analyse and manage. Renegotiations might be one result of such principal agent phenomena.

The four quadrants constitute a simple but holistic view of the causes of renegotiation. The basic message on renegotiations as a tool to preserve the economic purpose of the PPP during the life of the project is:

- The contract should not be opened due to endogenous reasons (top two quadrants) to the project.

- If the risks are allocated appropriately, objective exogenous reasons (bottom left quadrant) could lead to renegotiations only in extreme circumstances (imminent bankruptcy of the country).
- Some renegotiations may be necessary due to changes in policy (subjective/political and exogenous reasons), but that can also open the window to opportunistic behaviour by the policy maker (not all policy initiatives are legitimate).

In general, one could say that objective endogenous and exogenous reasons (upper left and lower left quadrants) are less problematic for PPPs. Issues in these two quadrants can be resolved through learning or be considered as force majeure (general crisis). Issues in the right-hand quadrants are more problematic. Opportunistic behaviour on either side is ultimately self-defeating if the purpose is to involve private capital in infrastructure delivery and harvest potential efficiencies.

The electorate is generally not indifferent when massive PPP failures are reported and yet it appears that in some cases the public and private sides can collude in mutual opportunistic behaviour. Given the need for infrastructure investment and the preference for financing investment from capital markets rather than tax revenue in many countries, remedies against opportunistic behaviour, starting with ruling out renegotiation on all but defined and exceptional grounds, are essential. These are discussed in the next section.

How to approach renegotiations

As was noted in the introduction, the economic purpose of a PPP is fulfilled only if the competition for the contract was effective. At risk of oversimplifying, one could state that any change to the contract after it was signed that undermines competition is undesirable. However, are there conditions in the contract that can be changed without inducing opportunistic behaviour, and might therefore legitimately be renegotiated?

Based on our four quadrants, only the bottom left quadrant (exogenous and objective circumstances) has that property; circumstances such as the global financial crisis cannot be predicted or managed within the scope of the contract. Arguably, if you have no awareness of a possible event or its probability it makes no sense to bet for or against it. Moreover, there are numerous other easier ways to behave opportunistically, so why bet on a global economic crisis?

The lower right quadrant deals with situations that are subjective but influence the project from the outside. Renegotiation may be needed here to adjust the PPPs to legitimate changes in policy through the long life of the project. At the same time, opportunistic behaviour on the part of the public side is possible after the contract is agreed, illustrated by the example of changes in local government policy towards accommodating traffic in southern California, involving the SR91 expressway PPP mentioned above [10]. Over the long life of typical transport-sector infrastructure projects, changes in transport policy may arise that have a material effect on a PPP and could make it necessary to renegotiate the contract.

All the issues covered in the upper quadrants can drive opportunistic behaviour.

- Honest mistakes in the contract can be due to inexperience and are a professional risk (upper left quadrant). If any party to the contract could open it at any time to correct its projections of costs or benefits, what would be the point of the contract in the first place? In extreme cases (e.g. if the public side has misspecified the service required), the contract should be cancelled and retendered[11].

- Situations that are subjective, derived from the behaviour of parties to the contract (e.g. deliberate omissions in the contract with the hope of ex post renegotiation) and endogenous to the project (upper right quadrant), are by definition managed by the contract. It is difficult to imagine examples where renegotiation in this area would improve the outcomes for all involved parties (including the users) and is not risk-inducing opportunistic behaviour.

There may be a need to retain some flexibility and allow for some renegotiation but as soon as that possibility is allowed, there is no guarantee that through this opened door only genuine and objectively necessary changes will pass. We divide our discussion below into two sections, one where the public party has a record of opportunistic behaviour and second, where protection from opportunistic behaviour by the private party is the object.

Guarding against opportunistic behaviour from the public side

Moszoro et al. (2014) provide a literature review of studies addressing political and institutional maturity and private investment. In their study, using the World Bank's Private Participation in Infrastructure (PPI) Project Database and other databases, they confirm that the volume of private investment in infrastructure is highly sensitive to the quality of government variables. These include freedom from corruption, rule of law, quality of regulation and the number of legal disputes in the sector. They quantify the increase in investment through PPPs that can be expected as a result of decreasing corruption, improving the rule of law and improving the quality of regulation as well as the negative impact on investment of having one more project going to court. The direction of causality, though intuitively appealing, is not entirely clear nor necessarily linear. Banerjee et al. (2006), for example, showed that countries with higher levels of corruption actually attract more PPPs.

That contractual arrangements are no replacement for political credibility can also be concluded from the experience of economic regulators around the world. In the United Kingdom, for example, the Regulatory Asset Based model (RAB)[12] for financing infrastructure through capital markets has the lowest cost of financing, right after government bonds. This reflects effective insulation from time-inconsistent behaviour on the part of government through the use of independent regulatory agencies. It represents an alternative to the PPP model for large enough assets or packages of projects. In place of contracts, making regulators dependent on periodic mandates conferred by the legislative arm of government (Parliament) rather than the executive (Cabinet and line ministries) protects regulatory decisions from short-term political imperatives. The executive has the opportunity to make changes by amending the primary legislation (with passage through Parliament) establishing the regulatory agency, and can influence regulatory attitudes through the choice of regulators as their mandates arrive at term, although change is constrained by the attitudes of potential investors. As Stern (2013) notes:

> *"*[The RAB models] ... are primarily intended as protection against actions by regulators or governments that could lead to asset stranding. *However*, *precisely because they have no explicit legislative support, their reliability as a commitment device depends crucially on regulators keeping to the spirit as well as the letter of RAB commitments*. If UK regulators were seen by investors as violating that spirit, then the RAB's credibility as a commitment device could disappear very quickly – and would probably be virtually impossible to retrieve. In this regard, investor perceptions are almost as important if not more important than observed developments. ...
>
> *The key conclusion […] is that the role of the RAB as a commitment device is a consequence of the quality of its implementation rather than from the definition of the RAB per se."*

Political or regulatory credibility is a form of reputation: it takes a lot of work to build but is easily undermined. As the public side is ultimately the responsible parent of a PPP contract, it has to signal whether it condones opportunistic behaviour or not. The behaviour of the state will determine the strategy of the private sector. As Guasch et al. (2014) report, many countries are signalling that they are willing to progress in terms of political credibility. Lessons learned in PPP renegotiations in Latin American countries have motivated changes in the legislative frameworks of Peru, Chile, Colombia and Mexico, for example. Some specific measures include:

- Transparency, publishing PPP contract conditions in detail on a public website and use of a PPP delivery unit independent from the line Ministry to control/regulate PPP contracts (Colombia).
- Referral to a sectoral regulator for contract templates and review of PPP contracts (Peru -- although negotiation and renegotiation remain the prerogative of the line Ministry with the regulator providing opinions).
- Disuse of clauses providing for adjustments to preserve "financial equilibrium" (Chile and Peru).
- Platforms for renegotiations led by the Ministry of Finance (Chile and Peru).
- Use of regulatory accounting tools (Peru and Chile).
- A freeze period for renegotiations for the first three years (Peru, Colombia).

Given the United States example, institutional arrangements providing for the continuity of service provision in case of bankruptcy by a transport operator can be very useful. They greatly strengthen the bargaining position of the public side in enforcing contracts.

Whether all of the measures above will turn out to be efficient or feasible (the freeze period for renegotiation, for example) in the long run and not produce other adverse consequences is a matter for further investigation. What is clear is that, in general, they are directed at maintaining the spirit of the contract.

In many instances, the solution is to move some of the responsibility for renegotiation away from the part of government that enters into a PPP contract. Ideally, there could be a requirement that if renegotiation is sought by either party to the contract this should involve an application to reopen the contract to an independent regulator to determine if there are legitimate grounds for allowing renegotiation. Such measures would be aimed at reducing the risk of public sector opportunism and of different actors and levels in the public sector acting in inconsistent ways. No country has yet gone this far in the separation of responsibilities.

Guarding against opportunistic behaviour from the private side

The analysis in the previous sections suggests that opportunistic behaviour from the private side in PPPs can be induced by the behaviour of the public side. Arguably, if institutional measures of the kind discussed in the preceding section were put in place and the spirit of the contract credibly maintained by the public side (with bankruptcy the usual result of deficiencies, in the upper left quadrant of Figure 1.1), there would be much less contract renegotiation and the economic impact of the renegotiations undertaken would be less significant.

Whilst addressing government credibility is fundamental, a number of other approaches to containing opportunistic behaviour by the private party can be taken. One of the serious problems,

highlighted in Latin American case studies (Engel et al. [2014] and Guasch et al. [2014]), is the issue of lowballing or aggressive bidding in PPPs, which leads to large cost overruns, not always with collusion on the public side.

The lowballing issue also concerns traditional procurement. A new EU Directive on Concessions[13] prescribes overall economic advantage as the basis for awarding contracts, as opposed to the lowest bid - which has generally been preferred by some EU countries to avert fears of corruption through inflation of contract prices - as it is a simple and straightforward method. Other approaches are possible, such as pricing the contract according to the average bidding price and awarding it on non-pricing criteria. It is recognised, however, that these approaches are inferior to the surety bond system used in the United States.

A surety company[14] guarantees that a contractor that has obtained a surety bond will fulfil its duties under its procurement contract. In case of failure, both the surety company and the contractor are liable to forfeit the value of the bond to the procuring entity. Calveras et al. (2004) explain that surety companies are regulated and required to have sufficient capital reserves to back the bonds they issue. Because they are responsible for completing the contract or compensating the procuring entity, they are heavily incentivised to screen potential contractors' technical ability and financial status. Many countries require bonds but these are sometimes too small to act as a deterrent to over-bidding.

In some cases, reputation tracking (contractor performance benchmarking) has been employed to avert opportunistic behaviour. The United Kingdom Highways Agency, for example, applies that principle in some simpler contracts. Whether and how such an approach could be employed for the delivery of large and complex infrastructure projects is a challenge, as it would have to draw on the international performance of private partners in PPPs, which usually involves a special-purpose vehicle comprised of a number, sometimes a large number, of construction companies and finance companies. These do not always compete in the same constellations with the same partners.

It is worth noting that the PPPs reviewed in the Latin American case studies (Guasch et al. [2014] and Engel [2014]) did not generally employ total lump-sum contracts, or turnkey contracts, which require delivery of infrastructure for a fixed price and date. The performance of this kind of contract in PPPs and other project finance deals in the UK, Australia and elsewhere has proved superior to other procurement contract types in terms of on-budget and on-time delivery. Blanc-Brude and Makovšek (2013) find a median cost overrun rate for turnkey projects of 0% and an average rate of 2%. But such complete transfer of risk gives rise to other questions in terms of a substantially higher price that has to be paid[15].

Other challenges with regard to the PPP renegotiations involve non-opportunistic changes in policy that require an extension of, or an addition to, existing infrastructure tied into a PPP. Normally, to avoid opportunistic behaviour on the private side, the new extension should be publicly tendered (where new operators can bid together with the existing operator to create competition). But this can be difficult in cases where the additional infrastructure would infringe on the business model of the existing PPP. One way to proceed would be to cancel the existing PPP (the state would have to buy it from the private partner) and retender the existing and new infrastructure together under a new PPP. The EU set a limit on the value of such changes in Directive 2014/23/EU, but negotiations softened the extremely tight limits initially proposed to such a degree that in practice they provide very limited restraint (50% of the value of the initial contract per round of renegotiation). It remains to be seen if the transparency requirements in the form of the obligation to publish Concession Modification Notices will, in practice, act as a constraint on significant modifications to concession contracts in the EU.

Unsolicited transport infrastructure investment proposals are often viewed as problematic, as it is difficult to generate competition for them and there may be a temptation for public authorities to alter priorities to accommodate private finance – at the cost of reduced overall programme efficiency. However, unsolicited proposals can be a source of innovation and for that reason they are welcome in some United States states. For example, variable tolling in real time, as introduced on SR91 in southern California, was never in State DoT plans, neither were Virginia's Capital Beltway express lanes. Virginia requires competing proposals to be sought when such proposals arise but, with only 120 days required for consultation, alternative proposals will not always be forthcoming.

Transport infrastructure is not generally created in a competitive market through unsolicited proposals but is subject to a national or regional government plan. Integration of PPPs into such a plan could be challenging if every substantive policy change were to lead to a wave of renegotiations over a host of contracts. From this viewpoint, alternative forms of private capital involvement in network industries might have merit. The RAB model is better suited to accommodate changes, which would appear as renegotiations in a PPP. It creates an independently managed environment to accommodate exogenous impacts and policy changes. It has other advantages (such as a lower cost of finance than a PPP) and challenges of its own. Establishing a value for the initial asset base (which, in turn, determines the returns on investment allowed) is always controversial and the cost of regulatory oversight makes it too costly an arrangement for the average PPP project.

Some of the advantages of the RAB approach to asset management can be transferred to PPPs. The RAB model relies on an independent regulator to set the framework for alterations to initial contractual conditions and adjudicate on what changes are legitimate. An independent regulator can be given responsibility for some aspects of the oversight of PPPs as, for example, is the case with OSITRAN in Peru, or the authority to adjudicate on when a distressed project should legitimately enter renegotiation rather than bankruptcy proceedings.

Conclusion

Although contracts can never be complete, they can be very nearly complete. Foreseeable risks can be allocated between the parties. Clauses in the contract can provide procedures for dealing with unforeseen circumstances – with a test to verify that the existing allocation of risks does not already address the situation. When renegotiation is triggered under such arrangements, an independent jury might be used to check that the outcome is what the parties might have been expected to negotiate if they had foreseen the change. Of course, populating such a jury is not without controversy and its judgements may be questioned (and subject to review in court). Establishing such procedures, however, increases transparency.

Renegotiation should not be treated casually. It should be used only exceptionally, as the direct effect will usually be adverse to the public interest – fiscally or through user charges (even if there are long-term benefits through maintaining a positive investment climate). The real possibility of bankruptcy, demonstrated through contract terminations, is essential to the market discipline and efficiencies that PPPs are expected to bring to infrastructure investment. Routine renegotiation is a symptom of a disease, reflecting a gap or weakness in contracts, or tolerance toward opportunistic behaviour. Preventing renegotiation is as important as doing it properly. The risk in designing a contract in a way that provides for renegotiation is that it will induce strategic bidding, and this has to be countered by a clear policy that renegotiation is reserved for exceptional circumstances.

Provided a nearly complete contract is written and the behaviour of the public side is not opportunistic (the public side which is the ultimate parent of the contract and ultimately responsible for its outcomes), renegotiations of substantial impact will be few and normally far between.

A crucial element when renegotiations do occur is that the spirit of the contract is maintained. If the parties of the contract are allowed to take back promises given at contract signature, the economic purpose of the PPP contract dissolves. In many countries "taking back promises" has often been the case, with government being part of the problem with its own opportunistic behaviour. What the state chooses to signal with the creation or respect of new regulatory institutions or a commitment to stick to contract provisions is thus of crucial importance. India has a short track record but now has a large number of PPPs and provides a clear example that it is possible to avoid any renegotiations in the early years after signing PPP contracts -- in contrast to the general experience in Latin America and elsewhere. Florida also has a record of only rarely renegotiating, with only one out of 13 road sector PPPs renegotiated.

Where fixed-price, fixed-date turnkey contracts are not applied, PPPs and traditional procurement contracts seem subject to similar forms of strategic behaviour from bidders. The application of the lowest bid as the principal selection criteria in such a context can lead to over-aggressive bids, unsustainable offers and, ultimately, renegotiation. Reputation and demonstrated competence ought to be included in selection criteria. Surety bonds to demonstrate the seriousness of bids have proved effective in deterring opportunistic overbidding when they are sufficiently large; and a supervisory board or regulatory agency separate from the contracting authority, to advise or determine when renegotiation is legitimate, appears to be a worthwhile safeguard.

It should be noted that there are cases, albeit rare, of renegotiation that benefit all sides, including the users of transport infrastructure. Whilst the Latin American tradition of 'concessionarios progressivos', concession extensions, probably reflects opportunistic behaviour as much as the efficiencies to be achieved by extending contracts while construction equipment is on site, government-led or unsolicited proposals from existing concessionaires to extend or bundle old contracts with new can resolve difficult co-ordination and planning issues.

When governments are not part of the problem, PPPs still remain subject to challenges. Policies will evolve, national infrastructure plans will change. If a transport network consists of many PPPs, an adjustment in the national policy might be impeded by the need to renegotiate each and every PPP contract. There are challenges with extending infrastructure managed by an existing PPP contract without losing the benefits of competition. Other forms of private capital involvement exist and the governments would do well to explore their comparative advantages and weaknesses in relation to PPPs when they seek large-scale financing of transport infrastructure from capital markets.

Notes

1. The study covered several hundred contracts from three decades by a company which was a market leader in the country.

2. A volume of literature on infrastructure project cost overruns exists, but most of them report only the magnitude of cost overruns, and not the causes. It is not appropriate to equate cost-overruns against the initial contract with contract renegotiations. This would only be the case in lump-sum contracts, whereas in other cases it could be the result of the risks allocated to/borne by the public side.

3. Firstly, we do not know what the relative price for the infrastructure delivery is (what is the price of risk transfer to the private sector, life-cycle optimisation considerations aside). Secondly, in traditional procurement, any "renegotiations" have to occur during or immediately after construction. In the case of PPPs they could theoretically occur much later, which is never captured by studies dealing with construction cost performance.

4. The term "strategic misrepresentation" implies a misstatement of fact or submission of misleading information. It appears in the research literature in relation to budget preparation, investment appraisal (e.g. deliberate underestimation of cost) and in other examples. A related term refers to the strategic behaviour of bidders, known in the research literature as "lowballing". It refers to behaviour where the bidders submit unrealistically low bids, assuming that they will be able to achieve renegotiation later, through hold-up or other means. In effect lowballing is a bet. The additional revenue from the renegotiation might not necessarily materialise (this depends on the behaviour of the procurement authority).

5. A Trust Indenture is an agreement in the bond contract between a bond issuer and a trustee. It represents the bondholder's interests by highlighting the rules and responsibilities that each party must adhere to. It may also include a definition of the source from which the income stream for the bond is derived.

6. The IRR-Internal Rate of Return is the rate at which the present value of all future cash flow is equal to the initial investment. The higher the IRR, the more attractive the investment is to investors. Reducing the payments to the private partner for the initial investment (CAPEX - Capital Expenditures) or the payments for the operation of the asset (OPEX – Operational Expenditures), will reduce the IRR.

7. The point made is case specific. It applies to roads, for example, but not so much to passenger franchises in rail, where the operators with their pricing policies and products can substantially influence the ridership on their trains.

8. In the absence of insurance, the first price bid (the low bid) carries with it the risk of the bidder being unable to fulfil its contractual obligation (or pushing for renegotiations) at considerable cost to the public. This risk can be reduced with the average bid approach, where the price paid will be higher. Another way to approach the risk of the first price bid is to devote resources to monitoring (benchmarking, preselection, etc.) to carefully eliminate bidders likely to default on

their obligations. Excessive restrictiveness will also adversely affect competition, leading to a suboptimal outcome for the public partner. Thus, in theory, the average bid approach beats first price auctions if the cost of monitoring is high.

9. This highlights the relevance of obtaining the financial models of bidders for concession contracts as part of the offer documents, and rigorously assessing – if necessary with independent expertise – the *prima facie* sustainability of the offers based on the models.

10. It should be added, that this was an early US experience with PPPs, and that subsequent contracts define "compensation events", which allow the public to build competing facilities or facilities that harm the demand for the project – and how the SPV will be compensated if they do.

11. In this case, the cost incurred by the private party in the initial bidding and later on should be taken into account and compensated. In 2012 in the UK, for example, a mistake over passenger forecast methodology in the tendering process for the West Coast Mainline rail franchise on the part of the government resulted in cancellation of the process, with bidders compensated for the cost of bidding so as not to deter them from taking part in future tenders (www.gov.uk/government/news/west-coast-main-line-franchise-competition-cancelled).

12. In a PPP, all efficiency gains are determined in the competition for the contract (e.g. to construct and operate infrastructure), which will be in place for its duration. There are no additional instruments in place to capture or share any additional efficiency, or provide incentives for those during the operation of the asset. In an RAB model, the efficiency gains are primarily derived from incentives of an economic regulator (a dedicated independent institution) provided to the infrastructure manager (the company, with a licence to construct and operate infrastructure). The incentives involve putting the recovery of cost by the private investors at risk, in case the agreed efficiency targets (improvements) are not met. Both approaches have their challenges, which are beyond the scope of this paper.

13. Directive 2014/23/EU of 26 February 2014 on the Award of Concession Contracts, Article 41.

14. An insurance company that issues a surety bond or a guarantee.

15. Daito and Gifford (2014) find a statistically significant difference of 66% in contracted prices for CAPEX between P3 DBFOM and Design-Build highway projects. Makovšek (2013), based on the study of Blanc-Brude *et al.* (2006) on EIB-financed road projects in Europe, illustrated that PPPs can be 19% more expensive (for CAPEX) than traditional procurement even after the construction risk has been taken into account. It is not immediately clear whether this premium could be explained by life-cycle cost optimisation decisions (building higher-quality infrastructure to reduce later cost of maintenance) or other causes.

References

Athias, L. and S. Saussier (2007), "Un partenariat public-privé rigide ou flexible? Théorie et applications aux concessions routières", *Revue Economique*, 58, 565-76.

Barnejee, S.G., J.M. Oetzel, R. Ranganathan (2006), "Private Provision of Infrastructure in Emerging Markets: Do Institutions Matter?", *Development Policy Review*, 24 (2): 175-202

Beuve, J., J. de Brux and S. Saussier (2014), "Renegotiations, Discretion and Contract Renewals: An Empirical Analysis of Public-Private Agreements", *Working Paper EPPP*, Sorbonne Business School.

Bitran, E., S. Nieto-Parra and J. Robledo (2012), "Opening the black box of contract renegotiations: An analysis of road concessions in Chile, Colombia and Peru", *Draft Renegotiations in Chile, Peru and Colombia*, Mimeo.

Blanc-Brude, F. and D. Makovšek (2013), "Construction risk in infrastructure project finance", *EDHEC Business School Working Papers*.

Blanc-Brude, F., H. Goldsmith, T. Valila (2006), "Ex ante construction costs in the European road sector: a comparison of public-private partnerships and traditional public procurement", *Economic and Financial Report 2006/01*, European Investment Bank.

Brux, J. de, J. Beuve and S. Saussier (2011), "Renegotiations and Contract Renewals in PPPs. An Empirical Analysis", *Working Paper Chaire EPPP*.

Burnett, M. (2012), "The Current Private Finance Initiative Reform in the United Kingdom – How should it be measured*?", European Procurement & PPP Law Review;2012,* Vol. 7, No. 2, Note 11, p. 120.

Burnett, M. (2013), "PPP Contract Management – Still in need of more attention?", *European Procurement and PPP Law Review 2013*, Vol. 8, No. 3, pp. 216-229.

Button, K and Z. Chen (2014), "Demand forecasting errors and the ownership of infrastructure", *Applied Economics Letters*, 21:7, 494-496.

Calveras, A., J.J. Ganuza and E. Hauk (2004), "Wild bids: Gambling for resurrection in procurement contracts", *Journal of Regulatory Economics*, 26:41-68.

CEPA (2005), *Public-Private Partnerships in Scotland: Evaluation of Performance*, Cambridge Economic Policy Associates Ltd.

Cirmizi, E., L. Klapper and M. Uttamchandani (2012), "The Challenges of Bankruptcy Reform", *The World Bank Research Observer*, 27 (2): 185-203, http://dx.doi.org/10.1093/wbro/lkr012.

Daito, N. and J.L. Gifford (2014),"US highway public private partnerships", *Managerial Finance*, Vol. 40, Issue 11, pp. 1131-1151.

DeCarolis, F. (2009), "When the highest bidder loses the auction: Theory and evidence from public procurement", *Working Paper*, Mimeo, University of Wisconsin.

Engel, E., R. Fischer and A. Galetovic (2011), "Public-Private-Partnerships to Revamp US Infrastructure", *Hamilton Policy Brief*, Brookings Institution.

Engel, E., R. Fischer and A. Galetovic (2014), "Soft Budgets and Renegotiations in Public-Private Partnerships", *ITF Discussion Paper No 2014-17*, International Transport Forum at the OECD, Paris.

Flyvbjerg, B., M.S. Holm and S. Buhl (2005), 3How (in)accurate are demand forecasts in public works projects? The case of transportation", *Journal of the American Planning Association*, 71(2), 131-146.

Gifford, J., L. Bolaños and N. Daito (2014), "Renegotiation of Transportation Public-Private Partnerships: The US experience", *ITF Discussion Paper No. 2014-16*, International Transport Forum at the OECD, Paris.

Guasch, J.L., D. Benitez, I. Portabales and L. Flor (2014), "The Renegotiation of PPP Contracts: An overview of its recent evolution in Latin America", *ITF Discussion Paper No. 2014-18*, International Transport Forum at the OECD, Paris.

ITF (2013), *Better Regulation of Public-Private Partnerships for Transport Infrastructure*, ITF Roundtable No 151, OECD Publishing, Paris/ITF, http://dx.doi.org/10.1787/9789282103951-en

Jahren, C.T. and A.M. Ashe (1990), "Predictors of Cost Overrun Rates", *Journal of Construction Engineering and Management*, Vol. 116(4).

Makovšek, D. (2013), "Public-Private Partnerships, Traditionally Financed Projects and their Price", *Journal of Transport Economics and Policy* (JTEP), 47(1), 143-155.

Moszoro, M. et al. (2014), "Institutional and Political Determinants of Private Participation in Infrastructure", *ITF Discussion Paper No. 2014-15*, International Transport Forum at the OECD, Paris.

Næss, P., B. Flyvbjerg and S.R. Buhl (2006), "Do road planners produce more 'honest numbers' than rail planners? An analysis of accuracy in road traffic forecasts in cities versus peripheral regions", *Transport Review*, 26(5), 537-555.

NAO (2003), *PFI: construction performance*, Report by the Comptroller and Auditor General, HC 371, Session 2002-2003, National Audit Office; London.

NAO (2008), *Making Changes in Operational PFI*, Report by the Comptroller and Auditor General, HC 205, Session 2007-2008, National Audit Office, London

Olson, M. (1993), "Dictatorship, Democracy, and Development", *American Political Science Review*, 87(03), 567-576.

Persson, T. and G.E. Tabellini (2002), *Political economics: Explaining economic policy*, MIT Press.

Stern, J. (2013), "The Role of the Regulatory Asset Base as an Instrument of Regulatory Commitment", *CCRP Working Paper No. 22*, Centre for Competition and Regulatory Policy (CCRP), City University, London

Williams, T.P., J.C. Miles and C.J. Moore (1999), "Predicted cost escalations in competitively bid highway projects", *Proceedings of the Institution of Civil Engineers - Transport*, Vol. 135(4): pp 195-199, ICE Publishing

Chapter 2

Renegotiations in public private partnerships: Theory and evidence

Eduardo Engel and Ronald Fischer, University of Chile,

Alexander Galetovic, University of Los Andes, Chile

Public private partnerships (PPPs) have the potential to increase efficiency and improve resource allocation. However, contract renegotiations are common and make us question the benefits of PPPs.

Under current accounting standards, PPPs allow intertemporal reallocations of infrastructure spending that do not occur under traditional methods of procuring infrastructure and which allow governments to escape the constraints of congressional purview. This chapter reviews the theoretical results in Engel et al. (2009a) as well as data from Colombia, Chile and Peru comprising 610 highway PPPs and 540 renegotiation processes to verify these predictions. The data and original analysis comes from Bitran et al. (2013), complemented with additional descriptive statistics. The empirical evidence supports the predictions of the theoretical model.

"Cynics suspect that the government remains keen on the Private Finance Initiative, not because of the efficiencies it allegedly offers but because it allows ministers to perform a useful accounting trick." *The Economist*, 2 July 2009

Infrastructure provision via a PPP has become an accepted mechanism in many countries. This explains the rise from almost zero PPP investment in Europe in 1990 to almost EUR 30 billion in 2006, before falling by one-third in the aftermath of the financial crisis. When considering low- and middle-income countries, the numbers rise from approximately USD 20 billion in 1990 to more than USD 160 billion in 2010, and with no ill-effects from the financial crisis[1]. PPP investments range from highways, bridges, airports and tunnels to less conventional prisons, convention centres, hospitals, schools, sanitation systems and railways (Engel et al., 2014).

There are several reasons for the increased use of PPPs. One of them is the potential for efficiency gains from packaging in one contract the final design, financing, construction and operation of a project[2]. Second, some countries, such as the United Kingdom, used it to escape the constraints imposed by the Maastricht Agreements on public spending. Other countries believe, or act as if they believe, that PPPs provide access to additional sources of finance. There are also political economy arguments for PPPs: For example, some countries avoid the unpopularity of privatisation by transferring (temporarily) state assets to a private party for a limited time. The problem is that having a successful PPP programme necessitates avoiding a series of pitfalls that are observed in the programme of many countries.

In particular, governments should set limits on contract renegotiations, as they can overturn the efficiency gains of PPPs. This is not easy and PPP programmes are often riddled with contract renegotiations. An early study by Guasch (2004) covered over a thousand Latin American concessions prior to the year 2000. One of his findings was that over 30% of contracts are renegotiated, and in the case of roads, the figure is 54.4%. Another finding was that there is often a bias towards the private party; in 62% of cases, tariffs were raised, and in a similar proportion the required investment was reduced[3]. It is clear that in a long-run contract, it will be necessary to make adjustments in response to changes in demand, in quality standards or for other similar reasons. These adaptations of the contracts require renegotiations, and so long as they are conducted transparently, can lead to welfare gains[4,5]. The trade-off between the gains from flexibility in order to adapt the project to changed conditions and the risk of opportunistic renegotiations is examined in Athias and Saussier (2010). However, this reasoning does not explain why it is often the case that there is substantial renegotiation in the early stages of the project, and even during construction[6]. In our interpretation, there are incentives to renegotiate. One case is when there are mistakes at the planning stage by the Public Works Authority (PWA), which is reluctant to admit the fact publicly, leading to contract renegotiation on very easy terms for the firm. These mistakes may range widely, but often include intentionally or unintentionally omitted components of the project. Unintentional omissions are a result of incompetence at the PWA, but there are cases in which the omission is desired by the PWA. This occurs, for example, when the PWA omits components of the project in order to lower its cost and receive the approval of the Finance minister or other budgetary authority[7].

However, there is an additional reason for intentional renegotiation of PPPs by government, and moreover, it is a motive that is associated with PPPs and not to other types of infrastructure provision contracts. What is special about PPPs is that the project is financed by the concessionaire and that future obligations to it are not registered as debt in the fiscal balance sheet. This can happen when the availability payments are made by the state (the case of the Private Finance Initiative [PFI] programme in the United Kingdom), but even more so when user fees are the main basis of resources for repayment.

Thus the private party can provide additional infrastructure, not included in the original contract, with costs to be paid either by future users or governments.

Infrastructure investment is popular among politicians and helps an incumbent during elections. However, governments face budgetary constraints – in the case of developing economies spending limits are often introduced by multilateral organisations. In the case of the UK, the Maastricht agreements limiting public investment led to an abandonment of the Ryrie Rules used for PPP investments. These rules included all PPPs as part of public investment, thus limiting their usefulness for the current administration[8]. Many other countries have also used PPPs to escape budgetary constraints. In Engel et al. (2009a), we showed that budget renegotiations can also be used to increase spending and escape budgetary constraints, thus helping a government get re-elected. We use the results of that paper to examine the political-economy use of renegotiations.

The model starts with the observation that under traditional provision of infrastructure, a company is hired to build a project backed with fiscal funds, and is paid when the project is finished. The fiscal funds must be approved in the budgetary process and are therefore restricted. An increase in spending associated with the project requires either a reassignment of budgetary funds or going through the budgetary process. Thus, it is difficult and costly to increase spending on the project, and we assume that it is impossible under traditional provision.

In the case of PPPs there is a difference, however, because the private party is paid over time and finances the project by itself. Due to deficient accounting standards, changes in the future flow of resources that the firm will receive as repayment are usually not included in the fiscal balance sheet. Thus, an increase in future user fees, or an extension in the life of a PPP that charges user fees do not require budgetary approval. In countries where availability payments are not included in the balance sheet, government may increase the value of these future flows. This means that the present government can bind the resources available to future governments in exchange for current infrastructure spending by the PPP. In essence, in a renegotiation for additional infrastructure, the PPP "lends" to the current government in exchange for these future funds.

Engel et al. (2009a) presents a model with four predictions. First, under competitive bidding and renegotiation, firms will make bids that are below costs. A standard interpretation is that this corresponds to cases of Winner's Curse. However, there is empirical evidence that lowballing bids are higher under weaker institutional frameworks, where renegotiation is easier, see Athias and Nuńez (2008) and (2009). This is consistent with our prediction of the association of opportunistic renegotiations and lowballing. Second, renegotiation includes not only compensation for the low bids, but also additional investment. Third, these renegotiations occur early and, fourth, a large part of the cost of renegotiations falls onto future governments. In that paper we simplified the analysis by assuming that firms have identical costs and there is perfect competition among bidders.

Further extensions of this research would loosen these constraints. For example, if a firm has a cost advantage over the remaining bidders, it might use limit pricing, so the winner might not be placing a bid below costs. On the other hand, if a firm has an advantage in renegotiation over the rest of the field, it might be able to offer a lower bid than a more cost-efficient firm, thus creating a further inefficiency in renegotiations. If costs are equal, but there are few firms and there is a first-price auction, bids may also be higher than costs.

Another point to take into consideration is that the desire by the government to engage in renegotiation may depend on its probability of winning the election. Since the reallocation of future resources is costly, a government that is sure to be re-elected will not renegotiate the contract, while the

desire and extent of renegotiation depends on the likelihood of re-election without the increase in public spending associated with renegotiation. Note also that during renegotiation, it is easy for the government to be a bad bargainer in exchange for political slush funds, which are useful to pay for campaign expenses. The relationship between corruption and PPP renegotiations has been studied by Guasch and Straub (2009).

The solution, noted in Engel et al. (2009a), is that in order to reduce the incentives to renegotiate, the PPP and all its associated obligations should be included in the balance sheet of the government, and subject to the same oversight as other budgetary expenses.

There is empirical evidence for the predictions of this model. Engel et al. (2009b) describe the extent of renegotiations in the Chilean PPP industry up to 2006. The results were consistent with the predictions of the model.

More recently, Bitran et al. (2013) have studied renegotiations of highways in Chile, Colombia and Peru. These authors examine 61 interurban concession contracts between 1993 and 2010. In Chile they study the 21 interurban concessions (2 400 km) awarded up to 2004. They analyse 60 contract changes, adding up to USD 2.1 billion, of which USD 0.9 billion was to be paid by future administrations. They also include 17 additional years of contract terms (i.e. another cost for future administrations, which will not be able to sell these contracts as brownfield concessions). In Colombia the authors studied 25 contracts covering 4 800 km. They examined 430 contract changes worth USD 5.6 billion and 131 years of extension to the contract terms, and add almost 1 000 km of roads to the original contracts. In Peru they examined 15 road contracts for USD 2.3 billion covering 5 500 km. These concessions are newer, with an average elapsed time of 4.6 years, but despite this, they have been renegotiated 53 times. The cost has been USD 300 million and has added nine years to the contracts. Thus the more recent data examined in Bitran et al. (2013) confirm the predictions of this chapter as well as the previous study of Engel et al. (2009b) for Chile.

This chapter reviews the political economy model of Engel et al. (2009a) and the evidence supporting its predictions organised as follows. The next section describes the intuition behind the model in Engel et al. (2009a) and its predictions. We then present the evidence from Bitran et al. (2013) and derive the implications.

A simple renegotiations model

Model

The model is simple, with two periods: at the end of the first one, we have an election to change or keep the current administration. Social welfare depends on infrastructure services (other things being equal), and we assume a zero discount rate so social welfare is the sum of per-period social welfare:

$$U = u(I_1) + u(I_2) \quad (1)$$

where u is strictly increasing and strictly concave and I_t denotes infrastructure services in period t. In this setting, infrastructure lasts for a single period. This setting implies that not all infrastructure investments are made in period 1. In a first approximation, both the PPP and construction industries are competitive and the cost of a unit of infrastructure is one dollar. There are no costs of operation. The construction industry and the PPP industry are competitive, infrastructure fully depreciates in one period and each unit of infrastructure costs one dollar. Operation costs are zero.

Taxes per period Ti are exogenous, and the budget must be balanced:

$$T_1 + T_2 = 1 = I_1 + I_2 \quad (2)$$

Maximising social welfare subject to the budget constraint leads immediately to the result that investment in each period should be the same: $I_1 = I_2 = ½$. We assume (a big assumption) that Congress wants to maximise social welfare, and uses spending limits in period 1 (I_1) to achieve this. The problem is that the executive includes, in its own utility function, the probability of being re-elected. The probability of re-election depends on infrastructure investment in period 1, so that the government's utility function is:

$$G(I_1, I_2) = u(I_1) + p(I_1)u(I_2) \quad (3)$$

This utility function reveals that the government cares about social welfare only if it continues in government. We assume that p is increasing and strictly concave. This is a standard formulation in this context (Alessina and Tabellini, 1990)[9]. Note, however, that from the government's point of view, biasing expenditure towards the first period increases utility by increasing the chances of re-election.

Conventional provision vs. public private partnerships

In general, the provision of public infrastructure can be private (the case of a private sanitation company), conventional (government hires a construction company to build the infrastructure and pays the company out of current funds) and via a PPP[10].

Congress authorises expenditure of $I_1 = I_2 = ½$ in period 1, and the government cannot exceed this limit. However, PPPs have the possibility of increasing current expenditure and getting paid later, as they finance the project themselves; and most importantly, these deals are not registered by congressional oversight in most countries. Thus, there is the potential to make a credible promise of future repayment, something that is not possible under conventional provision, where funding and payment are made period by period.

There are various possibilities for transferring resources to the second period: the government can, for example, grant a term extension to the PPP, raise future used fees or lower the quality standards of the project. As we show in Engel et al. (2013), these options always involve a transfer of resources from future administrations and users, and allow the government to increase first-period spending in excess of budgetary limits.

Conventional provision. As mentioned above, Congress allows the government an expenditure of at most $I_1^S = ½$, a limit that cannot be exceeded, because there are no mechanisms for it. There is procurement to an amount $I_1 = ½$ from construction companies (here, competition ensures that investment is comparable). If $½ > T_1$, the government issues debt of an amount $D = ½ - T_1$. This means that $I_2 = T_2 - D$, since the intertemporal budget constraint always holds. Since period-2 spending in the optimal case is $I_2 = ½$, we have that $T_2 = ½ + D$. This means that in this case there is no mechanism to shift spending between periods, and the government cannot achieve its desired spending pattern. Note also that an alternative way for Congress to control spending is by putting a limit on the issuance of public debt.

Public private partnerships. In this case, the private firm does not only build the infrastructure project, but it also operates and finances the project. The firm makes a bid for a payment of B (over the

two periods) in order to build infrastructure to the amount ½, which is all that Congress allows. Given the expenditure limits enforced by Congress, B ≤½.

Assume now that the contract is renegotiated before period 2, in order to increase infrastructure investment by the amount W, in exchange for an additional amount R to be paid in period 2 to the private firm. The new contract specifies W in additional investment (to ½+W) in exchange for increased payments, to be paid in the second period. Total payment is B + R. Thus, the agreement involves an intertemporal obligation that has not been approved by Congress and that can be used to exceed the expenditure limits[11]. In equilibrium, the values of the variables B, R, W can be determined.

PPP renegotiations and additional infrastructure spending

Suppose the government only faces the intertemporal budget constraint ($I_1 + I_2 = 1$) and is not limited by the per-period supervision by Congress. Then the first-order conditions (FOC) for the government's choice are:

$$\frac{dG(I_1, 1 - I_1)}{dI_1} = u'(I_1^*) - p(I_1^*)u'(1 - I_1^*) + p'(I_1^*)u(1 - I_1^*) = 0, \qquad (4)$$

It is fairly easy to show that $I^*_1 > ½$. Just to give the flavour of the proof, consider the case in which $p' = p'' = 0$, i.e. when the probability of re-election is constant and does not depend on infrastructure investment. Even so, the fact that the government values the future less leads to excessive expenditure in period 1. The FOC become:

$$u'(I_1^p) - pu'(1 - I_1^p) = 0.$$

Note that only when the probability of re-election is p = 1 do we reproduce the efficient solution. Now, it is easy to see that the higher the probability of re-election p, the lower the distortion in governmental incentives, i.e. $dI_1^p/dp < 0$, and thus whenever p < 1, we have that the desired first-period spending is $I_1^p > ½$.

There is an additional effect, however, which comes from the fact that the probability of re-election increases as first-period infrastructure investment increases. Hence, there are two reasons for governments to desire to increase first-period investment.

Implementing the incumbent's optimum via renegotiation

What is noteworthy is that using renegotiations, the government is able to achieve its desired allocation of infrastructure investment. There are two things to consider here: first, the bargaining power of each party; second, the degree of lowballing by the winning bidder. In Engel et al. (2009a) we show that, independently of the bargaining power of the parties, the government can always obtain its chosen allocation.

The reason is that as the firm obtains more bargaining power, the competition to be the firm that builds the infrastructure project becomes more intense (in the expectation of profitable renegotiation), increasing the extent of lowballing. In turn, lowballing implies that there exist period-1 ex post free funds that the government can use, apart from any reallocation due to the possibility of the PPP firm "lending" resources to the government to increase first-period investment.

We assume that the government, following the spending cap set by Congress, auctions a PPP contract with period-1 investment $I_1 = ½$. Note that renegotiation leads to W in additional infrastructure in exchange for a renegotiated amount of R to be paid in the second period: we have that second-period investment can only be $1 - (B + R)$. Thus the utility of the incumbent is:

$$u(\tfrac{1}{2} + W) + p(\tfrac{1}{2} + W)u(1 - (B + R))$$

During renegotiation the concessionaire obtains a rent $R \equiv R - W$ where the markup is given by its renegotiation ability. In this first stage, we assume that all firms are identical in this respect. Then an increase in the rent, due to reduced bargaining power by the incumbent, increases lowballing because of competition among firms. If we demote the extent of lowballing by L, then $L = ½ - B$, where B is the bid. By competition, we have that first-period spending commitments by government are $B + R$ and must equal first-period spending $½ + W$. Note the effect that, in equilibrium, the firms lowball to the extent of what they will obtain in the renegotiation process.

The important point is that the transfer implicit in the lowballing is a free transfer to the incumbent, which can use it to increase its spending in the first period, without it being at stake in the renegotiation process. Under the two assumptions of efficient bargaining and competition, this is sufficient to achieve the desired first- period investment by the incumbent. To make the point, we show that when the concessionaire has all the bargaining power, the incumbent can achieve its desired spending.

The private party has all the bargaining power. Since the government does not obtain any additional utility by renegotiation (because it is all appropriated by the firm), renegotiation keeps its pre-renegotiation utility constant. However, this utility includes the resources saved by lowballing: This means that there are free second-period resources. The incumbent's utility of no renegotiation is: $u(½) + p(½)u(½ + L)$, where the additional second-period resources are due to the fact that the first-period expenditure cost less than ½. Thus the problem for the winning bidder – after being awarded the contract – is to maximise its profits $R - W$ by renegotiation, under this constraint:

$$\max_{\{W,L\}} R - W \qquad (5)$$

$$\text{s.t. } u(\tfrac{1}{2} + W) + p(\tfrac{1}{2} + W)u(\tfrac{1}{2} + L - R) = u(\tfrac{1}{2}) + p(\tfrac{1}{2})u(\tfrac{1}{2} + L)$$

The first-order conditions of this problem arise from competition and the absence of loss on the part of the private parties. This means that $R = L + W$, i.e. second-period additional payments are equal to the extent of lowballing plus the additional first-period infrastructure investment. We obtain the expression:

$$u'(½+W) - p(½+W)u(½-W) + p'(½+W)u(½-W) = 0$$

which is identical to (4)! Thus, even when the firm has all the bargaining power, the incumbent can use renegotiations to achieve its desired allocation of expenditure.

Note that in this setting we get cost overruns because the firm makes an offer that is below costs; however, this is not inadvertent but endogenous to the model. The renegotiated amount R to be paid in the second period includes an amount to compensate the firm for lowballing in its period 1 winning bid.

The government has all the bargaining power[12]. In the case in which the incumbent has all the negotiating power, there is also no lowballing, since firms know that they will not be able to raise their profits through renegotiation. In that case, renegotiation takes place, but the cost of the additional work W is equal to period-two repayment R and we have a straightforward case of government attaining its preferred allocation of infrastructure investment by maximisation of its utility.

One way of giving all bargaining power to the government is by a congressional mandate that all additional works in renegotiation should be awarded by the concessionaire to the winner of an open auction for these additional works. In this case, there are no profits to the concessionaire even though it pays for the works in the first period (and is receives the compensation in the second period). There will be no lowballing, but the ability of the concessionaire to "lend" to the incumbent means that the incumbent is able to attain its desired allocation of investment.

In this model, the incumbent distorts the allocation of investment away from the optimal, in order to enhance its probability of being re-elected. Second-period infrastructure spending is reduced from its optimal amount. A simple generalisation of this model is to assume that in many cases the government is certain of being re-elected and does not want to distort the allocation of investment.

Results. We have shown that:

- governments include additional work during the renegotiation process
- renegotiations occur early (during construction) so that additional work can be added
- the cost of renegotiation is passed onto future administrations (or users, in the case of user fee revenue).

These predictions will be contrasted with the empirical evidence in Chile, Colombia and Peru below.

Extensions

The section covers some extensions of the original model.

Stochastic renegotiation. A more realistic situation for the government is that its election is in doubt only in certain cases, while in others it is fairly certain that it will be re-elected. In the case of certain re-election, the government prefers not to distort the allocation of expenditure across periods, since it will be in power with certainty in the next period. Assume that, with exogenous probability r, there is a shock which makes for a weak government (after awarding the PPP in a competitive auction). In that case, the re-election probability depends, in part, on its infrastructure investments in the first period. We model this as:

$$G(I_1,I_2) = u(I_1) + p^e(I_1)u(I_2),$$

where $p^e \equiv \pi p + (1 - \pi)$. 1 is a weighted average of the two probability functions. Now since the winning bidder in the project will renegotiate with probability π, the equilibrium bid falls by πL.

Consider the case of all bargaining power to the firm. In the event of a strong government [which occurs with probability $(1 - \pi)$], the resources the government saves as an effect of lowballing in the winning bid can be spent on additional infrastructure investment. If the government is weak, we are back to the previous models, but the amount R that must be paid back in the second period to the firm includes

an additional amount to compensate the firm for lowballing by the strong government that did not need to renegotiate. Thus the distortion in second-period expenditure is larger.

In the case where all bargaining power belongs to the government, there is no lowballing. Thus there is no change in the investment in the case of strong governments, because it does not obtain its desired investment at a price below cost. This also means that a weak government achieves its desired allocation of investment, as in the previous section.

Bargaining differences among firms. Assume that one of the firms is known to have more bargaining power than the others. This means that the amount of lowballing it offers (within the fixed price limit) does not compensate totally for the rents it obtains from renegotiation. In this case, the government – unless it has all the bargaining power so there is no lowballing – cannot achieve its desired allocation of investment across periods. The rents that the winning firm obtains will reduce the resources available to the government, resulting in a constrained optimum.

Accounting for PPPs

The appropriate way of accounting for PPPs in government balance sheets has been an issue for a long time. The solution Eurostat (2004) found was to make the decision based on the part of risks that the private party has to bear. If that party bears at least construction risk plus either availability or demand risks, the PPP is not included in the fiscal balance sheet. This decision seems to have been a compromise between the forces pushing for the exclusion of PPPs altogether and those that found that it was an unsound fiscal policy, as events would show[13]. More recently, several countries have been considering stricter approaches without an implicit bias to PPPs, denoted by the "control approach", because ultimate control determines whether to incorporate the PPP into the balance sheet ("Eurostat Treatment of Public Private Partnerships", 29/10/2010). Another alternative would be to reconsider the Ryrie rule that included all PPPs in the fiscal accounts.

A related important advance towards a sounder policy is the gradual incorporation of contingent obligations associated with PPPs into the fiscal accounts. Recently, Eurostat has established a separate set of accounts for contingent liabilities. See "Supplement on contingent liabilities and potential obligations to the EDP related questionnaire", Eurostat, 22/07/2013. Some Latin American countries (Chile, Colombia) have gone beyond this by applying standard financial tools to put a value on these liabilities.

Evidence from Chile, Colombia and Peru

In this section we report on the evidence for the hypothesis presented in this chapter. We begin with two examples that illustrate how the Chilean government has used renegotiations to circumvent Congressional approval for increased expenditures.

The rainwater collectors. In 2001, there was flooding in Santiago, which led to political pressures on the government to invest in mains collectors that would drain the rainwater from flood-prone areas. Since the government was unwilling to obtain the necessary resources from the budget or through increased indebtedness, it decided to renegotiate the scheduled contracts of the urban highways constructors, so that they would build the drains. The sums involved were in the hundreds of millions of dollars and required changes to the contracts of three urban concessions during the construction phase. The initial payments for the additional works were scheduled to begin several years in the future.

The San Antonio Bypass. Access to the main port of Chile was hampered by the fact that trucks had to go through the city of San Antonio to reach the port. The government decided to add a special access route to the port that bypassed the city. There were three options to finance the project: i) with fiscal resources; ii) through an independent self-financed tolled concession; or iii) as a non-tolled extension to Route 78 from Santiago to San Antonio. The president at the time, while a candidate, had promised the city that he would not impose a toll on the proposed access. Even though the government had ample access to the international credit markets, it decided to renegotiate the contract, valuing the 8-kilometre project at around USD 45 million. The payment consisted of a substantial increase in tolls with a further increase in 2012. It is not clear whether the expected revenue from increased tolls corresponds to the value of the project.

Concession programmes

Chile. As mentioned in the introduction, the Chilean Concession Program is considered among a handful of well-established PPP programmes (Hemming, 2005). Detailed data on concession contracts are available on the webpage of the Ministry of Public Works (MOP by its Spanish acronym) and the quality of fiscal accounting can be described as at par with average OECD levels.

Chilean public infrastructure PPPs were launched in 1993 with the El Melón Tunnel concession. As shown in Table 2.1, between 1993 and 2006, MOP awarded 50 PPPs: 26 roads, 10 airports, three jails, two water reservoirs, five public transportation infrastructure projects and four other miscellaneous projects. At the time, roads represented 89% of the USD 11.3 billion invested in PPPs.

By 2014 there were three hospitals and seven additional roads under construction, in addition to several large infrastructure projects (the underground Américo Vespucio Oriente, Part II and the renewal of the Santiago Airport PPP) that are planned to be auctioned in the near future[14].

The history of Chilean PPPs has not been without *contretemps*: In 2002, at the time when the programme was at its most active, corruption was discovered in the PPP unit. In order to avoid losing personnel to private firms, the PPP unit devised a scheme to raise the remuneration of its employees[15]. Consulting firms hired by the PPP unit would charge extra amounts. These firms would then hire the employees of the PPP unit as experts, and pay them for non-existent work, thus raising their total remuneration. The ensuing scandal sent the Minister of Public Works to prison and removed almost all of the executive cadres in the PPP unit. For this reason, as well as the excess expenditure on PPPs in the previous years (studies, contingent guarantees, subsidies, etc.), there were almost no new PPPs for several years, until the end of the decade when there was a new push in favour of PPPs[16].

Table 2.1. **Chilean PPPs and renegotiations**
(in USD millions)

	Number of projects and renegotiations[1]	Average	Original investment estimate[3]	Renegotiated amounts[4]	Total investment	Renegotiations as fraction of original value
Pan American Highway	8/28/24[2]	24	2.875	843	3.719	0.33
Interurban highways	13/22/25	27	2.118	426	2.544	0.23
Urban highways	5/12/0	32	2.421	1.332	3.752	0.33
Highways	26/62/49	27	7.414	2.601	10.015	0.89
Airports	10/9/12	13	384	48	432	0.04
Prisons	3/1/4	23	221	113	335	0.03
Water reservoirs	2/2/3	28	120	24	144	0.01
Public Transport	5/2/2	15	157	26	183	0.02
Other	4/2/0	23	169	1	170	0.02
Other PPPs	24/16/21	18	1.051	213	1.264	0.11
Total or average	50/78/70	22	8.465	2.813	11.279	1.00

Source: Engel et al. (2009a).
Notes: (1) Includes cancelled projects. (2) Projects/bilateral negotiations/arbitration panels, (3) Excludes cancelled projects. (4) Includes the amounts required to cancel 3 concessions.

Colombia. In Colombia, PPP partnerships in public infrastructure began in 1993 and, by 2012, approximately 32% of its road network was under PPP contracts[17]. By 2012, the government had signed 48 contracts in the transport sector, and local authorities were also involved in PPPs. There were serious problems with the first PPPs, leading to changes in the rules and new "generations" of PPPs. There have been four generations of PPPs altogether and for the current one, the legal environment for PPPs in Colombia is considered to be very good.

The first PPPs were not a success. The lack of road-shows for international investors and the short preparation times meant that only local firms could participate, and thus seven of thirteen projects were negotiated directly without an auction. Among many other problems, there was no detailed road project, so it was difficult to plan the eminent domain purchases for the roads, which caused long delays. Successive "generations" of PPPs improved on previous mistakes and the current fourth generation has been fairly successful. The main public infrastructure PPPs are roads, of which 27 had been awarded up to December 2010, for a total contract value of USD 6.5 billion and covering 4 800 km of roads (Bitran *et al.*, 2013). Currently, there are 48 extant PPP projects for roads (WBI, *op. cit.*).

Peru. Peru's PPP programme on public infrastructure is more recent than that of Chile and Colombia. Though the initial legislation dates from 1991, only one road was commissioned in the 1990s. That PPP was renegotiated several times during its 13-year duration. A new start in Public Private Partnership began in 2001, with the Lima Airport concession; thus, the programme only really got going after that date. In 2008, a new law modernised and added flexibility to Peruvian PPPs in public infrastructure. This means that the Peruvian system for PPPs has learned from the errors of other

countries and is considered well-conceived. This explains the relative lack of renegotiation, apart from the fact that the programme is more recent. Moreover, there are fewer recent projects.

By 2010, there were 15 road PPPs, with a total initial value of USD 2.5 billion, i.e. it was still a relatively small programme in comparison to those of Chile and Colombia. Either because the programme is newer or because of a better legal design, there have been fewer renegotiations.

The data

The following table, derived from Bitran *et al.* (2013), provides some basic information on road PPPs in the three countries.

The following facts are interesting. First, renegotiations begin early, during the construction stage. Second, each country has a large number of renegotiations, but there is a substantial difference between the numbers for Peru and Chile and those for Colombia. Chile and Peru average 3.3 and 4.8 renegotiations per concession respectively, while Colombia has more than 20 per project. While the total fiscal cost, as a percentage of the initial value, is less than 20% in Chile and Peru, in Colombia the fiscal cost almost triples the initial cost. Moreover, Colombia has increased the term by a third, while the other countries have extended the term by less than 5%. On the other hand, Colombia has managed to use renegotiations to change the design of the projects, adding on average 25% to the project length, while the other countries have kept the length of the original projects.

Table 2.2. **Characteristics of renegotiations in each country**

	Chile	Colombia	Peru
Total road concessions	21	25	15
Avg. initial value (million USD 2009)	243	263	266
Avg. term length (years)	25.2	16.7	22.1
Mean length (km)	114	195	383
Mean concession years elapsed	12.5	9.0	4.6
Concessions with renegotiations	18	21	11
Total number of renegotiations	60	430	53
Avg. time of first renegotiation (years)	2.7	1.0	1.4
Avg. cost of renegotiations per road (million USD 2009)	47.2	255.8	28.8
Avg. term increase (years)	0.9	6.3	0.8
Avg. length increase (km)	0	54.6	0

Source: Bitran *et al.* (2013).

Standardised comparisons among countries

The previous comparisons suffer from the fact that Peru has had concessions for a much shorter time (except for one early PPP). Appropriate comparisons should consider the difference in age of concessions before performing a comparison on the propensity to renegotiate.

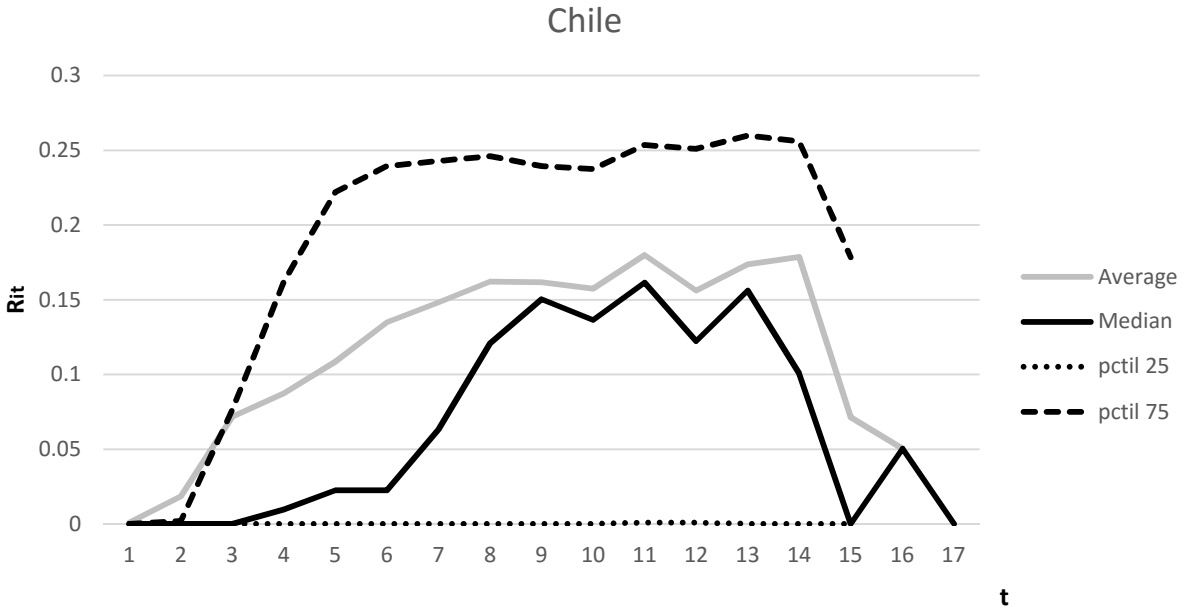
Renegotiations during construction

A simple comparison is to examine the extent of renegotiations during construction. The prediction of the model is that there will be substantial renegotiations during construction. In this respect, it is useful to note that, in general in developed countries, the maximum increase in cost over the final estimates for road construction is of around 10%[18]. This is also the case for private infrastructure investments. In Chile this is the case for road PPPs, as the value of renegotiations to the construction value is 5.4%. There is excessive variance in these results. In the case of Peru, the equivalent value is 12.5% and in Colombia it is an incredible 56% on average.

It is clear from the figures that, first, Colombia is in a class by itself in the extent of renegotiations. Second, there is much variation in the extent of renegotiations during construction in different PPPs.

Peru and Chile look similar in terms of their renegotiation patterns. However, this may be due to the fact that Peru's programme is younger, so most concessions have run for a shorter period. We try to correct for this by looking at the extent of renegotiations of concessions with the same age. Thus we examine the accumulated renegotiations of PPPs of a given age. Our standardised variable is the ratio of accumulated renegotiations in PPPs of age t to total investment in those PPPs. Let $R_{i\tau}$ be the amount renegotiated in year r in concession $i = 1,\ldots,n$ and I_i be the initial investment in the concession. Then $R_{it} \equiv \Sigma_{\tau \leq t} R_{i\tau}$ is the accumulated amount of renegotiations up to date t in concession i[19]. The ratio compares the total amount renegotiated in all concessions of age t to the total investments.

Figure 2.2. **Profile of renegotiations by PPP age, quartile and country**



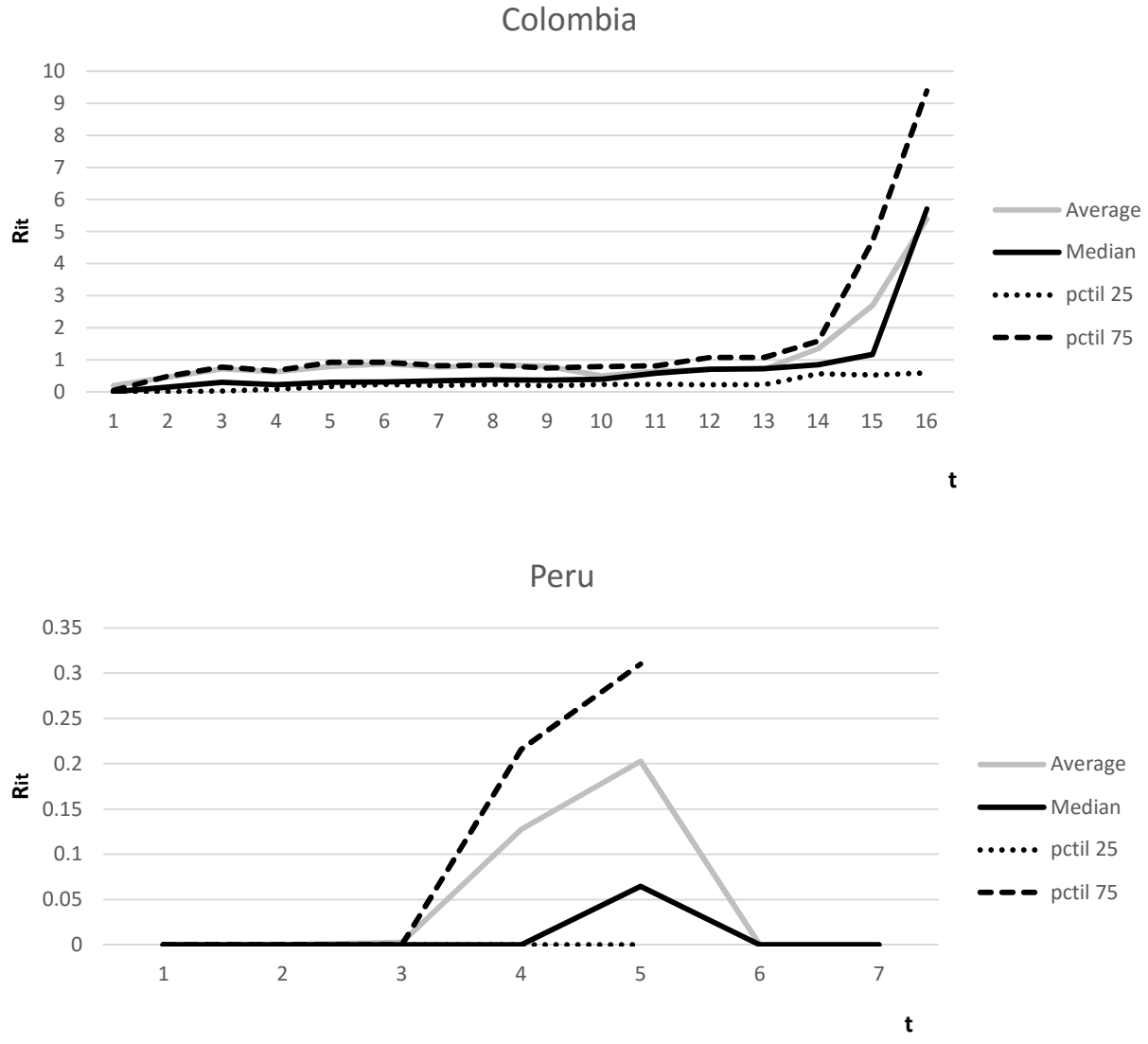


Figure 2.2 shows this variable graphed for the three countries. This figure allows a better understanding. The figure shows the data divided by quartiles, so that the terms in (6) are divided into quartiles according to the amount renegotiated[20].

$$\rho_t \equiv \frac{\sum_1^{n_t} \mathcal{R}_{it}}{\sum_1^{n_t} I_i} \qquad (6)$$

In the case of Chile, we observe that some concessions, even after 15 years, have no relevant renegotiations (in the 25% percentile). Other concessions are renegotiated almost from the beginning. On average, renegotiations as a percentage increase until the 14th year, and there are too few concessions to make conclusions after that. In any case, the percentage even at the 75% percentile does not reach 30%

of the initial value. Notice, however, that in the projects in that percentile, renegotiations take place during the first four years, i.e. during construction.

In the case of Colombia, the results are skewed by the disastrous effects of the first generation of concessions (the early concessions are those dating over 14 years since they were awarded). The average renegotiation is also very high in all years, perhaps because the first generation concessions weigh every year. When considering the median, the level of renegotiations is lower, but it increases significantly at year 10, which seems to indicate that the second generation of concessions was not that successful in eliminating the problems caused by the initial design mistakes.

Peru has fewer concessions and they are more recent, so the figure is not as informative. Nevertheless, the average and 75 percentile are higher than for Chile (though obviously far from the Colombian figures) from the third year onwards.

Testing the predictions

This section describes the tests of the predictions of the model, using the results in Bitran *et al.* (2013).

Type of renegotiation. A first thing to notice is that most renegotiations are by mutual (or bilateral) agreement, so there is no conflict among the parties. In Chile, 83% of renegotiations lead to these agreements and it is also true for 98% of the cases in Colombia and in all cases in Peru. The arbitration option, which reveals the inability to reach an agreement, is only chosen in 17% of the cases in Chile and 2% in Colombia.

In Chile and Peru, most renegotiations are led by the government, and to a lesser extent in Colombia, with 40%, but where jointly led agreements have about the same percentage. It can be concluded that renegotiations find their justification in the political economy. This option transfers more of the fiscal costs onto future governments than arbitration, and may be one of the reasons for the preference of governments for this type of renegotiation.

When do they occur? In the standard interpretation of renegotiations, they should be more frequent as time passes and as previously uncertain events take place. In all three countries, however, more than half of the renegotiations took place during the construction phase, that is, within the first four years of the contract. There are three interpretations for these observations. One is that projects were not carefully designed and require modifications. This can be described as the incompetent interpretation of renegotiation. The second interpretation is that government wants to add additional works without going through the normal budgetary process and may also want to take advantage of the equipment already on site. Third, the firm may want to recoup from lowballing its offer. These last two interpretations work together in the model.

When is the cost of renegotiations paid? A large chunk of the cost of renegotiations falls onto future governments, as predicted by the model. In Peru, only 14% of renegotiations have fiscal costs that fall on the current government. In Chile, most renegotiations involve the current government incurring some costs, but 90% of renegotiations have some costs falling on future governments: by a combination of extending the project term, raising future tolls and assuming additional risks. In Colombia, most renegotiations (88%) have costs falling on the current government. However, 6% of renegotiations involve future costs, and these account for 60% of all fiscal transfers.

The extension of the project term is one way of transferring cost to future administrations. When the term of the concession ends, the government in place has a valuable asset that it can either operate by

itself, obtaining toll revenue, or it can put it to auction, in exchange for additional works and revenues. Chile and Peru have used term extensions, but this has added less than a year to the typical concession. In the case of Colombia, on the other hand, the average extension has been of 6.5 years. This means that a future government that would have received the resources associated to the released PPP will be denied their use (assuming a presidential term of less than seven years). However, this was the case of the 15 early concessions whose lengths were extended by an average of 70%. More recent PPPs have had a variable term, and term extensions have been avoided.

What do they pay for? Engel et al. (2009b) show that in the case of Chile, for those renegotiations where data is available, 84% of the sums contracted were designated as additional investments, with the remaining 16% designated as additional payments for works included in the original contract. This is consistent with lowballing by firms in the original auction, as suggested by our model.

In Colombia, only 5% of renegotiations involved road extensions, but these accounted for a third of the total renegotiated value. As Bitran et al. (2013) mention, concession projects have been used to achieve objectives for which they were neither intended nor designed. These authors add that the costs of these additional stretches of road may be higher than registered in the data, because these extension projects are also renegotiated, and the added costs are no longer included as part of the original renegotiation. In Colombia there was one example of extreme lowballing that eventually led to the cancelation of the contract.

Conclusions

In Engel *et al.* (2013) we have shown that one of the benefits of PPPs for incumbent governments is that they allow them to exceed spending limits, because, as in England, PFIs were not part of the balance sheet, given the then current Eurostat rules. In this chapter we note that there is a further advantage to PPPs from the point of view of incumbent governments, which we studied originally in Engel *et al.* (2009a). We showed that, because PPP renegotiations are outside of the purview of Congress they can be used to increase government spending. This leads to a set of predictions: i) competitive firms can make loss-making offers, expecting to recoup their losses though renegotiation., ii) these renegotiations can also be used to increase government expenditure, iii) governments will shift part of the payments onto future governments and iv) we will observe renegotiations during the construction stage of the PPP. We describe data on renegotiations of highway concessions in Chile, Colombia and Peru that are consistent with the results of our model and also show significant differences among countries in the magnitude of renegotiations.

Notes

1. Though these PPPs suffered during the Asian crisis.

2. As in Hart (2003), Bentz *et al.* (2005), Bennett and Iossa (2006) and Martimort and Pouyet (2008).

3. For more on renegotiations of infrastructure projects, see Guasch *et al.* (2006a), Guasch *et al.* (2006b), Guasch *et al.* (2007) and Guasch *et al.* (2008). For developed countries, Gómez-Ibañez and Meyer (1993) have also observed that renegotiations are common.

4. There is scope for corruption in renegotiations of contracts, even though the renegotiation itself is justified. See Guasch and Straub (2009) for evidence of corruption in renegotiations.

5. Note that PVR (Present Value of Revenues) contracts can avoid some renegotiations or at least constrain its bounds [Engel *et al.* (2001)]. By making it easy for the Public Works Authority (PWA) to buy back a PPP project at a predefined value, it can buy back a contested project and auction it again to a new bidder, with the additional investment. Even if it does not do so, the threat constrains the bounds of the bargaining set.

6. Cantarelli *et al*. (2010) is a good reference to the causes of cost overruns in infrastructure projects (not only PPP projects).

7. A recent study by Rosenfeld (2014) shows that the most important causes of cost overruns in construction projects in general (not circumscribed to PPPs or even infrastructure projects) are: i) premature (i.e. poor) tender documents; ii) too many changes in requirements; iii) unrealistic tendering prices. This is consistent with our analysis of renegotiations of PPPs, except for our assumption that these causes can be endogenous in PPP projects.

8. See Engel *et al.* (2013).

9. We can write $p(I1) \equiv P(u(I1))$, where $P' > 0$ and $P'' < 0$, then $p' > 0$, $p'' < 0$. Thus our formulation is reduced for a case where the probability of re-election depends on the first-period utility.

10. Henceforth we will not consider the case of privatisation and will concern ourselves only with PPPs and conventional provision.

11. It is possible to control these underhand fiscal loans, but they require an overhaul of the fiscal accounts system, so that these hidden obligations are revealed.

12. In Engel *et al.* (2009a) we show that this result is also true for the intermediate case, where each party has bargaining power.

13. Observe that, at its inception, the UK Private Finance Initiative used the Ryrie rules. Under these rules, all PPP investments were required to be included in the budget of its sector (Engel *et al.,* 2014, p. 25). Irwin (2007) cites the case of New South Wales (Australia), where the Auditor-General required that all assets and liabilities of the privately-financed treatment plants be included in the state government's balance sheet.

14. Most Chilean seaports are managed under PPPs with excellent results in terms of productivity and total costs, but they are usually considered separately, as they are governed by a separate legislation.

15. The extreme rigidity of the public system meant that salaries were non-competitive in the area.

16. See Engel *et al.* (2014) or Bitran *et al.* (2013).

17. World Bank Institute, "Public-Private Partnerships in Colombia: Scaling-up Results", October 31, 2012.

18. See, for example, "*The Cost Estimating Manual for WSDOT Contracts*, Washington State DOT, September 2008, p. 14.

19. Where t is less than the age of PPP i.

20. That is, the 75 quartile considers the 25% of PPPs which renegotiate most at that age.

References

Alessina, Alberto and Guido Tabellini (1990), "A positive theory of fiscal deficits and government debt", *Review of Economic Studies,* 57:403-414.

Athias, Laure and Antonio Nuńez (2008), "Winner's curse in toll road concessions", *Economic Letters,* 101 (3):172-174.

Laure Athias and Antonio Nuńez (2009), "The more the merrier? Number of bidders, information dispersion, renegotiation and winner's curse in toll road concessions", *Working paper,* University of Lausanne, August.

Athias, Laure and Stephane Saussier (2010), "Contractual flexibility or rigidity for public private partnerships? Theory and evidence from infrastructure concession contracts", *Discussion Paper 2010-3,* Chaire EPPP, Institut d'Administration des Entreprises, July.

Bennett, John and Elisabetta Iossa (2006), "Building and managing facilities for public services", *Journal of Public Economics,* 90:2143-60.

Bentz, Andreas, Paul A. Grout and Maija Halonen (2005), "What should governments buy from the private sector–assets or services?", University of Bristol.

Bitran,E., S. Nieto-Parra and J. Robledo (2013), "Opening the Black Box of Contract Renegotiations: An Analysis of Road Concessions in Chile, Colombia and Peru", *OECD Development Centre Working Papers*, No. 317, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/5k46n3wwxxq3-en.

Cantarelli, Chantal C., Bent Flybjerg, Eric J.E. Molin and Bert van Wee (2010), "Cost overruns in large-scale transportation infrastructure projects: Explanations and their theoretical embeddedness", *European Journal of Transport and Infrastructure Research,* 10(1):5-18.

Engel, Eduardo, Ronald Fischer and Alexander Galetovic (2001), "Least-present-value-of- revenue auctions and highway franchising", *Journal of Political Economy,* 109(5):993-1020.

Engel, Eduardo, Ronald Fischer and Alexander Galetovic (2009a), *Soft budgets and renegotiation in public-private partnerships*, Technical Report 15300, NBER, August.

Engel, Eduardo, Ronald Fischer, Alexander Galetovic and Manuel Hermosilla (2009b), "Renegociación de concesiones en Chile", *Estudios Públicos,* 113:151-205, Verano.

Engel, Eduardo, Ronald Fischer and Alexander Galetovic (2013), "The basic public finance of public-private partnerships", *Journal of the European Economic Association,* 11(1):83-111, February.

Engel, Eduardo, Ronald Fischer and Alexander Galetovic (2014), *Public-Private Partnerships: A Basic Guide,* Cambridge University Press.

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

Guasch, José Luis (2004), "Granting and Renegotiating Infrastructure Concessions: Doing it Right", The World Bank, Washington D.C.

Guasch, José Luis and Stephane Straub (2009), "Corruption and concession renegotiations: Evidence from the water and transport sectors in Latin America", *Utilities Policy*, 17:185-190.

Guasch, José Luis, Jean-Jacques Laffont and Stephane Straub (2006a), "Renegotiation of concession contracts: a theoretical approach", *Review of Industrial Organization*, 29:55-73.

Guasch, José Luis, Jean-Jacques Laffont and Stephane Straub (2006b), "Renegotiation of infrastructure concessions: An overview", *Annals of Public and Cooperative Economics*, 77:479-493.

Guasch, José Luis, Jean-Jacques Laffont and Stephane Straub (2007), "Concessions of infrastructure in Latin America: Government-led renegotiations", *Journal of Applied Econometrics*, 22(Jo):1267-1294.

Guasch, José Luis, Jean-Jacques Laffont and Stephane Straub (2008), "Renegotiation of concession contracts in Latin America", *International Journal of Industrial Organization*, 26:421-442.

Hart, Oliver (2003), "Incomplete contracts and public ownership: Remarks and an application to public-private partnerships", *Economic Journal*, 113:C69-C76.

Irwin, Tim (2007), "Government Guarantees: Allocating and Valuing Risk in Privately Financed Infrastructure Projects", The World Bank.

Martimort, David and Jérôme Pouyet (2008), "To build or not to build? Normative and positive theories of private-public partnerships", *International Journal of Industrial Organization*, 26:392-411.

Rosenfeld, Yehiel (2014), "Root-cause analysis of construction-cost overruns", *Journal of Construction Engineering and Management*, 140(1), January. http://dx.doi.org/10.1061/(ASCE)CO.1943-7862.0000789.

Chapter 3

The renegotiation of public private partnership contracts: An overview of the recent evolution in Latin America

José Luis Guasch, University of California,USA

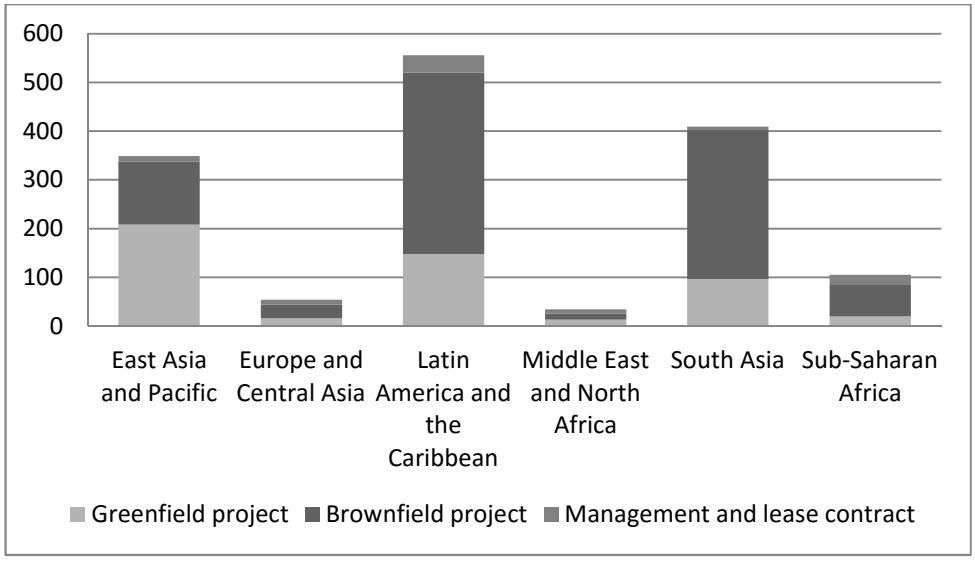
Daniel Benitez, Irene Portabales and Lincoln Flor, World Bank

This chapter analyses the experience of renegotiations in Latin America: the lessons learned, reflections made and their high incidence, based on the evolution of PPP contracts over the last 25 years.

The chapter also shows how countries, via new PPP laws, regulations, norms and specific platforms, can reduce the incidence and the incentives to renegotiate contracts. Based on experience over the last two decades, many countries in the region have improved renegotiation practices and regulations/frameworks through their PPP legislation and associated regulations, e.g. Peru (2008), Chile (2010), Colombia (2011) and Mexico (2012.) The preliminary findings show advances in the implementation of platforms to address renegotiations and new trends in the renegotiations of contracts, particularly in complex projects and where governments are providing financial or credit enhancement, such as sharing risk or co-financing.

Over the last 25 years, more than 6 000[1] public-private partnership (PPP) projects have reached financial closure in developing countries. This number, the benefits secured and the trends of the PPPs suggest that private participation in infrastructure has become a good, viable option to complement public investment for the development of infrastructure and the provision of public services. As well as supporting economic growth, improving quality of life and contributing to poverty reduction, it provides an alternative for financing infrastructure.

Figure 3.1. **Number of PPP transport projects in developing countries by type and region (1984-2013)**

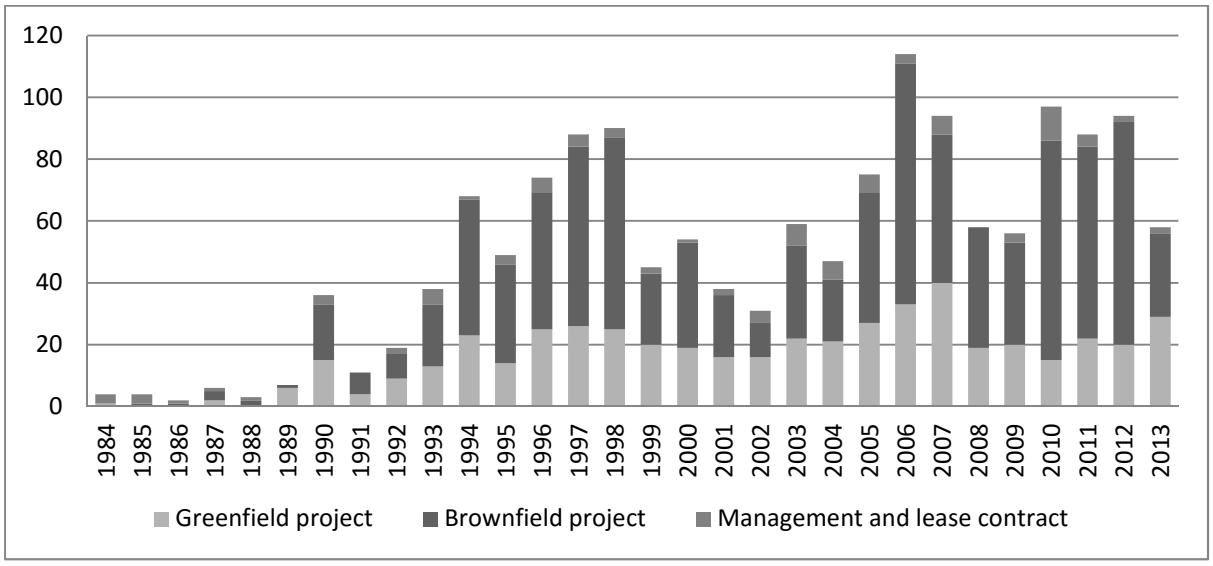


Source: Based on PPI Database data, World Bank.

The transport sector comprises 25% of the total PPP contracts of the developing world. Three regions and countries lead this process: Latin America (Brazil), South Asia (India) and East Asia and the Pacific (China) – all large emerging economies with high economic growth rates. Almost 90% of worldwide PPP transport projects have been concentrated in these three regions over the last 30 years. In the developing world, in 2013, about 78% of the total investment commitments in projects in the transport sector were concentrated in Brazil and India.

By contract type, brownfield projects are predominant in transport PPP projects, although the number of these has fluctuated according to economic cycles. The number of greenfield projects has remained relatively constant over the last twenty years. In general, brownfield projects are usually easier to implement than greenfield projects, which are more risky, complex and uncertain, in particular in traffic forecasting. In this context we should expect a greater proportion of potential contract renegotiations associated with greenfield projects. The low number of management contracts suggests the importance of the infrastructure gap that developing countries have tried to reduce mainly through a high number of Build-Operate-Transfer (BOT) PPP projects.

Figure 3.2. **Number of PPP transport projects by type and year in developing countries**



Source: Based on PPI Database data, World Bank.

A big legacy and a significant concern concerning PPP contracts in Latin America (LCR) over the last 25 years is the high number of renegotiations. Overall in the transport sector, over 75% of contracts are renegotiated, and in some countries the incidence of repeated renegotiations of the same project is astonishing. For example, between 1993-2010, Colombia showed seven times more renegotiations for road PPPs than in Chile or Peru (Bitran *et al*., 2012 and Guasch, 2014), partly associated with additional investment in infrastructure that was not included in the original PPP contract. This suggests poor project preparation studies – critical to assess the real dimension/scope of the infrastructure projects – poor contract management and significant consented opportunism and abuse. Furthermore, as outcomes of the negotiation process, additional payment commitments increased the fiscal impact and considerably reduced the value for money of the PPP project, estimated on the basis of the original contract (Bitran *et al.,* 2012).

In this context, a poor project preparation study by the government (scope of the project, level of investment, improper and ambiguous risk allocation, minimum requirements, selection criteria and PPP procurement procedures) and lack of effective contract monitoring can lead to potential contract renegotiation from both parties, public and private. Political reasons to accelerate the implementation of PPP projects with limited or lack of project preparation and proper filters (for example, without feasibility studies and proper evaluations by experts) can lead to consecutive renegotiations to accommodate the continuity of the PPP contract and the implementation of the contract commitments[2]. There is no reliable systemic data collected on PPP contract renegotiations. The most complete study is by Guasch (2004 [updated in 2014]) which shows that, between 1980-2002, 78% of the PPP contracts in transport infrastructure in Latin America were renegotiated fairly quickly after the signature of the contract (3.1 years).

Important lessons learned in PPP renegotiations in Latin American countries were collected, and motivated them to introduce key changes in the PPP legislation in countries with PPP experience (Peru, 2008 and Chile, 2010) and recently Colombia (2011) and Mexico (2012). The new regulations established a freeze on renegotiations for the first three or more years, clarify risk allocation,

compensations and rate of return, and state that no contract modification can alter the risk allocation matrix, etc. Renegotiations also occur in other countries with extensive PPP experience, such as France, the USA or the United Kingdom.

Table 3.1. **Percentage of renegotiated contracts by region and sector**

Region / country	Sector	% of renegotiated contracts	Source
Latin America and Caribbean	Total	68%	Guasch 2004 (2012)
	Electricity	41%	
	Transport	78%	
	Water	92%	
US	Highways	40%	Engel Fischer & Galetovic 2011
France	Highways	50%	Atthias and Saussier 2007
	Parking	73%	Beuve *et al.* 2013
UK	All sectors	55%	NAO 2001

Source: Estache, Antonio and Stéphane Saussier, "Public-Private Partnerships and Efficiency: A Short Assessment", CESifo DICE Report 12 (3), 2014, 08-13.

Even under a context of renegotiation, the PPP programmes have proved quite effective on average to bring about the desired benefits and reduce the infrastructure gap that most countries face. While the benefits have been quite significant, they could have been even higher had the programme and project been better designed and implemented. There have been issues and problems mostly related to the post-contract award management of projects.

While the ex-post contract award management of PPP projects is indeed critical for securing the expected benefits of projects, it has in general not been an important priority for governments, or treated lightly, or as a sort of residual to be taken care of. It is indeed surprising when noting that most PPP contracts have durations of 15-30 years, or for PPPs in the social sector which can involve more complexity; for example, in the health sector, where fixing the level of service and monitoring is a great challenge for governments. Issues do and will come up, and they are often not well specified or detailed in the contract, in particular in dynamic markets where changing cost structure is aligned to the main drivers (for example, the high prices of commodities) or demand has increased above expectations or levels of service. This all creates opportunities for abuse and opportunism, and significantly raises the likelihood of conflicts among the two parties. The conflicts appear at all levels: i) contract-based; and ii) beyond the contract through renegotiation.

To some extent, disputes and differences in interpreting the contract are to be expected, and are considered business-as-usual, but this applies only to those which are contract-based and not under renegotiation (contract/risk modifications). Yet the incidence of both has been and is a concern, particularly that of renegotiation. Renegotiations have been, by and large, the critical problem facing PPPs. Given its implications on value for money and the legitimation of PPPs over traditional procurement, there is a need to be prepared and to diffuse, pre-empt and address the issue.

The PPP contract, processes and institutionalism are the key determinants, along with contractual integrity, that impact on the likelihood of securing benefits and avoiding conflicts. If the key contractual clauses are not well written (or risks are not well allocated) the benefits will be reduced and the incidence of conflicts significantly increased. If the oversight/fiscalisation and regulation is not properly set up, again the benefits will be reduced and conflicts increased. If the conflict resolution mechanisms are not predictable and transparent enough, interest and benefits will likely decline.

As reported here, a very significant number of PPPs have been renegotiated shortly after the contracts have been signed. These renegotiations occur frequently in a short period of time after financial close (or even before). The problem is especially acute in some sectors, notably transport and the supply of water and sanitation. Most renegotiations are initiated by private-sector operators and, to a lesser extent, by government. Thus it is indeed critical to understand the issue, its causes and how best to address them so that PPP programmes can generate the expected benefits. This is the challenge of this study, which analyses and evaluates the renegotiations paradigm over the last 25 years.

Definitions: What is renegotiation?

A renegotiation of PPP contracts involves a change in the original contractual terms and conditions, as opposed to an adjustment in the payments (or tariffs) that takes place under a mechanism defined in the contract. Those contractual changes as described below in Table 3.2.

The challenge in "good" renegotiations is to improve the value for all parties, including users of the services, but account for the possible fiscal consequences of the contract modification.

Renegotiation requests are often linked to aggressive bids, which have become quite widespread. The rationale for an aggressive bid is that it is presented at the time of auction, with the intention of being awarded the contract and later, away from competitive conditions, renegotiating better terms with the government bilaterally. If there is only one valid bid, under weak institutions, the negotiating position of the government is undermined and, in general, it will try negotiating the PPP contract and accepting part or all of the renegotiation conditions[3]. An aggressive bid is defined when the present value of revenues (R) is insufficient to cover the present value of costs at the time of the bid, including taxes and depreciation of the PPP project, thus generating losses on the return on capital investment:

$$R = (P - C)Q - T - D < rK$$

where:

	R: Revenues	T: Taxes
	P: Unitary price	D: Depreciation
	C: Unitary cost	rK: Rate of Return of CAPEX
	Q: Quantity	

Table 3.2. **Definition of renegotiation and examples**

Renegotiation occurs when:	Examples
i) there is a change in the risk matrix assignment and/or in the conditions of the contract, or	• Reduce the level of services (airports, from IATA A to B). • Defer or advance investments for several years. • Extension of the contract term. • Reduction guarantees (financial bonds) • Increase the guarantee of the government (to pay lenders). • Delays in the reduction of tariffs (tolls). • Reduce the thresholds of the economic equilibrium of the contract, etc.
ii) there is a change in project scope (if this was not regulated in the contract)	• Government requests new investments. • Reduction of fees for the government. • Avoid bankruptcy of the operator. • Changes in contract scope, etc.
Renegotiation does not occur when:	• Tariffs are adjusted with a formula set in the contract or indexed by inflation or other index. • Triggers are activated and eventual investments become mandatory. • Payments to operator if they are regulated in the contract, etc. • Correction of errors in the contract, which do not create obligations, commitments or contingencies (typos, contradictions that affect the implementation of the PPP contract, etc.).

Under a legal framework without restrictions, renegotiations can occur at any time after the PPP contract is signed. Usually the results of renegotiations are: improvement of the terms of the operator and/or investors, reduction of efficiency, reduction of quality for users and adverse fiscal impact, including increases in direct and contingent liabilities. Some have benefited the users, but they are a very small proportion of the renegotiated contracts.

Renegotiations typology

Renegotiation initiations can be classified as being initiated by government, by the operator or concessioner, by both or ambiguous. When initiated by the government, the reason usually is because of a change in priorities, a change of government party or that the government cannot fulfil its contractual obligation. Politically opportunistic reasons may also exist (in some cases, government wants to anticipate or expand investments, or delay the increase or decrease in tariffs to augment popularity prior to elections, etc.). On the other hand, when initiated by the private sector, renegotiations are due quite often to opportunistic reasons – seeking to maximise the present net value of the PPP contract (more revenue, fewer costs or investments and/or less risks), but also protecting against shocks (domestic or external) that significantly unbalance the financial equilibrium.

Table 3.3. **Renegotiation classifications: Initiated by the government, the operator or concessioner, by both or ambiguous**

	Both Government and Operator	Government	Operator
All sectors	13%	26%	61%
Water and Sanitation	10%	24%	66%
Transport	16%	27%	57%

Source: Guasch (2004, updated 2014), Concesión y renegociar las concesiones de Infraestructuras hacerlo bien- Análisis de renegociar las concesiones en América Latina y el Caribe, mediados de la década de 1980-2010.

Why renegotiation is an important issue: implications

The concerns about the incidence of renegotiations are biased in that:

- They eliminate the competitive effect of the auction including transparency, questioning the credibility of the model/programme.
- They lead to asymmetric information and lack of negotiation skills of the public sector and lack of competitive pressures to renegotiate the contract.
- They create distortion in public tenders, in that the most likely winner is not the most efficient operator but the most expert/qualified in renegotiation.
- They decrease the benefits/advantages of PPPs and the welfare of users, usually with a fiscal impact by increasing liabilities to the government.
- While some can be efficient, many of them are opportunistic.

In the case of unsolicited bids, when the only available bid is presented by the proponent, some PPP legislation allows governments to negotiate the contract conditions. Even this is not a formal renegotiation; the same challenges are present. Other PPP legal frameworks regulate a negotiation period after the contract is awarded, where under threshold the parties will agree on specific topics.

Some renegotiations are the consequence of dispute resolution decisions, where the government or the operator has to pay the other party or when there are reductions in costs or risks. The typology of costs associated with disputes, conflicts and renegotiations are:

- Time and financial resources: to address and resolve the conflict.
- Social and political: Since conflicts tend to be highly visible and have extensive coverage by the media, leading to public discontent, the PPP model tends to lose credibility and public support, and the government can be weakened.
- Financial/fiscal: Often the results of the negotiation have a fiscal cost to the government.
- Economic and social: Users tend to be adversely affected by the results of conflicts, particularly renegotiations (in terms of reduced access, higher or lower prices and delays in service quality).

On average, these costs are quantified as 3-15% of the investment; the impact and uncertainty of the results of the conflict resolution can be quantified as adding 2 to 4 percentage points onto the capital cost of the project.

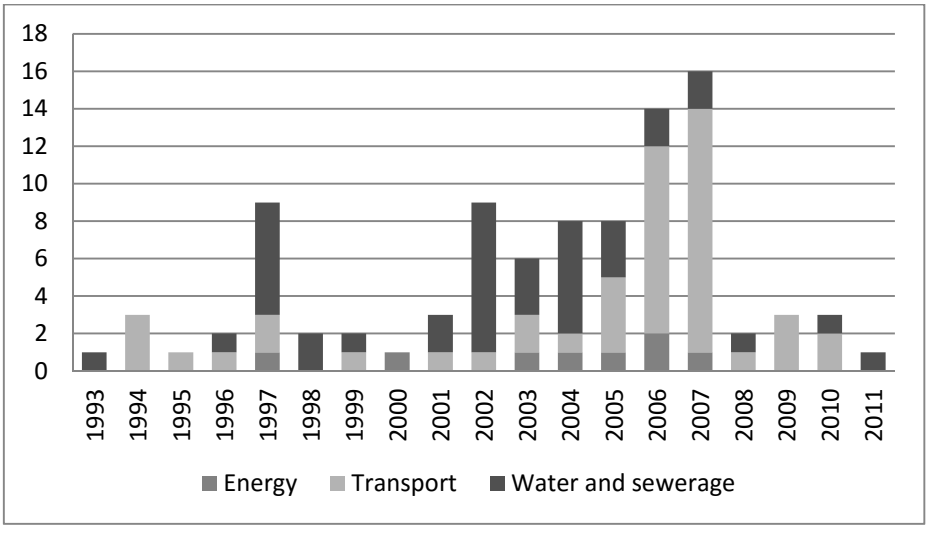
Evidence

Overall incidence of renegotiated contracts in Latin America and the Caribbean

From 1990 to 2013, more than 1 700 PPP projects reached financial closure in Latin American countries, 41% of the total PPP contracts being concentrated in one country (Brazil).

As the projects become more complex, an increase in government support is usually needed. In Latin America between 2000 and 2007, a surge in government support for PPP projects occurred, including transport infrastructure, followed by a sharp decline after the global financial crisis.

Figure 3.3. **Projects with government support**



Source: Based on PPI Database data, World Bank.

The increase in the complexity of PPP projects might suggest more incidence of renegotiation but, on the other hand, the countries with PPP experience have improved their renegotiation regulations in their PPP legislation, which intends to reduce incentives and manage renegotiations with better structure and oversight.

As shown in the table below, the incidence of renegotiation continues to be significantly high, averaging 68% overall and 78% in transport infrastructure, and is achieved relatively soon after the award of the contract, on average, one year later [3.1 years between 1980 and 2000 (Guasch, 2004)]. The most common sectors continue to be transport, water and sanitation; although social sector PPPs are gaining ground.

Table 3.4. **Percentage of renegotiated PPPs and average time to renegotiation**

Sectors	Percentage of renegotiated PPP	Average time to renegotiation
All Sectors	68%	1.0 years
Electricity	41%	1.7 years
Transport	78%	0.9 years
Water	87%	0.8 years
Social Sectors	39%	1.2 years
Other Sectors	35%	1 year

Cancel or renegotiate contracts

Governments with weak institutions face a crucial trade-off between the cancellation and renegotiation of a PPP contract to avoid, for example, a potential bankruptcy. The number of cancelled contracts in Latin America is low but has increased in the last 30 years, about 5% of total PPP projects granted, as shown in Table 3.5 below. This rate is slightly higher than the average for developing countries (4.3%)[4]. When contrasted with the number of renegotiated contracts, it strongly hints to the difficulty of governments to commit to a policy of no-renegotiation and assume the political consequences of cancellations of PPP projects. One would expect that number to be significantly large, particularly at the beginning of a programme, where government could signal a credible policy of no renegotiations by rejecting the request. Yet, when confronted with renegotiation, governments can opt to deny the request and leave the decision to the private operator regarding whether or not to abandon the concession. Yet that seldom happens and, for a number of reasons that we detail below, governments find it easier to allow the renegotiation of contracts (Harris and Pratat, 2009). This becomes a vicious circle, since private operators understand the difficulties of governments to manage the PPP programme; their inability to cancel contracts and reject renegotiation requests, and the political consequences.

Table 3.5. **PPP contracts cancelled 1984-2013 in LCR (no divestitures)**

Infrastructure LCR: Total number of PPP projects	Cancelled	Percentage of projects
1 713	**85**	**4.96 %**
By sector	By sector	By sector
Transport	39	7.01%
Energy	19	2.46%
Water and Sanitation	22	8.56%
Telecom	5	3.91%

Source: Based on PPI Database data, World Bank.

Specific examples in Latin America: Renegotiations in Chile, Colombia and Peru

Table 3.6 and Figure 3.4 show the evidence of renegotiations in three Latin American countries – Chile, Colombia and Peru – for the period 1993 to 2010. They show a significant incidence of both

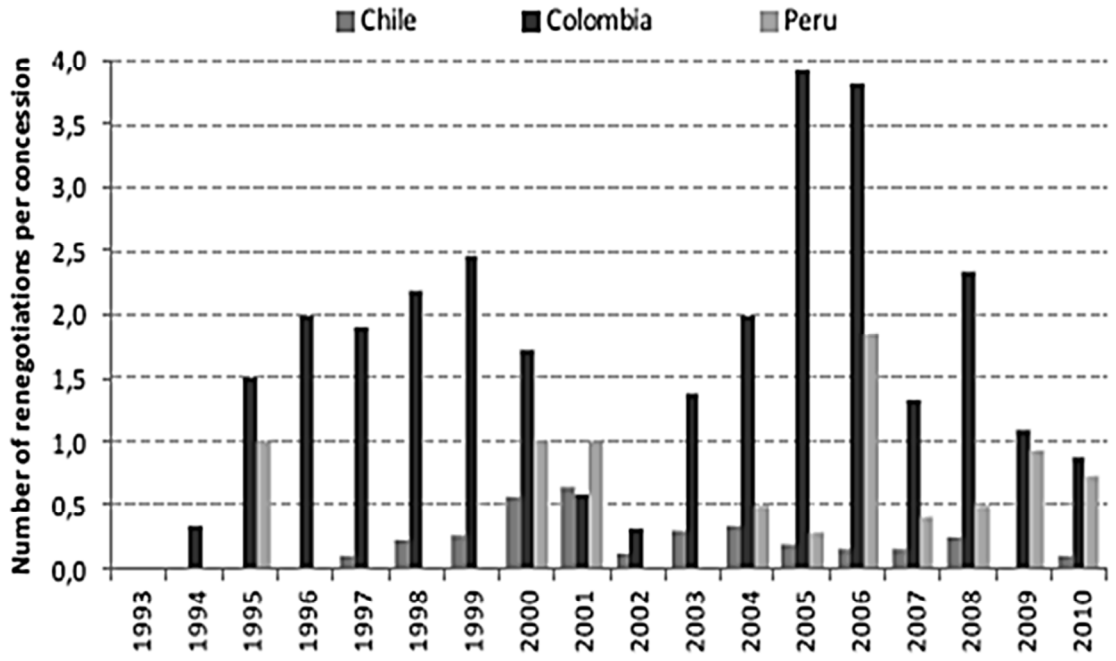
renegotiations of PPP road contracts and renegotiations of the same contract, and the substantial fiscal costs of the outcomes of renegotiations. Colombia shows an important fiscal impact, in particular between 2005 and 2006.

Table 3.6. **Summary of sample statistics by country: 1993-2010**

	Chile	Colombia	Peru
Total road concessions	21	25	15
Mean initial value of contract (constant USD Dec 2009, million)	246	263	166
Mean initial term (years)	25.2	16.7	22.1
Mean concession length (km)	114	195	383
Mean concession years elapsed	12.5	9.0	4.6
Renegotiated road concessions	18	21	11
Total number of renegotiations	60	403	44
Mean number of renegotiations per concession	3.3	19.2-	4.6
Mean time of first renegotiation (years)	2.7	1.0	1.4
Mean fiscal cost of renegotiations (constant USD Dec 2009, million)*	54.8	262.5	28.9
Mean fiscal costs / initial value (percentage)	20.3	278.5	13.4
Mean added term (years)	0.9	6.3	0.8
Mean added length (km)	0	54.6	0
Number of renegotiations / concessions year elapsed	0.2	1.8	0.9

Source: Bitran et al., 2012.
*Over the life of the contracts, across all renegotiations.

Figure 3.4. **Number of concession renegotiations per year in each country**



Source: Bitran et al., 2012.

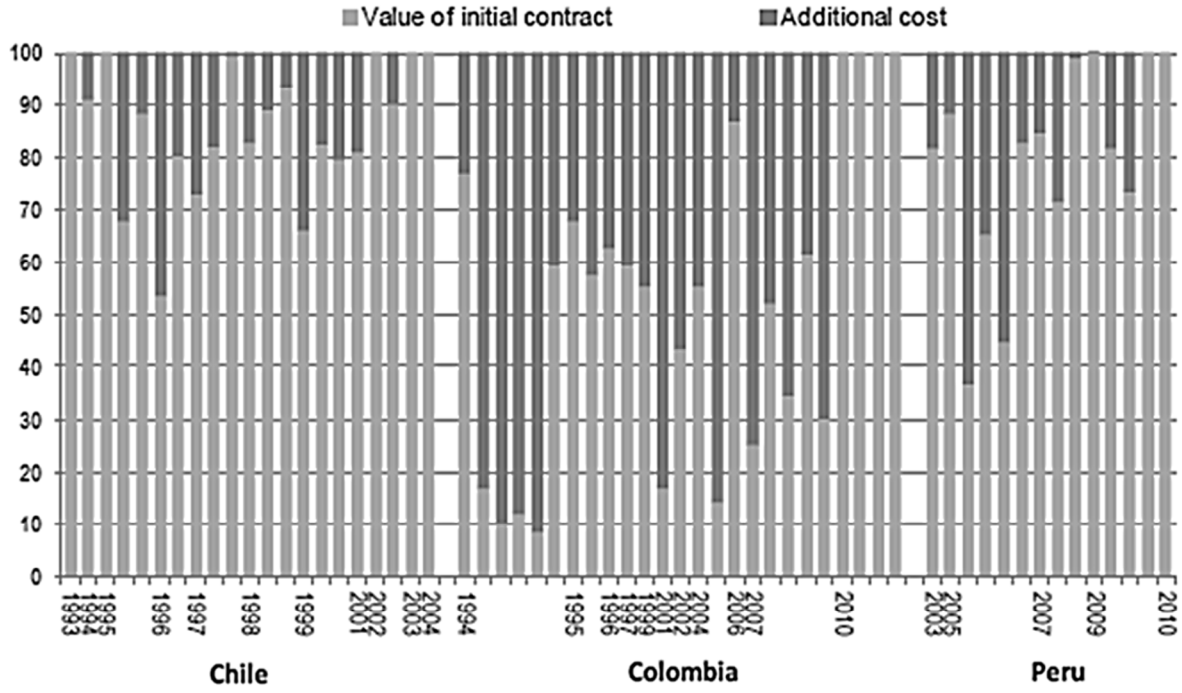
The trends in PPP road contract renegotiations in Chile, Colombia and Peru (see Table 3.7) show the government leadership motivating renegotiations, most of them during the construction stage, which suggests poor project preparation regarding the scope and condition of the infrastructure, and with important fiscal costs.

Table 3.7. **Characteristics of contract changes: 1993-2010**

		Chile	Colombia	Peru
Total		**60**	**403**	
How	Bilateral agreement	83%	98%	100%
	Arbitration	17%	2%	0%
	Government-led	84%	40%	64%
	Firm-led	12%	20%	23%
	Jointly-led	4%	40%	13%
When	During construction	53%	51%	62%
	After construction	47%	49%	38%
What for	Complementary works	69%	39%	17%
	Change conditions	22%	55%	83%
	Both	9%	1%	0%
	Add new stretches	0%	5%	0%
Paid when	Present fiscal transfer	66%	42%	14%
	Deferred fiscal funds	55%	6%	0%
	Other costs realised later	36%	28%	39%
	No cost	14%	24%	47%
Types of cost	Fiscal transfer	66%	48%	20%
	Increase concession term	12%	12%	14%
	Higher toll tariffs	24%	1%	0%
	Other type of payment	16%	0%	0%
	Without direct cost	15%	45%	77%

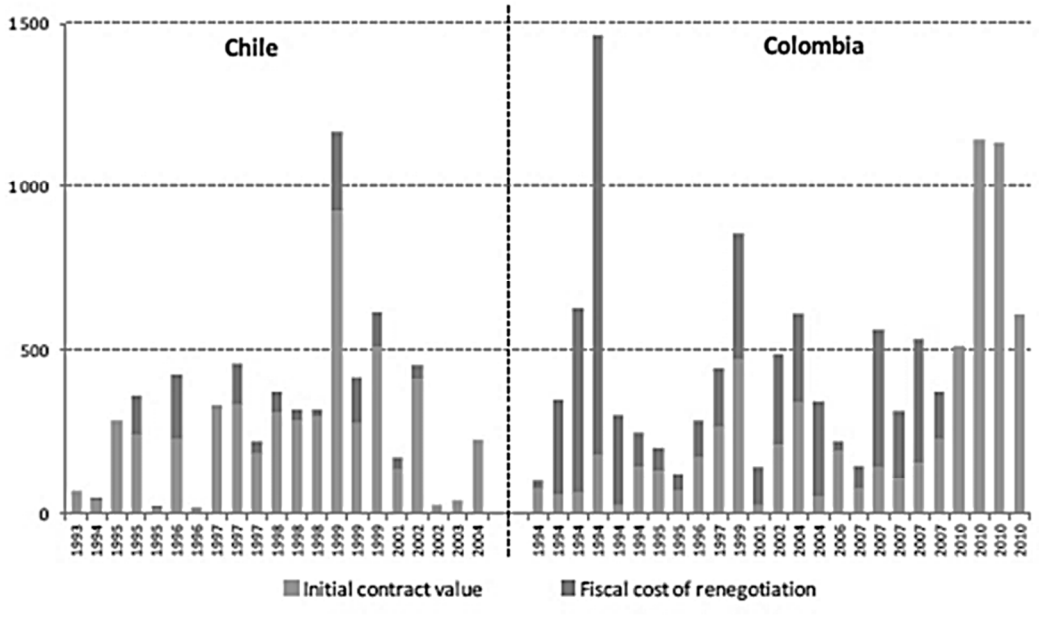
Source: Bitran et al., 2012.

Figure 3.5. **Additional cost versus initial contract value (%)**



Source: Bitran et al., 2012.

Figure 3.6. **The fiscal costs of renegotiations in Chile and Colombia**
(Constant prices in million USD, December 2009)



Note: The x-axis indicates the year in which the concession contract was initially signed.

Source: Bitran et al., 2012.

Other cases outside the region

This high incidence of renegotiations is not confined to the LAC Region. Other cases in point are the experiences of India, Portugal and Korea[5], among others.

i. India

India launched in the late 2000s an aggressive programme of PPPs, particularly in the road sector, awarding over 300 highway PPPs; many of them with the support of the Viability Gap Fund, often awarded under the criteria of requested minimum subsidy. As of 2014, more than half of those projects are encountering problems, with the private operators requesting renegotiation of the contract. Apparently, a significant number of those renegotiation demands originate from aggressive bids. The Government of India has been evaluating the situation and prepared a response for this systemic problem, but on a selective and case-by-case basis. Overall, its approach has been to reject most of the requests.

ii. Portugal – Case Study[6]

"Troika" Agreement – PPP reforms implemented, 2011-12

All PPP projects to be developed were paralysed, affecting several sectors during 2011-12. The Ministry of Finance (MoF) and the International Monetary Fund (IMF) assessed the PPP legal and institutional framework under a new PPP framework law and UTAP (Unidade Técnica de Acompanhamento de Projetos) was created (June 2012). MoF updated and enhanced its reporting instruments on PPPs and concessions. Ernst & Young were hired for the assessment of the PPP renegotiations.

Table 3.8. **Portugal renegotiations case study**

Strategic position of the States message to private partners	• **The road model is not sustainable for the public partners (EP) party.** • **Renegotiation will provide more rational contracts and remuneration schemes.** • **Overall reduction of public payments through reduction in IRR, CAPEX and OPEX** • **No debt renegotiation is undertaken: any debt renegotiation would increase financial costs of contracts.** • **Financial institution would increase financial costs of: only transitory ADSCR reduction from 1.25 to 1.05.**
January 2013, formal launch of negotiations to 1.05	Renegotiations of 16 contracts in order to reduce State gross payments. The main strategic lines: • Paralyzing investments in course and reduction of contract scope (sub concessions) • Rationalization of engineering standards according to international/EU standards • Suppression of automatic payments for future CAPEX • Reduction of the shareholder's IRR Additionally, toll revenue related measures.
Negotiation outcome measures IR	Target for 2013: 300 million (IRRCAPEX). Overarching negotiation objective: reach sustained savings throughout the projects standards 7 preliminary agreements reached throughout 2013: • 2.5 Billion euros, contract life cycle forecast • 231 Million EUR in 2013 Amended contracts did not entry into force in 2013, pending financial institutions and Court of Auditors approval.
Negotiation outcome institutions and Court of Auditors	Forecasted savings of 6.600 million euros (-22%): • State concessions (9) = 2.800 Million euros (-17%) • EP subconcessions (7) = 3.800 Million euros (-25%) Negotiation status (September 2014): • 5 contracts approved by financial institutions • 6 agreements pending financial institutions approval • 5 contracts still under negotiation Once approved, contracts are to be send to Court of Auditors

Evolution 2005-2013

Overall indicators show, as of 2013, an increase in the average of renegotiations compared with 2004 levels, a significant increase on average in the number of renegotiations per concession/PPP and a decrease in the incidence of renegotiation in selected countries that have implemented measures to address the issue.

Drivers of renegotiation requests

Renegotiation requests can have multiple causes, external and/or internal. Some examples associated mainly with external drivers are:

- Significant changes in economic circumstances. In regulated markets where no prices can be adjusted unilaterally by the private operator, this frequently leads to renegotiation requests, either by the operator or the government (even if the risk allocation is established in the contract).
- Occasionally, economic conditions change unexpectedly – due to macroeconomic conditions beyond the control of the parties (e.g. financial crises worldwide, currency fluctuations) –break the bankability of the project and induce renegotiation requests.
- Unforeseen natural events or disasters that require emergency interventions or investment.

Among the most common internal drivers for demands for renegotiation are:

- Elections where the new administration can change the regulation and contract terms and affect operator rights, etc.
- New user demands over and above the original level of services (in particular in the first generation for roads and airports).
- Bidding errors, aggressive offers and poorly-written contracts and ambiguous risk allocation;
- Breach of contractual obligation by government (the land expropriation process can be lengthy and not be available in time), lack of bankability of the project (misperceived risks) and lack of preparatory studies (which increase construction risk).
- Opportunistic behaviour by operators and governments (governments may decide to modify the contract for the benefit of users acting unilaterally to capture electoral votes, or a newly-elected government may change priorities to modify or expand investments after the elections).
- The opportunity of governments to bypass fiscal controls to secure additional financing and avoid authorisation (by parliament) for additional investments.
- The inability of governments to credibly commit to a policy of no-renegotiation leads to the abuse of renegotiation requests.
- The operator's perceived leverage to influence the host government to grant them additional benefits through renegotiation and weak contract monitoring.

Platform for addressing renegotiations and measures taken to tackle this issue

A number of countries have taken measures to address the renegotiations issue with mixed success, mainly as the result of not implementing a coherent and comprehensive renegotiation platform, along the lines shown below.

Here are some of the normative measures implemented by some countries.

Table 3.9. **Measures taken in some countries to address the renegotiations issue**

Mexico	**New law and regulations and procedures**
Peru	Review to the Law and Regulations
Chile	New Law and Regulations and Conflict Resolution Framework
Colombia	New Law and Regulations and Institutionality and Process
Portugal	Platform for renegotiations
India	Normative package to guide the renegotiation process

Addressing renegotiations in Latin America (and elsewhere) will continue to be a great challenge where a solid legal and institutional structure can help to mitigate requests and better regulate the renegotiation process, but more specific measures are needed. Countries ought to adopt a Renegotiation Platform. Elements of that platform are indicated below and some of them have already been adopted by certain countries:

- The contract should stipulate the renegotiations approach, criteria and process.
- Increase the political cost of accepting renegotiation demands, by implementing a Transparency Framework; use of the Internet, publishing requests, decisions and arguments, and using the media to provide information on requests, decisions and rationale.
- Establish a reputation of not being well-disposed to renegotiate by cancelling PPP/concessions processes, particularly from requests driven by aggressive bids.
- Use and implementation of a high-level "delivery unit" to resolve deadlocks in the preparation of projects/contracts.
- Use and implementation of a resolution/problem unit (licences, permits, rights-of-way, evaluations, specifically environmental, archaeological, etc.).
- Establish a freeze period for renegotiations; for example, no renegotiations will be considered for a three- to five-year period after award of the contract. Only a few exceptions could be accepted (Peru and Colombia).
- Establish clear jurisdiction over the decision to renegotiate, at a high level, such as the Interministerial Committee headed by the Minister of Finance (Chile and Peru).
- Establish in the contract the right to evaluate and reject aggressive and reckless bids, defining the criteria and standards, including submission of a financial model for those bids or additional guarantees (financial bonds).
- Establish a transparent framework for conflict resolution (panel of experts and arbitration). Using proper panels of experts (whose composition to be based on technical profiles and

selected at random from a pool of experts) to address issues such as aggressive bidding, renegotiation requests, arbitration, regulation-resetting tariff structure.

- Establishing a matrix of risks with detailed risk identification and allocation setting so that modifications of the contract must not alter the risk allocation. A legal statement or regulation that the risk matrix cannot be altered (Mexico).
- Establish that if the contract is modified, the net present value of the modifications must be zero, and preserve value for money.
- Impose an appropriate (biting) level of performance bonds: for example, at least 15% of the investment (Uruguay).
- Clarification and wording of key contractual clauses and binding documents.
- Putting in place a platform for efficient land expropriation and for the securing of rights of way (Mexico and Chile).
- Structure financial support by government (certain and contingent) over time, not all at the beginning (i.e. viability gap funding).
- Establish guidelines for levels of compensation.
- Symmetry on effects and compensation of unilateral actions taken by government.
- Request a mandatory bidding process for an additional infrastructure request (either by government or by the operator) and the interest rate for PPP financing (Chile).
- Use appropriately the selection of competitive factors (such as the award criteria) to increase the costs – render exit more expensive. When possible use as award criteria (for some sectors) the least-present value of revenue, as it is quite robust to mitigate renegotiation requests - automatically extending the duration of the contract if economic conditions become adverse (Chile and Colombia).
- A greater role of the regulator and PPP unit in the design and regulation of the contract (Peru, Colombia).
- Abandonment of clause on financial equilibrium (Chile and Peru).
- Platforms on renegotiations and processes led by the Ministry of Finance (Chile and Peru).
- Use of regulatory accounting (Peru and Chile).
- Transparency of the renegotiation process. Disclosure of information since the request, analysis, negotiations, final amendment and web information. Greater use of LPVR as the award criteria to mitigate demand risk (Chile and Colombia).

Some reflections on PPP renegotiation

Finally, we provide some reflections on the issue of renegotiations of PPPs. There are indeed valid reasons to renegotiate PPP contracts and some incidence is to be expected for various reasons, such as incompleteness of the contract, the long duration of the contract/project, the likelihood of unforeseen events with significant economic/financial impacts, the likelihood of changes in priorities by succeeding governments and so on. Yet the observed high incidence of renegotiations is of serious concern and a source for criticism and questioning of the effectiveness of PPP programmes. It indicates an abuse of the instrument and its use for opportunistic reasons rather than well-founded contractual ones. The benefits

of PPP programmes have been extensively proven over the 25 years of PPP experience in Latin America (Guasch, 2004; 2012). Yet to sustain the programmes and secure the expected benefits, the issue of renegotiations (whose outcomes generally reduce the original benefits of the contract) needs to be addressed and is the major weakness of PPP programmes.

As presented here, key principles to guide country initiatives when addressing renegotiations are as follows:

- When governments are confronted with requests for renegotiation, the sacred character of the original contract/bid must be respected to preserve the value-for-money of the original contract, and the contractual or bid offer must not be breached.

- The operator should be held responsible for its offer and risks accepted in the contract.

- The financial equation of the winning offer should always be the reference point, and if the contract is to be modified, the outcome should have an impact of zero net present value of the benefits, and the contract modifications should not change the original risk allocation matrix.

- Renegotiation must not be used to correct errors in the bid or excessively risky or aggressive bids.

Notes

1. Consulted on 24 September 2014, World Bank and PPIAF, PPI Project Database (http://ppi.worldbank.org) has data recorded from 6 224 projects in three key sectors (transport, energy, water and sewage).

2. For example, in 2005 three PPP roads (Interoceanic 2, 3 and 4) were awarded in Peru without cost-benefit analysis. The government's approval circumvented this important step. In 2006, a third amendment was signed to allow the financial close of the projects. In 2009 and 2010, influenced by the global financial crisis, the government decided to side-step the cost-benefit analysis and reduce the filters (value-for-money analysis was postponed during those years) and the deadlines during PPP project preparation, for a selected group of candidate projects.

3. If only one valid bid was received, and the winning bidder did not want to sign the contract, unless there is a commitment to renegotiate later this behaviour can be assimilated with an aggressive bid. If institutions are weak and cancellation for the PPP process can affect the PPP programme or have political consequences, this context can induce more aggressive bids. Even in the case where a contract is signed or the government decides to reject the renegotiation conditions, the contract has to be cancelled and the PPP project has to be rebid, under a new procurement process. Political promises to develop infrastructure and deliver services will affect the credibility of the government, and there is no guarantee of more competition under a new PPP process. In political terms, the whole PPP programme can be affected or delayed.

4. For the same period, low-income countries show a PPP cancellation rate of 7.16%.

5. In Korea, there are currently over 168 projects (in the construction or operation phases) which have been renegotiated (*source*: KDI PIMAC, 2012).

6. *Source*: Unidade Técnica de Acompanhamento de Projetos (UTAP), 2014.

References

Bitran Eduardo & Marcelo Villena (2012), "Benefits and Costs in Public Private Partnership: Transport Infrastructure Projects in Latin America", Facultad de Ingeniería y Ciencias, Universidad Adolfo Ibáñez.

Bitran E., S. Nieto-Parra and J. Robledo (2012), "Opening the black box of contract renegotiations: An analysis of road concessions in Chile, Colombia and Peru", *OECD Development Working Paper 317*; OECD Publishing, Paris.

Guasch, J.L., J.-J. Laffont and S. Straub (2007), "Concessions of Infrastructure in Latin America: Government-led Renegotiation", *Journal of Applied Econometrics*, 22, pp. 1267-1264.

Guasch, J.L., J.-J. Laffont and S. Straub (2006), "Renegotiation of Concession Contracts: A theoretical approach", *Review of Industrial Organization*, 29: 55-73.

Guasch J.L., J.-J. Laffont and S. Straub (2005), "Infrastructure Concessions in Latin America: government-led renegotiations", *World Bank Policy Research Working Paper 3749*.

Guasch, J.L. (2004), *Granting and Renegotiating Concession Contracts: Doing it right*, World Bank Publications.

Guasch, J.L., J.-J. Laffont and S. Straub (2003), "Renegotiation of Concession Contracts in Latin America", *Policy Research Working Paper 3011*, The World Bank, http://dx.doi.org/10.1596/1813-9450-3011 .

Harris, Clive et al, (2003), "Project Infrastructure: a review of Cancelled Private Projects", World Bank, Note Number 252.

Harris, Clive and Pratap Kumar (2009), "What drives private sector exit from infrastructure?" Gridlines, Note 46, PPIAF.

Huamaní, Sandro and Tito Vargas (2011), "Renegociaciones no eficientes a partir del diseño del contrato y la licitación en las concesiones en transporte". *Revista de Regulación en Infraestructura de Transporte*, No. 7, OSITRAN.

Laffont, Jean-Jacques and Jean Tirole (1993), *A Theory of Incentives in Procurement and Regulation*, The MIT Press, Cambridge, MA.

McAffee, Preston and John McMillan (1986), "Bidding for Contracts: A Principal Agent Analysis", *The RAND Journal of Economics*, Vol. 17, Issue 3, Autumn, 326-338.

Montesinos, Jorge and Eduardo Saavedra (2011), "Algunos alcances en torno a la institucionalidad y renegociación de concesiones en la infraestructura de transporte de uso público en Perú", *Revista de Regulación en Infraestructura de Transporte*, No. 7, OSITRAN.

OECD/ECLAC (2012), *Latin American Economic Outlook 2012: Transforming the State for Development*, OECD Publishing, Paris.DOI: http://dx.doi.org/10.1787/leo-2012-en

Tirole, Jean (2007), "Bounded rationality and incomplete contracts", http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.123.5630 (accessed October 6, 2012).

UTAP (2014), "Renegotiations of PPP Concessions in Portugal", PowerPoint Presentation.

Chapter 4

Renegotiation of transportation public private partnerships: The United States experience

Jonathan Gifford, Lisardo Bolaños and Nobuhiko Daito,
George Mason University, USA

Public private partnerships (PPPs) typically rely on long-term contracts between participants. When conditions arise that fall outside the expectations embodied in the contract, one party may seek to renegotiate the contract terms. Globally, the frequency of PPP contract renegotiations has been sufficient to raise questions regarding why these events occur and what their consequences are for the projects and society. The literature highlights four relevant causes behind renegotiation occurrences: unexpected exogenous changes, the complexity of the contractual relationship, winner´s curse and rent seeking behaviour.

This chapter examines the United States experience with highway PPP renegotiations, including four types of event: contract modifications, defaults, bankruptcies and buyouts. While the United States highway PPP market has grown gradually, failure to understand renegotiations and their potential consequences may dampen the market and adversely affect national infrastructure investment efforts. The analysis finds that insufficient evidence exists to disentangle the drivers of renegotiation in the United States, although exogenous changes and contractual relationship complexity appear to be paramount. The analysis highlights the distinct political and institutional environment that shapes highway PPP renegotiations in the US, suggesting the need for continuing and sensible analysis to effectively manage the undesirable consequences of renegotiations.

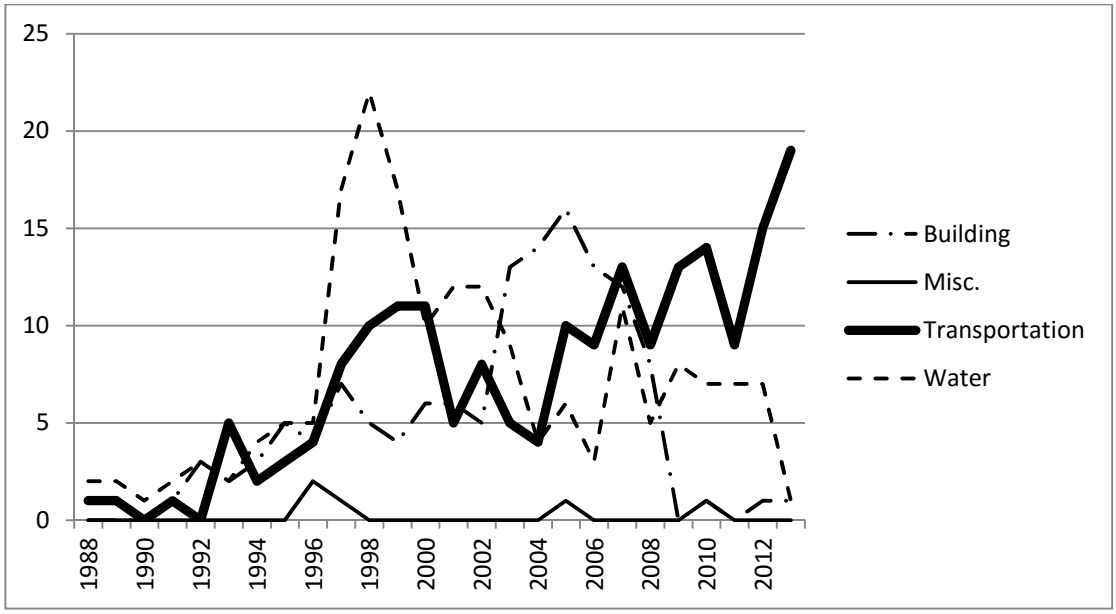
Contract renegotiation allows contract participants to accommodate changes brought on by unexpected state changes not accounted for in original (incomplete) and often long-term contract relationships (Hart and Moore, 1988). While parties to a contract might desire agreements that account for every contingency and preclude future renegotiations, such contracts would be prohibitively expensive to develop. As a result, compromises are required. However, this often enables contract parties to behave opportunistically with asset specificity, necessitating sometimes costly renegotiations of earlier contractual agreements (Klein, Crawford and Alchian, 1978; Williamson, 1996).

This study focuses on contract renegotiation within the United States highway public-private partnership (PPP) market. Contract renegotiation is common in the private sector, especially in finance (Roberts and Sufi, 2009) and labour contracts facing unexpectedly high inflation (Rich and Tracy, 2013). Considering infrastructure PPPs' long-term nature, inherent uncertainty and need for sophisticated expertise, one may expect contract renegotiations to form an important component of the PPP contract process (Saussier, Staropoli and Yvrande-Billon, 2009). However, a number of unique complexities arise when contractual renegotiations involve the public sector. In addition, when renegotiation possibilities emerge in the infrastructure PPP context, public perceptions can be very negative. Observers may suspect that such renegotiations result from poor planning or opportunistic behaviour by parties seeking rent at the cost of users and taxpayers. All these factors make PPP contract renegotiations a fruitful topic for research.

In addition, a deeper understanding of PPPs may provide particular assistance for policy makers, especially in the transportation sector. Alternative procurement mechanisms for transportation infrastructure investment have experienced growing interest in the United States (US Department of the Treasury, 2014) and PPPs in particular have become increasingly popular, as severe budgetary and financial constraints drive governments to employ project equity and debt to access private sector funding and financing (Engel, Fischer and Galetovic, 2006; Small, 2010). Figure 4.1 shows the growing trend in United States PPPs reaching financial closure each year between 1986 and 2013, across four infrastructure sectors. The number of deals closing annually increased rapidly during the mid-1990s and has fluctuated since then. The transportation sector in particular included increasing numbers of projects during this period, especially since 2010, despite some dips in the 2000s. In total, 512 PPP projects reached financial closure across all four sectors by the end of 2013. While the number of United States transportation-sector PPPs remains relatively small compared to other world regions, the highway and tolled highway subsectors have provided the largest proportion of PPPs in recent years.

Despite PPPs' growing popularity, an inadequate understanding of what drives renegotiation may affect the approach's future viability. Several notable United States highway PPP renegotiation and bankruptcy cases have received wide attention and analysing why these occurred and drawing policy conclusions may inform future PPP implementation. The existing literature focuses on Latin American and European experience with PPP contract renegotiations, but it lacks an adequate analysis of the United States context. Knowledge of foreign market experiences is valuable, but the United States PPP market's unique characteristics, like its combination of common law, a federal system of government and its bankruptcy law, may have practical implications for how economic institutions evolve and how renegotiations proceed (Beck, Demirgüç-Kunt and Levine, 2003; Katsivela, 2007; La Porta, Lopez-de-Silanes and Shleifer, 2008; Qian and Weingast, 1997; Cirmizi, Klapper and Utamchandani, 2012).

Figure 4.1. **Number of DB & PPPs financial closes in the United States by sector, 1986-2013**



Note: PPPs of all contract types, including concessions, management contracts and Design-Build contracts.
Source: Public Works Financing Newsletter, 2014.

As a result, this study explores the United States PPP renegotiation experience by addressing the following research questions: (1) How has the United States experienced highway PPP renegotiations? (2) Does the United States market demonstrate any distinct characteristics with regard to the drivers of renegotiation?

While the term "PPP" may refer to a variety of contracts between public agencies and private firms, our interests reflect the Organisation for Economic Co-operation and Development's (OECD) definition:

> *"an agreement between the government and one or more private partners (which may include the operators and the financiers) according to which the private partners deliver the service in such a manner that the service delivery objectives of the government are aligned with the profit objectives of the private partners and where the effectiveness of the alignment depends on a sufficient transfer of risk to the private partners (ITF, 2008)."*

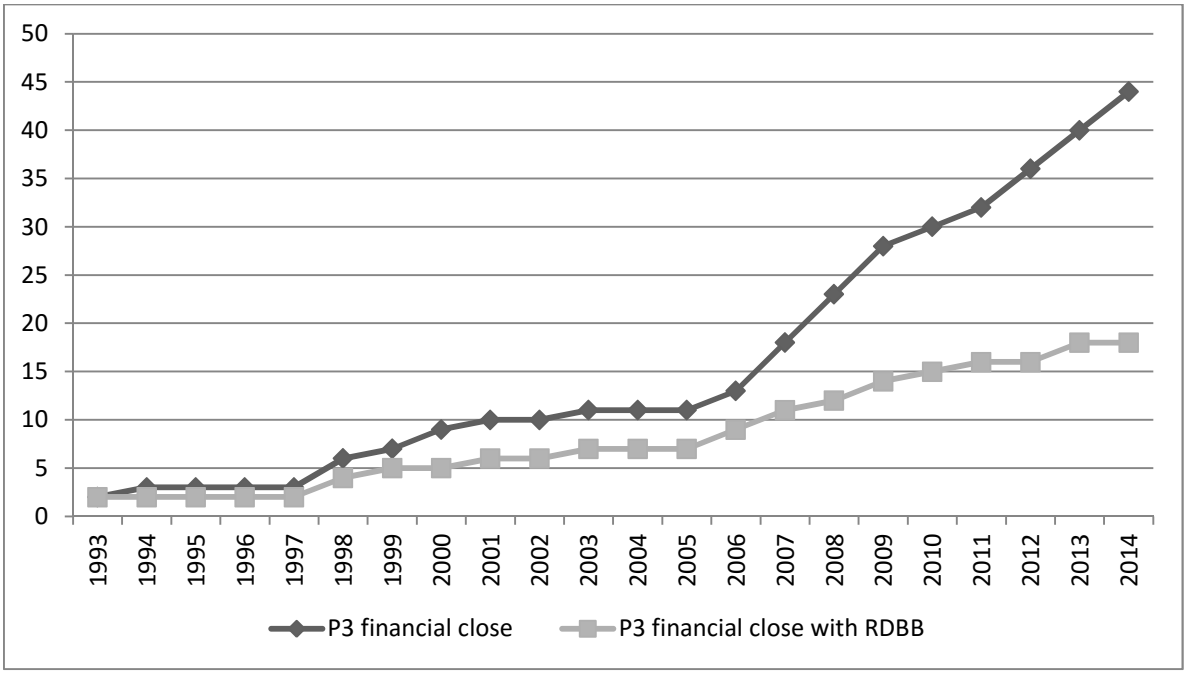
In the context of this study, we employ the term "PPP" when referring to infrastructure projects and facilities delivered through arrangements where private firms partner with a public agency in delivering and providing a service, including Design-Build-Operate-Maintain (DBOM), Design-Build-Finance (DBF) and Design-Build-Finance-Operate-Maintain (DBFOM), but not Design-Build (DB).

Turning next to renegotiation, the theoretical literature often defines the term broadly to include any modifications to PPP concession contracts (Guasch, 2004; Guasch, Laffont and Straub, 2008). The empirical literature, in contrast, tends to consider only major revisions to contractual agreements that the original contracts did not account for (Guasch, Laffont and Straub, 2008). Given this chapter's case study approach, we require a broader definition to help us understand the nuances of the United States PPP market. Consequently, in this chapter we will analyse, under the definition of renegotiation, the following events: contract modification, defaults, bankruptcies and buyouts (RDBBs). We define PPP contract modification to include modifications to PPP contractual agreements involving associated legal

processes. Defaults occur when the private partner fails to meet the debt service requirements. Bankruptcies occur when the corresponding legal process is used for an illiquid or insolvent firm to pay its debts. Buyouts of the private consortium occur when the new owners buy the PPP project. We believe our definition does not substantially alter the literature's conventional view, although we acknowledge that our perspective is motivated primarily by historical events in the United States PPP market[1].

Due to the small number of PPP renegotiation cases in the United States highway sector – see Figure 4.2 where we accounted for 18 projects – we explore the research questions through a series of case studies. Ultimately, the analysis highlights several unique characteristics of the US PPP market. First, the 2008 financial crisis acted as an external shock to a number of United States highway PPPs, directly and indirectly affecting demand for these facilities. Second, contractual complexities may explain why some PPP projects, particularly early ones, underwent renegotiations. Third, partner inexperience, both public and private, as well as underdeveloped institutional environments, influenced several cases. Overall, we find that the factors driving PPP contract renegotiations are very complex. Attributing a renegotiation case to any single factor or cause would be naive. Furthermore, empirically validating several theoretical explanations proved difficult (e.g. opportunism and the "winner's curse" effect). Often, only circumstantial evidence is available. To conclude, we suggest some directions for further analysis.

Figure 4.2. **Cumulative highway PPP financial closes**
Total & renegotiation: 1993-2014



Sources: Public Works Financing Newsletter, 2014.

The next section summarises the theoretical and empirical literature regarding PPP renegotiation and the following section presents six case studies. The final section discusses the case study findings and offers concluding remarks.

Literature review

Drivers of renegotiation: Theory

Renegotiations can occur for several reasons. Economists, for example, have focused on the inherent incompleteness of PPPs' contractual agreements (Guasch, 2004). Given infrastructure projects' complexity and uncertain environments, contracts between public agencies and private partners cannot account for every contingency. As a result, incomplete contracts may cause renegotiations due to both strategic and non-strategic factors.

The perception that renegotiations produce negative consequences for the public arises from literature focused on opportunistic behaviour by the private and the public sectors (Guasch, 2004). For instance, PPP actors might pursue contract renegotiation as a strategic or opportunistic response to rent extraction opportunities, even at the expense of other parties in the deal. Both government and private actors can behave opportunistically, against each other or against the public. In the government case, incumbent politicians might use PPPs as an off-balance-sheet mechanism to increase debt for infrastructure (Engel, Fischer and Galetovic, 2001; Engel, Fischer and Galetovic, 2009), expecting increases in infrastructure investment to produce favourable political outcomes.

Alternatively, private partners might behave opportunistically by winning PPP contracts with low offers, only to hold up the government later by asking for higher compensation via renegotiations (Guasch, 2004). Given the often prohibitive financial and political costs associated with soliciting new firms, the sponsoring public agency, at a disadvantage, may succumb and agree to change the terms as demanded.

The Mexican highway case offers a well-known example of such bidder opportunism. The government of Mexico granted 52 highway projects to private contractors during the 1990s, but many bids employed extremely optimistic forecasts. As a result, the government was forced to refinance the highways in 1997 at a cost of USD 3.3 billion[2].

Public and private partners involved in a PPP project may also pursue contract renegotiation in order to defend themselves against potentially negative outcomes. The literature suggests three causes of non-strategic renegotiation: a) exogenous changes; b) inadequate preparation for complex contractual relationships; and c) ruinous agreements generated by excessive competition during the bidding process (known as the "winner's curse").

In the first case, renegotiations can help adapt the original contracts to current environment when unexpected exogenous events like macroeconomic shocks occur (De Brux, 2010; Guasch, Laffont and Straub, 2008). Abrupt fluctuations in supply prices, interest rates or regional economic activity can profoundly affect a PPP project's financial performance. In these instances, the project's financial equilibrium changes without inducement by either the public agencies or the private firms. Similarly, before using *force majeure* clauses after events like earthquakes, storms or riots, the parties may try to maintain the relationship through renegotiations.

The financial crisis in 2008, for example, likely triggered a number of United States highway PPP renegotiations. Such shocks can have direct effects, given the close association between macroeconomic output and travel demand. Intuitively, a highway project's travel demand decreases during a recession, lowering the facility's revenue. In addition, the 2008 financial crisis' impacts in the housing sector undermined travel demand. Several highway PPPs appeared financially viable given assumptions regarding increasing regional demand. During the crisis, however, many development projects stalled,

lowering demand for transportation facilities. Looking internationally, Guasch and co-authors highlight the 2001 Argentinean currency devaluation and Brazil's similar experience in 1999 (Guasch, Laffont and Straub, 2003). The authors suggest that uncertainty surrounding such events and the lack of guiding principles for readjustment introduce regulatory risk for PPP projects.

The second case involves situations with very complicated contract development, especially when adequate bureaucratic capabilities are lacking (Saussier, Staropoli and Yvrande-Billon, 2009). For example, public agencies may authorise PPP executions without adequate project management, legal and/or financial staff. The private sector might also lack adequate staff or PPP experience. Confusion often emerges under these circumstances, motivating either or both partners to consider renegotiation. Which party initiates the process depends on which party the ambiguity favours.

The third case, referred to as the winner's curse, develops when bidding processes produce ruinous agreements. This situation may occur, for instance, when a public agency puts an existing toll road concession out for bid. The winner would make a financial arrangement to pay the government upfront to operate and maintain the facility for a pre-determined period. Subsequent toll revenues would cover the debt obligation as well as the facility's operation and maintenance costs. Since the facility's physical condition and future demand are often unknown, firms submit bids based on limited information with respect to the asset's true value. Auction processes favour the highest bids, potentially selecting a firm that overestimated the asset value. In such cases, unexpectedly low profits or even losses may result. After executing the contract, the winner may discover the concession's financial unsustainability and may request a contract renegotiation to continue operating the facility (Thaler, 1988)[3].

A survey of empirical literature

While the literature lacks a clear-cut test to determine why any particular renegotiation takes place, several empirical studies have investigated PPP renegotiations outside the United States. Although far from comprehensive, this section reviews some of the findings.

A number of studies have summarised statistics pertaining to PPP renegotiations in the Latin American transportation sector. An analysis of 218 Latin American transport concessions between 1989 and 2000 showed that 45% of the concessions underwent a renegotiation process. Fifty per cent of these were initiated by the private partners (Guasch, Laffont and Straub, 2008). Similarly, an earlier study of the Latin America and Caribbean region from 1985 to 2000 found that 55% of transportation concessions faced renegotiation, compared to 9.7% for electricity concessions and 74% for water and sanitation (Guasch, 2004). The study also found that, on average across all sectors, renegotiation occurred two years after the contract award. In the transportation sector, however, renegotiation occurred after three years on average, usually during the construction process, an unexpected result that usually is linked to private opportunism, as the private partner has the upper hand and the public sector may not be able to find an adequate substitute company to take over the project. In addition, renegotiation occurred more frequently after competitive bidding (46% of concessions) than after bilateral negotiations (8%), offering some support for the winner's curse theory. Renegotiations were also more prevalent under lowest tariff award criteria (60%) and under requirements for private partner investment in the contract's underlying asset (70%), and occurred more frequently under price caps (83%), probably because they made the private sector more vulnerable to external shocks. Table 4.A1.1 summarises additional findings.

Guasch and co-authors developed a model for contract renegotiations initiated by private contractors, empirically estimating factors associated with 307 PPP renegotiations in five Latin American countries' transportation and water sectors (Guasch, Laffont and Straub, 2008). The authors found that

having an established PPP regulatory environment reduced the probability that a PPP project would undergo renegotiations. The regulatory framework helped prevent mistakes, decreased the risk of disruptive modifications to contractual agreements and provided a means for both partners to address contingencies. The authors also found an association between price cap provisions[4] and higher renegotiation probabilities; the greater risk to private partners under price caps increased agreement fragility. Private investment was also associated with significantly higher renegotiation probabilities, as were minimum revenue guarantees, introduced to protect private partners. The authors argue that revenue guarantees lower efficiency incentives while raising incentives for strategically aggressive bidding. In addition, the authors found that most of the statistically significant variables, namely, regulator existence, price cap regulation, concession duration, elections, economic growth, etc., generated the same directional effects for both government-initiated and firm-initiated renegotiations.

As regards government-initiated PPP renegotiations, the literature has also found links between institutional instability and politically motivated renegotiations initiated by public agencies to extract rent from private firms (De Brux, 2010). Guasch et al. discuss a "typical" case where a newly-elected political authority, seeking voter approval, unilaterally decides either to dishonour the initial contract's toll increases or to lower existing tolls (Guasch, Laffont and Straub, 2006). The authors formalise such renegotiations, finding that contract designs, inadequate regulatory frameworks, deficient institutional environments and external shocks all increase the probability of government-initiated concession renegotiations. These findings support the public-sector opportunism and the exogenous shocks and complexity arguments. The authors argue that these factors have distinct effects for public agency-initiated renegotiations compared to renegotiations initiated by private partners. In contrast, private financing and investment requirements decreased the likelihood of government-initiated renegotiations but increased the likelihood of renegotiations initiated by private partners. Higher corruption levels, conversely, increased government-initiated renegotiations while decreasing renegotiations led by private partners.

The literature also finds institutional effects for private partner opportunism. Athias and Nuñez empirically investigated 49 toll road concessions around the world, focusing on the relationship between competition levels during initial bidding and renegotiation likelihoods (Athias and Nuñez, 2009). Analysing differences between original traffic forecasts, as included in winning bids and actual traffic levels, the authors find an association between higher numbers of bidders in toll road concession auctions (more competition) and aggressive bids. This finding supports the winner's curse explanation for renegotiation. The analysis shows a stronger effect when public procuring agencies withhold their traffic forecasts while soliciting bids. The authors also demonstrate a stronger winner's curse effect when the public agency has limited experience with PPPs (civil law countries or countries lacking stable institutions)[5]. In other words, bidders behave strategically and the winner's curse effect is stronger when renegotiations are easier.

Case studies

Table 4.A1.2 shows the geographic dispersion of highway PPP projects with financial close in the United States (45) and those that have had renegotiations (17). Out of these 17 projects, seven had contract modification, six defaulted, five went bankrupt and twelve were bought up. We examine the renegotiation experiences of six United States highway PPPs, or a third of the total to date. The six cases are: the Dulles Greenway (Virginia), Pocahontas Parkway (Virginia), the Elizabeth River Crossings (ERC, also known as Midtown and Downtown Tunnels, Virginia), State Route 91 Express Lanes (SR-91, California), the South Bay Expressway (SBX, California) and the Indiana Toll Road (Indiana). We selected these cases to encompass the diversity of United States experiences with PPP highway

renegotiations, especially across different geographies and years. We are including two cases from the West coast, one from the Midwest and three from the East coast. While the two cases from California originate from efforts done at the end of the 1980s, one of the Virginia cases, ERC, had its financial close in 2012. We included three cases from Virginia to understand the evolution of a state that is particularly active in the PPP market and that plans to pursue this further[6].

As shown in Tables 4.A1.3 and 4.A1.4, the six projects were developed in the two decades between 1993 and 2012 and they vary across several metrics: design characteristics, road length, road opening date and the time of financial closure. Newly-constructed roadway lengths range from relatively minor new construction (the Indiana Toll Road was a brownfield project) to 14 miles (22.5 km, the Dulles Greenway). Some projects, like the Otay River Bridge (SBX) and the new Midtown Tunnel (ERC), include sophisticated technical designs; others do not. The following sections briefly describe each case in turn, with an emphasis on renegotiations.

The Dulles Greenway

The Dulles Greenway is located in Loudoun County, Virginia and covers 14 miles (22.5 km), connecting the Washington Dulles International Airport with Leesburg. As Virginia's first modern toll road, it was built in 1993 and opened in 1995 using the state's Highway Corporation Act of 1988. The project began with an unsolicited proposal from the Toll Road Corporation of Virginia (TRCV) that convinced legislators that approving the Act would provide private funds for unfunded infrastructure projects (Wang, 2010).

The project's original construction cost estimate came to USD 350 million, and the Toll Road Investors Partnership II, LP (TRIP II), owned by the Shenandoah Group, Autostrade International and Kellogg Brown & Root, provided USD 40 million in equity. The remaining funding derived from private debt, involving CIGNA Investments, Prudential Power Funding Associates, John Hancock Mutual Life Insurance Company, Barclays, NationsBank and Deutsche Bank AG (FHWA, 2014a). The project was financed purely by the private sector and the TRCV even acquired most of its right of way without using condemnation through eminent domain. After 42.5 years, facility ownership would revert to the Commonwealth of Virginia.

The initial contract closed in 1993, but after the facility opened in 1995, traffic volumes were lower than expected. Revenues during the first years amounted to only 20% to 35% of initial expectations. TRIP II then sought to increase facility usage, including a toll reduction during the first year of operation that required approval from the state. Revenue did not grow to financially sustainable levels and the project went into default the next year. In 1997, the partners increased toll rates and raised the speed limit to 65 miles per hour (104.5 km/h). Two years later, the project restructured its debt and reached an agreement to increase the number of lanes from four to six. In 2001, TRIP II obtained a 20-year concession extension (to 2056) and three years later, they introduced variable toll rates adjusted for distance and time of day.

In 2005, Macquarie Infrastructure Group (now Macquarie Atlas Roads) bought TRIP II, with 50% of it eventually purchased by Macquarie Infrastructure Partners (Macquarie Atlas Roads, 2009). In 2013, Virginia granted TRIP II the right to increase tolls annually by one percentage point above the consumer price index (Samuel, 2008). That same year, and following California's South Bay Expressway experience (see below), an effort commenced to have the Commonwealth of Virginia "buy back" the toll road to lower the toll rates (Tanner, 2013).

Pocahontas Parkway

The Public-Private Transportation Act (PPTA) of 1995 increased the flexibility provided by the Highway Corporation Act of 1988. It allowed Virginia to evaluate unsolicited proposals from private entities and employ financing tools like tax-free bonds (Commonwealth of Virginia, 2012). Fluor Daniel and Morrison Knudsen (FD/MK) submitted a proposal to VDOT seeking a PPP agreement to design and build State Route 895, also known as Pocahontas Parkway. The road had been planned and approved by VDOT since 1983, but no funds were available for construction (Wang, 2010). The Pocahontas Parkway Association (PPA) was formed as a non-profit 63-20 corporation to raise tax-exempt revenue bonds to finance the project's USD 354 million construction cost[7]. The remaining financing consisted of a USD 18 million State Infrastructure Bank loan and USD 9 million in federal funding for roadway design (FHWA, 2014c). FD/MK provided an additional USD 5 million in equity. The agreement included a four-lane toll road with an 8.8-mile (14 km) extension, including a 0.3-mile (500 m) bridge connecting Chesterfield and Henrico south to Richmond. When the facility opened to traffic in 2002, revenue came to 45% of expectations [USGAO (US Government Accountability Office) 2004].

In 2006, facing a PPA default, VDOT received an unsolicited proposal from Transurban LLC regarding the project (Samuel, 2006). As a result, the contract with FD/MK was terminated and a new agreement was signed with Transurban LLC. The new agreement included rights to enhance, manage, operate, maintain and collect tolls from the roadway for 99 years. However, the agreement also included an obligation to construct the 1.85 mile (3 km) Richmond Airport Connector (RAC), with the expectation that the extension would increase demand for the Parkway. The agreement's financial structure included USD 141 million in private equity, USD 55 million in subordinated debt, a USD 150 million Transportation Infrastructure Finance and Innovation Act (TIFIA) loan, and USD 420 million in bank debt (FHWA, 2014c). Three banks participated in the deal: Depfa Bank, Banco Espirito Santo de Investimento and Bayerische Hypo- und Vereinsbank.

After 2009, facility usage diminished due to toll increases and declining regional travel demand after the 2008 financial crisis. Even the airport connector's completion did not increase demand enough to cover debt service. In 2012, Transurban completely wrote off its project equity and planned to turn the toll facility over to its lender before becoming insolvent (Samuel, 2013). In May 2014, DBi Services, a private company, took control of the road (Martz, 2014).

The Elizabeth River Crossings

Using the PPTA legal framework for unsolicited projects, VDOT approved an agreement with Elizabeth River Crossings OPCO, LLC (ERC) to design build, finance, operate and maintain (DBFOM) the Downtown Tunnel/Midtown Tunnel/MLK Extension, also named the Elizabeth River Crossings project. The project will increase the connection capacity between Norfolk and Portsmouth and includes: a) a new two-lane tunnel next to the existing Midtown Tunnel; b) improvements to the Downtown Tunnel; and c) improvements to a 0.8-mile (1.3 km) stretch of US Route 58. Construction began in 2012 with a concession length of 58 years and cost estimates of USD 2.1 billion, not including costs related to renegotiations. ERC, a joint venture of Skanska Infrastructure Development and the Macquarie Group, invested USD 272 million in project equity. Additional funding derived from a USD 465 million TIFIA loan, USD 408 million in public funds, USD 675 million in private activity bonds and USD 268 million in toll revenue from the existing tunnels (FHWA, 2014d).

The project underwent a public-sector-initiated renegotiation in 2012 to delay tolling in exchange for a government payment of USD 100 million (Samuel, 2012). Then, in 2014 when tolls were set to begin, a new governor renegotiated the contract terms to lower tolls during the first revenue-generating

years. The renegotiation cut toll rates in exchange for USD 82.5 million (Office of Governor, 2014). Toll collection at the new rates commenced on 1st February 2014. The public had severely objected to the original plan involving tolls on the existing tunnels in advance of the project's completion. Opponents claimed that such tolls were effectively taxes rather than user fees, since users saw no viable, free alternative (Reinhardt, 2012). Danny Meeks, a resident of Portsmouth, filed a lawsuit contending that VDOT unlawfully imposed the toll charges. Eventually, the Supreme Court of Virginia ruled in VDOT's favour (Meeks *v.* Elizabeth River Crossings, OPCO, LLC and Virginia Department of Transportation, 2013, VA App. 2013).

California State Route 91 Express Lanes

In the 1980s, many believed that Southern California needed a billion-dollar investment in its road infrastructure (*www.roadtraffic-technology.com*, 2012). To address this need, the state enacted Assembly Bill No. 680, allowing PPP use in four demonstration projects (Giuliano *et al*., 2012). The four projects were selected through a competition organised by the State Department of Transportation, one of which included a project building express toll lanes in the existing State Route 91's median[8]. In 1990, the state signed a build-transfer-operate (BTO) franchise agreement with the California Private Transportation Company (CPTC) as the private partner. The companies forming this entity included Level 3 Communications, Inc., Compagnie Financière et Industrielle des Autoroutes (Cofiroute) and Granite Construction Inc. (Caltrans [California Department of Transportation], 2009). The private partner provided USD 20 million in equity with additional funding coming from a USD 7 million subordinated loan from the Orange County Transportation Authority (OCTA) and USD 100 million in bank loans from Citicorp USA, Banque National de Paris, Société Générale, Deutsche Bank and CIGNA Investments (FHWA, 2014e).

The toll lanes opened in 1995, connecting Orange County to Riverside County through a four-lane, 10-mile (16 km) extension. The operation agreement was to last 35 years. In addition, it was the first United States road to rely completely on electronic toll collection and congestion management pricing, that is, prices adjusted to traffic flow.

Given the growing transportation infrastructure needs in the area, the OCTA faced citizens' discontent regarding the lack of additional investment in transportation infrastructure. Of particular concern was the original franchise agreement's "non-compete" clause constraining Caltrans and OCTA's ability to add "competing" or "complementary" road capacity. First, OCTA attempted to abrogate the clause but was prevented from doing so in court, as it was attempting to overcome the non-compete clause by arguing, without support, that the additional infrastructure was to be built for safety reasons. Finally, the OCTA bought out CPTC in 2003 in order to reduce traffic congestion. As a result, OCTA issued USD 195 million in toll revenue bonds (Metro Express Lane, 2014), purchasing the project for USD 207.5 million.

South Bay Expressway

The South Bay Expressway (SBX), like the State Route 91 Express Lanes, grew out of Assembly Bill No. 680. The project was designed as a design-build-operate-transfer (DBOT) agreement, lasting 35 years and covering a 9.4-mile (15 km) extension, connecting Spring Valley to Otay Mesa in southern San Diego County, California. The goal was to serve anticipated development generated by growing trade with Mexico (Wang, 2010). The state signed an agreement in 1991 with California Transportation Ventures, Inc. (CTV), originally owned by Parsons Brinckerhoff, Egis Projects, Fluor Daniel and Prudential Bache, although the first two partners left after 1992. In 1997, Koch Industries bought 29% of

the stock (Giuliano *et al*., 2012) and in 2002 CTV was bought completely by Macquarie Infrastructure Group.

The project experienced several delays. First, the private firm had agreed to manage the project's environmental permits. However, it did not obtain the requisite permits until 2001, despite the franchise agreement having been signed in 1991. Government environmental agencies, including the US Fish and Wildlife Service, the Army Corps of Engineers and the US Environmental Protection Agency, imposed permit requirements, including wetlands restoration, protected habitats for endangered species and recreational improvements in nearby communities.

Second, Parsons Brinckerhoff decided to sell its stake to Macquarie Infrastructure Group in 2002 after the permitting delay. This change in the agreement allowed Macquarie to access public funds to offset costs associated with the construction delays and environmental permitting. This included USD 140 million from the US Department of Transportation (USDOT) via the Transportation Infrastructure Finance and Innovation Act (TIFIA) (FHWA, 2014f). Additional funding came from private equity (USD 130 million) and bank debt (USD 400 million) from Banco Bilbao Vizcaya Argentaria, Depfa Bank plc, Allied Irish, Bank of Ireland, BNP Paribas, Commonwealth Bank, DVB Bank, DZ Bank and HSH Nordbank (Fretz, 2010).

Third, design changes to reduce environmental impacts complicated the Otay River Bridge construction, requiring a "top-down" approach using precast segmental structures to build the 19-storey bridge (Soule and Tassin, 2007). Ultimately, the contract between CTV and the bridge constructor, Otay River Contractors (ORC), involved a schedule that could not be fulfilled (according to ORC) due to requirements by Caltrans, the City of Chula Vista and the County of San Diego. This eventually led to litigation. Ultimately, the bridge-related issues delayed the project's opening by over 15 months and raised the estimated cost from USD 400 million in 1990 to USD 635 million when the project opened in 2007.

In addition, the project opened just as the subprime mortgage crisis hit San Diego, reducing demand to about a third of expectations (Chapter 11. Case No. 10-04516-LA11. Declaration of Anthony G. Evans, Chief Financial Officer of South Bay Expressway, LP, in support of the debtor´s chapter 11 petitions and first-day motions, 2010). This situation eventually led CTV to file for bankruptcy in March 2010. After a settlement between the creditors, the US Bankruptcy Court created the New SBX Equity owned by all the creditors (Samuel, 2011). USDOT claims were reduced from USD 170 million to USD 99 million and the banks' claims were reduced from USD 361.4 million to USD 210 million. Finally, the San Diego Association of Governments (SANDAG) bought the New SBX Equity, paying the banks USD 247.5 million in cash and extinguishing the private sector participation in the project. Of the original USD 172 million owed to USDOT (capital plus USD 32 million in capitalised interest), the Department will receive an estimated USD 93 million from toll revenues and will keep 32% of the project ownership, sharing any of the operation's surpluses (Hawkins, 2011; Jensen, 2011; FHWA, 2014f). Following its acquisition, SANDAG decreased toll rates by 40%, thus decreasing revenues by 20% (Poythress, 2012).

The Indiana Toll Road

The Indiana Toll Road (ITR) provides particularly valuable insights for policy debates regarding toll road PPPs (Wee, 2012). The project, originally named the Indiana East-West Toll Road, was funded by tolls through a legal framework established in 1951. The road opened in 1956 as part of the United States Interstate Highway System, covering 156.28 miles (251.5 km) and connecting Chicago, Indiana and Ohio. The Indiana Toll Road Commission managed the road until 1981, after which the road became

part of the Department of Highways. In 1983, the newly-created Indiana Toll Finance Authority, later the Indiana Transportation Finance Authority, took over the highway, giving it political and financial independence from the state (Levy, 2011).

In 2006, under Governor Mitch Daniels, Indiana awarded the rights to maintain, operate and collect tolls from the Indiana Toll Road to ITR Concession Co. LLC for the following 75 years. The ITR agreement included an operations and maintenance (O&M) contract covering the 156-mile (251 km), four-lane highway and the construction of additional lanes along ten of those miles. Four companies submitted proposals and ITR Concession Co. LLC, a joint venture between Cintra Concesiones de Infraestructuras de Transporte (acquired by Ferovial in 2009) and Macquarie Atlas Roads, won the bid, offering to pay USD 3.8 billion up-front. The deal included USD 748 million in equity and USD 3 248 million in debt from Santander, Bankia, Dexia, The Royal Bank of Scotland, BNP Paribas, Banco Bilbao Vizcaya Argentaria and Depfa Bank (InfraDeals, 2014). The deal allocated USD 255 million to the seven counties adjacent to the toll road, USD 250 million to the third-lane expansion and USD 40 million to introduce electronic toll collection. An additional USD 150 million went to Indiana's 92 counties for road improvements (Gilroy and Aloyts, 2013).

The deal raised much opposition, arguing that the state would see short-term gains in exchange for private firms profiting at the expense of citizen welfare over the long term. However, the joint venture faced a USD 260 million loss in 2010, with expectations for debt service default by 2012 (Holeywell, 2011). The recession and gas prices offer possible explanations. Given growing debt service concerns in 2013 and 2014, the participants began renegotiations with their lenders. In March 2014, for example, the project partners sold USD 500 million of their debt to investment firms "for around 60 cents on the dollar" (Glazer, 2014).

In total, five renegotiations have occurred between the Indiana Toll Road's public and private actors (IFA, 2013a). First, in exchange for state reimbursement (USD 60 million), the private actors agreed to a "toll freeze" in 2006 until electronic tolling was in place. Second, that same year, the state agreed to an investment obligation reduction. Third, in 2007 the state agreed to delays on certain investments until 2010. Fourth, it agreed to reimbursements in 2008 due to lost revenue connected to the electronic tolling (USD 60 million). Finally in 2010, the state agreed to additional delays on certain investments until 2011. In September 2014, ITR Concession Co. LLC announced it would file for bankruptcy, as the project's interest rate swaps, a condition imposed by the lenders, worked against its financial position by increasing its debt by USD 2.15 billion (Benman, 2014).

Discussion

The cases of PPP contractual renegotiations in the United States in the previous section demonstrate the unique characteristics of the market distinct from other regions of the world. Table 4.A1.5 summarises our overall assessment of these cases and Table 4.A1.6 which follows Guasch (2004) on Latin American concessions compares the consequences of the renegotiations. These cases can be categorised with respect to the sector that initiated the renegotiation process, while highlighting some of the consequences.

Among the cases we analysed, the public sector started the renegotiation process in two of the six cases. In the Elizabeth River Crossings case, toll deferral was the main interest; while in the State Route 91 Express Lanes case, the OCTA repurchased the concession to overcome the non-compete clause that was preventing the expansion of the general-purpose lanes. In the other cases, the private sector initiated renegotiations. The Dulles Greenway case involved tariff changes, additional investments

and the extension of the concession term. The Pocahontas Parkway project involved additional investments and extending the term of the concession. The Indiana Toll Road case resulted in a reduction of the investment obligations and compensation for toll freezes. The private partner changed in three of these four projects, while the Indiana Toll Road may undergo further changes, as the concessionaire filed for bankruptcy recently in September 2014[9].

In the absence of a clear test to determine the cause of each renegotiation in a robust manner from competing hypotheses, we will instead discuss circumstantial evidence that may provide insight for our analysis in the United States. We focus on the four theoretical explanations discussed above – opportunism, exogenous changes, complexities and the winner's curse effect.

Opportunism

Determining opportunistic motives (Williamson, 1996) of one party or the other requires careful evaluation. In the case of the SR-91 Express Lanes project, the opportunism hypothesis sheds light on the interesting mix of claims on opportunistic behaviour of both the public and private partners (Vining, Boardman and Poschmann, 2005). On the one hand, the private party obtained substantial profits, USD 29 million in just one year, which some may consider as substantial compared to the project's construction cost of USD 130 million. The contractual agreement also included a non-compete clause, protecting the concession from possible competition with expanded general-purpose lanes. On the other hand, the government attempted to bypass the non-compete clause in expanding the capacity of general-purpose lanes (citing safety reasons), but was eventually forced to settle in court. Furthermore, the government attempted to acquire the Express Lanes legislatively through condemnation. Therefore, one may find it difficult to reject opportunistic motives of the public sector more so than the private partner, although the final purchase agreement implicitly indicates satisfactory outcomes for both parties.

Elections have been considered to provide insights with respect to the public sector's opportunism (Guasch, Laffont and Straub, 2007). As already discussed above, changes in public leadership may trigger attempts to gain political advantage, or to protect from the accusation of gaining political advantage[10]. Facing the threat of losing in upcoming elections, incumbents may resort to renegotiation of PPPs for popular policies (e.g. lower tolls, adding capacity for low public cost). An incoming public official may attempt similar policies for the same reason. We identify shifts in political party control since 1992 in one or more state government branches – governor and both legislative chambers – although we recognise that the executive branch is the primary decision maker with respect to PPP renegotiations.

As Table 4.A1.7 shows, Indiana demonstrates the lowest contestability in its senate (no party shifts) and governorship (one shift), but the highest contestability in its house of representatives (four shifts). The renegotiation began under complete Republican Party control (2006) and lasted when Democrats took control of the State House (2007). No further renegotiation occurred since the Republicans recovered complete control in 2010, until the Indiana Toll Road filed for bankruptcy in 2014. We cannot conclude in this case that public opportunism motivated the renegotiation in Indiana.

Over the study period, California experienced no changes in its senate's party control, two changes in its House and three changes in its governorship. The state's purchase of State Route 91 took place in 2003, one year before Democrats lost the executive branch. Similarly, the significant South Bay Expressway renegotiation took place when the Democratic Party controlled the governorship and both legislative houses, but the party had either just gained or was about to lose that control. This may favour the hypothesis of public opportunism but the evidence remains insufficient.

Virginia shows the highest political contestability across the governorship and both legislative chambers. The Pocahontas Parkway renegotiation coincided with changes in party control across all three bodies. Similarly, the Elizabeth River Crossings renegotiations took place as the senate and the executive branch experienced changes in party control. Although one may argue from these cases that this state is more prone to renegotiations by public sector opportunism, in the absence of information regarding their motives, the evidence is insufficient.

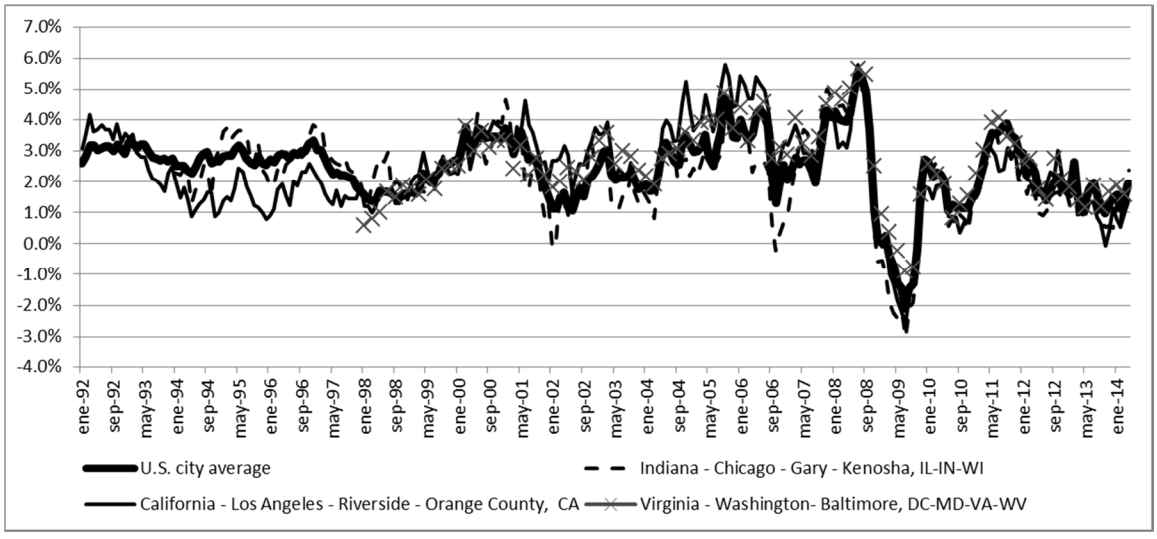
It is difficult to detect private opportunism. However, we can show whether the companies behind the deal have faced other renegotiations (see Table 4.A1.8). Previous renegotiation experiences might familiarise a company with renegotiation procedures, aiding them when complexity or exogenous shocks overwhelm subsequent projects. From this table, we see that, as of 2012, Macquarie, Fluor, Skanska Infrastructure Development and Ferrovial all participated in highway PPP projects around the world that experienced renegotiation at some point. However, most companies active in the PPP industry are likely to have some experience with renegotiation. Further research is necessary to understand the implications of these measures[11].

Exogenous changes

In the presence of exogenous shocks, renegotiations may help both parties accommodate unexpected changes. In the case of highway PPPs, we need to consider macroeconomic risks as potentially significant exogenous changes. To evaluate whether exogenous changes drive United States renegotiations, we investigate five macroeconomic variables found in the literature: inflation rate; economic growth; unemployment rate; input prices; and interest rate (Guasch, Laffont and Straub, 2007).

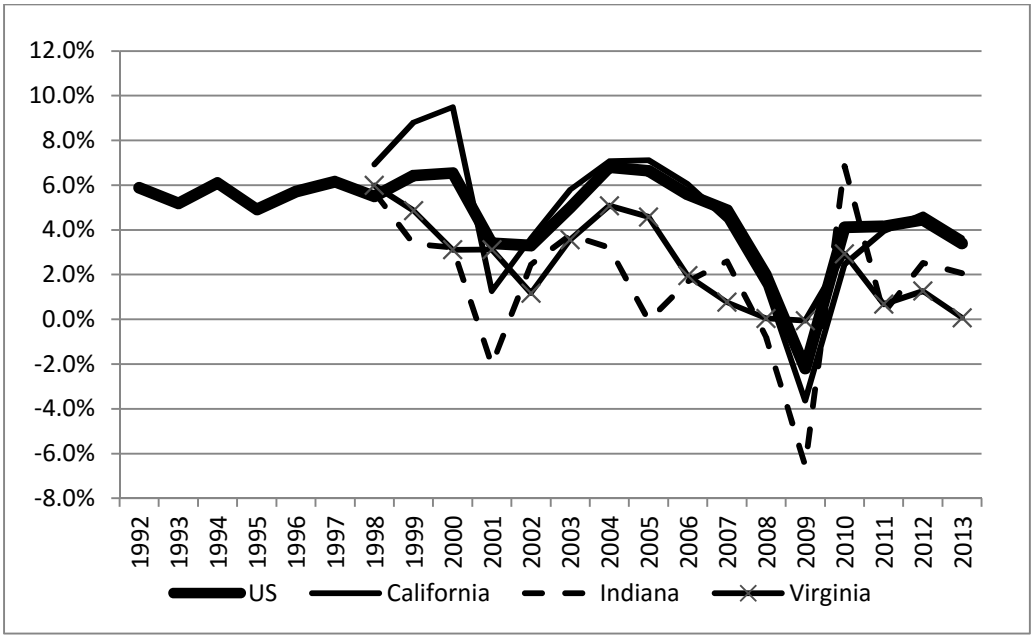
To capture negative demand shocks we focus on changes in the inflation rate, economic growth and the unemployment rate. First, we consider whether sudden increases in the inflation rate, measured through the Consumer Price Index (CPI), indicate negative real-income shocks. If toll road usage presents positive income elasticity, then sudden increases in the inflation rate should decrease available income and the revenue generated by transportation PPPs. Figure 4.3 shows no inflationary spike since 1992. In fact, the most significant shifts reflect the Great Recession's deflationary period, spanning March 2009 through October 2009. This suggests that inflation shocks could not have triggered the case study renegotiations.

Figure 4.3. **Consumer price index – All urban consumers (1992-2014)**



Source: Bureau of Labor Statistics. 2014.

Figure 4.4. **Real GDP growth in select states (1992-2014)**

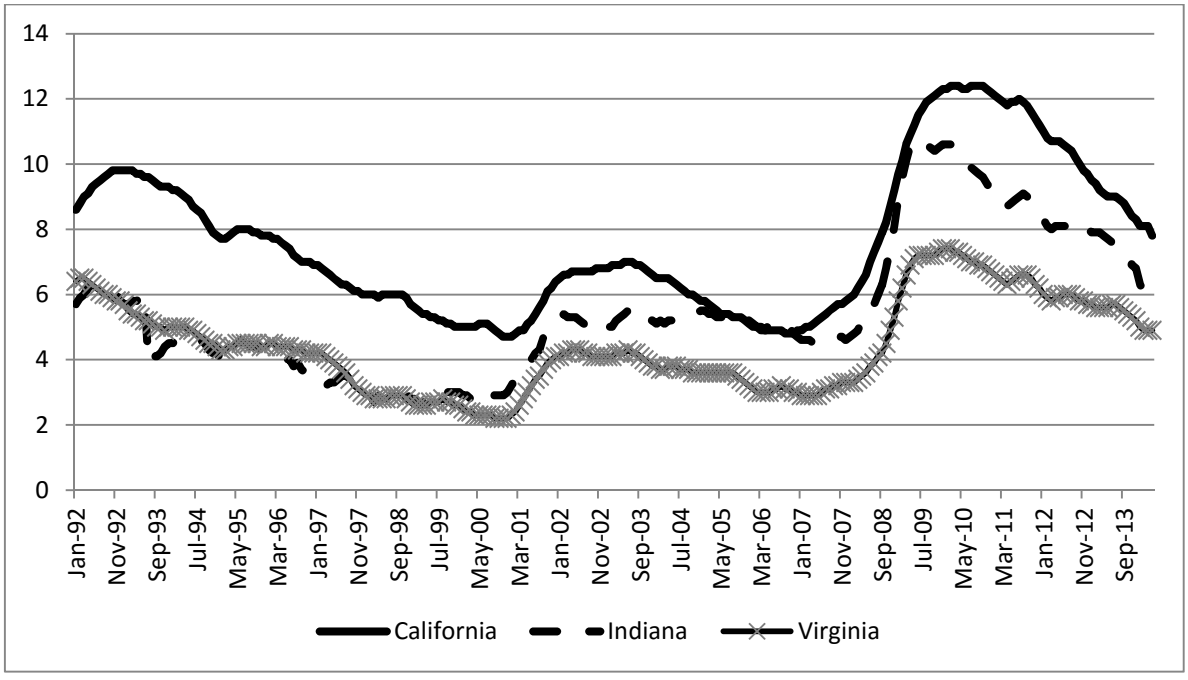


Source: Bureau of Economic Analysis, 2014a; Bureau of Economic Analysis, 2014b.

Second, declines in economic growth, measured through Gross Domestic Product (GDP), may diminish the income available to spend on toll roads. Figure 4.4 shows that California and Virginia experienced negative growth in 2009. In addition, both states experienced almost zero growth between 2001 and 2002, potentially affecting the Dulles Greenway and South Bay Expressway renegotiations. Indiana, by contrast, experienced four years of negative growth (2001, 2005, 2008 and 2009). While these GDP declines were important in the state, the Indiana Toll Road's financial close (2006) and its renegotiations (2012 and 2014) do not coincide with these economic downturns. However, the recessions' effects may have persisted over several years despite rapid recoveries in economic growth. For example, the 2009 recession may not have immediately influenced the projects, but its effects may have rather accumulated in the following years, affecting government budgets and elevating unemployment. It appears that the evidence linking shocks to the economic growth with renegotiations is mixed.

Third, a surge in unemployment may also have decreased demand for toll roads. We include unemployment in addition to economic growth because unemployment rates can rise or remain high despite recovery to economic growth. Figure 4.5 shows the unemployment rate from January 1992 to April 2014. Unemployment showed a decreasing trend until the economic downturn of 2001, increasing by almost 2% in the states under analysis. Unemployment rates declined again, starting in 2003 but, with the exception of California, they did not reach their previous lows. Unemployment increased again with the recession, peaking between 2009 and 2010 before slowly declining. The persistently high unemployment rates seen after 2009 may help explain the demand risk-related renegotiations occurring after the recession (e.g. Pocahontas Parkway and South Bay Expressway).

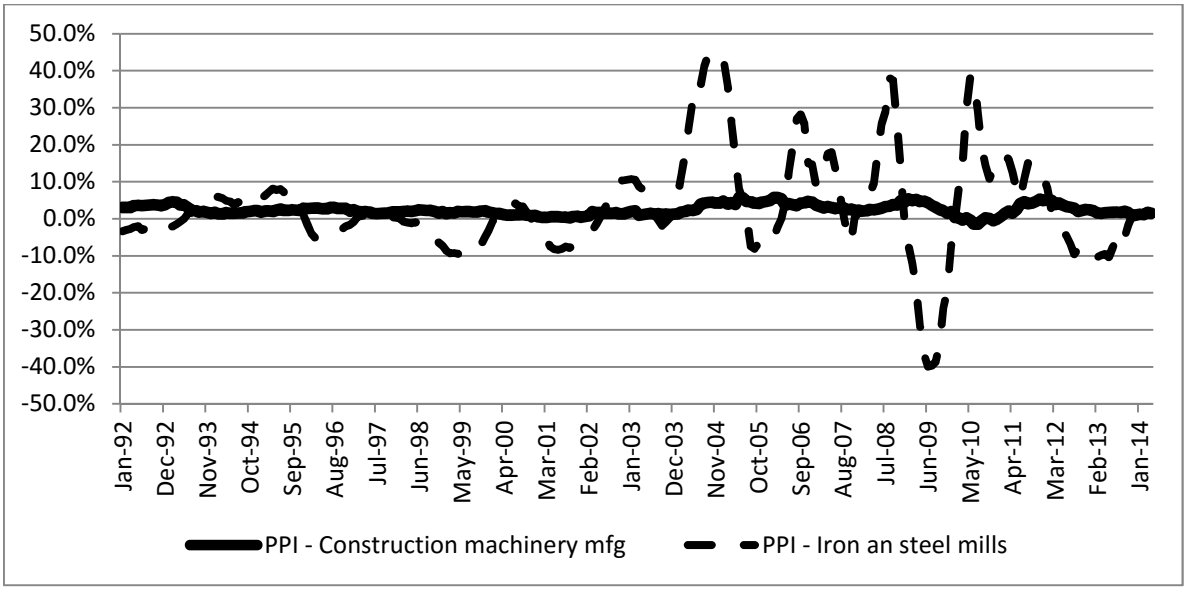
Figure 4.5. **Unemployment rates in states with highway PPP renegotiations, 1992-2014**



Source: Bureau of Labor Statistics. 2014.

A different perspective considers how changes to input prices and interest rates may have affected the supply of transportation infrastructure by altering project profitability. Using the Producer Price Index (PPI), we first consider two potential sources of cost increases: construction machinery manufacturing and iron and steel mills. Figure 4.6 shows PPI changes for both sources starting in 1992. Inflation for construction machinery manufacturing has remained constant at under 10%. Iron and steel mills' production costs, however, have shown much more volatility, particularly between 2002 and 2011. Cost changes during this period ranged from 45% inflation in November 2004 to 40% deflation in June 2009. These unexpected fluctuations in steel costs may have driven the South Bay Expressway's renegotiation.

Figure 4.6. **PPI (construction machinery & iron and steel mills) 1992-2014**

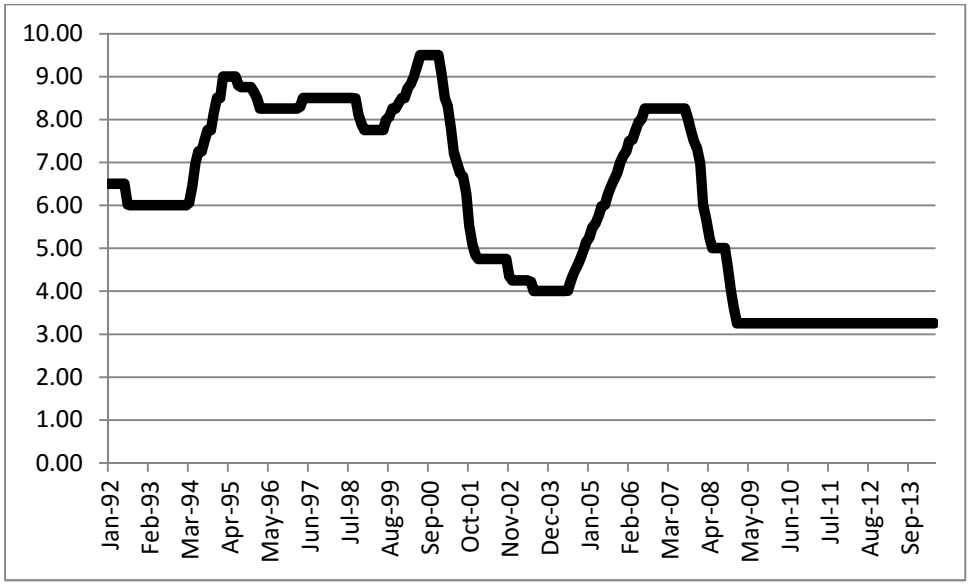


Source: Bureau of Labor Statistics, 2014.

Interest rate shifts may also have affected the project's perceived profitability. Partners may prefer to invest their money under variable market rates rather than in a PPP project. Figure 4.7 shows the bank prime loan rate from 1992 to 2014, noting how debt service increased 50% between 1993 and 1994 and increased 100% between 2003 and 2005. These high interest rates may have affected the Dulles Greenway renegotiations (1994 to 2000, 2005). The combination of financial practices and persistent market conditions may also affect PPP projects. In the case of the Indiana Toll Road, in 2007, banks conditioned their funds on the acquisition of an interest rate swap which would protect the project in case of raising interest rates. However, as a consequence of the recession, interest rates fell below the 2007 levels instead of rising, which put the project under financial stress and eventually drove the project to bankruptcy in 2014[12].

Considering this evidence, it appears that economic growth, unemployment rates, input prices and interest rates may have had important effects on the renegotiation of the cases, although more robust analysis is necessary to be more conclusive.

Figure 4.7. **Prime bank loan rate, not seasonally adjusted (1992-2014)**



Source: Federal Reserve Bank of St. Louis. 2014.

Complexity

The political environment of PPPs can also increase complexity, which decision makers need to account for in reaching a deal or respond to when circumstances change, requiring renegotiation with the partner at any point through the project life. In the United States, the politics of not only the PPPs but also public infrastructure investment in general have experienced political backlash, on the basis of civil rights, environmental protection, opposition to tolls and so forth. Opposition to the rapid growth of the interstate highway network nationwide during the 1960s-70s emerged in urban regions across the nation, significantly influencing the outcome of some of the planned facilities. For example, the Washington DC region once embraced the plan of a 38-mile interstate highway network. Many of the planned links were to pass through predominantly black neighbourhoods. After 22 years of fierce political battles, only ten miles were ever built, and the issue of race played a considerable role in shaping the actual limited highway network in the District of Columbia (Levey and Levey, 2000). As such, one may therefore argue that civil rights issues have played an important role in the politics of highways at all levels in the United States.

Intuitively, toll charges on freeways would face equivalent political challenges, especially when a given toll scheme may be perceived to disproportionally affect particular neighbourhoods. The Elizabeth River Crossings project predominantly serves cross-river commuters and businesses in port-related industries in Hampton Roads. It is in this context of United States politics that tolling free facilities resulted in persistent opposition, conceivably leading the public decision makers to delay the imposition of tolls and to lower the toll levels during the ramp-up period (VDOT, 2014).

Resonating with the political dynamics of the Elizabeth River Crossings Project, the literature on ethnic, linguistic and religious fractionalisation and fragmentation of communities has suggested that population diversity may complicate the implementation of public goods projects (Alesina, Baqir and Easterly, 1999; Alesina and La Ferrara, 2000; Alesina, Glaeser and Sacerdote, 2001). We investigate the potential of public disagreement on particular policies or projects, through estimating an ethnic fractionalisation index using census information from 2010. Table 4.A1.10 shows that fractionalisation is

the highest in California (0.77), high in Virginia (0.58) and relatively low in Indiana (0.37)[13]. When compared worldwide, data as summarised in Table 4.A1.11 show California and Virginia with a high proportion of ethnic diversity. Accordingly, the renegotiation experiences of PPPs in these states can be partially explained on this basis, although obviously more rigorous and across-the-board analysis would be necessary to draw conclusive insights in this regard.

Looking next at the public partners, we evaluate whether each state had previous experience with PPPs. Governments with limited PPP experience may struggle to manage such innovative projects. Five of the case study projects were among the first in their state. The Indiana Toll Road was the first PPP in Indiana, while the SR-91 Express Lanes project was the first in California. The South Bay Expressway, despite its construction a decade after State Route 91, was part of California's initial 1989 experiment, under Assembly Bill No. 680. The Dulles Greenway was Virginia's first private toll road since the 1800s, a project constructed under the Highway Corporation Act of 1988 (VDOT, 2006). Similarly, the Pocahontas Parkway was the first project to take advantage of the state's Public-Private Transportation Act of 1995 and was the first 63-20 corporation for highways. As a result, government inexperience offers a possible explanation for these project's renegotiations, as governments had neither the appropriate expertise nor the human resources with the experience to deal with some of the uncertainties in handling these agreements. The Elizabeth River Crossings project, however, cannot possibly be considered as novel. The financial close in 2012 and the state's two-decade experience with PPPs prior to the deal indicate that inexperience of the state agency may not be able to explain this project's renegotiation.

Finally, a state's institutional environment can also contribute to the relational complexity of PPP deals. Even with decades of PPP experience, a firm or government may not have the technocratic capacity to manage a PPP contract. We review state management capacity, using the State Management Report Card funded by The Pew Charitable Trusts, evaluating state performance and focusing our attention on the infrastructure component[14] (summarised in Table 4.A1.12 for 1999, 2005 and 2008) (Barrett and Greene, 2008; Government Performance Project, 2005; King, Zeckhauser and Kim, 2004). According to these ratings, Virginia demonstrates the strongest infrastructure performance during the analysis period. Indiana falls in the middle of the table, with California showing one of the lowest scores. In this regard, one would expect Virginia to have the strongest institutional quality of the states under consideration. The case results do not reflect this expectation, so government management capacity may not necessarily be a factor driving United States PPP renegotiations.

In addition, since Guasch et al. find evidence that regulatory bodies diminish renegotiation probabilities in highly corrupt environments, we analyse whether state regulatory bodies oversee the PPP contract process (Guasch, Laffont and Straub, 2007). In Virginia, the Office of Transportation Public-Private Partnership (OTP3) has the objective to ensure the timely delivery of the Public-Private Transportation Act (PPTA) projects, which address priority transportation needs. The OTP3 operates under the Secretary of Transportation and, while outside VDOT, it receives administrative support from the agency (Virginia Office of Transportation Public-Private Partnerships, 2014)[15]. In addition, the multimodal PPTA Steering Committee reviews the OTP3 recommendations. In contrast, California and Indiana both rely on their Departments of Transportation to oversee their PPP projects (KPMG, 2013). These institutional differences suggest that OTP3's independence and dedicated resources should reduce the number of negotiations in Virginia. The case results do not reflect this expectation, suggesting that the presence of dedicated regulatory agencies may not reduce renegotiation occurrences for these cases.

Winner's curse

Finally, we discuss the possibility that the winner's curse effect may have been in place in any of these cases. This effect, in the context of brownfield concessions, would take the form of unreasonably high bids, generating profit shortfalls that necessitate contract renegotiations (Athias and Nuñez, 2009). In contrast, in the context of greenfield PPP projects, this effect would be reflected in unreasonably low bids, which would then require renegotiation to ensure construction completion and continuing operation by the private partner. To investigate whether this "winner's curse" effect influenced any of the study cases, we evaluate the award processes and the numbers of bidders involved. Only two of the case projects involved bidding processes: the Indiana Toll Road and Elizabeth River Crossings. The winning Indiana bid by Cintra Concesiones de Infraestructura de Transporte and Macquarie Atlas Roads offered USD 3.8 billion up-front. In contrast, Indiana Road Company LLC offered USD 2.8 billion, Itinere Infraestructuras S.A. offered USD 2.5 billion and Indiana Toll Road Partners LLC offered USD 1.9 billion (IFA, 2013). Given that the competing bids were lower than the winning bid by at least USD 1 billion, it is difficult to reject the claim that the "winner" over-bid, leading to the renegotiations that the concession eventually underwent[16].

In contrast, the Elizabeth River Crossings' renegotiations appear to be unrelated to the winner's curse. While three companies submitted statements of interest, only one pursued the project. As a result, a bilateral negotiation process between the public and private actors established the deal's final elements, including the price.

Conclusion

The aim of this research was to investigate the United States highway PPP market experience, focusing on contractual renegotiations. Beginning with a theoretical framework derived from a brief literature review, we conducted six case studies of tolled highway PPP renegotiations. These cases vary considerably with respect to their contract types, engineering characteristics and political and economic circumstances. Moreover, in contrast to the EU or Latin American markets, these United States projects inhabit distinct, state-based, institutional and regulatory environments. However, United States PPP renegotiation has not experienced the same level of analysis as international markets. The relatively few United States PPPs and scarce data availability might explain this situation, while they present considerable difficulty in employing econometric analysis methods for addressing the research questions. This research serves as a foundation to bridge this gap in the literature.

The six case studies presented in this chapter underline a few distinct characteristics of the United States highway PPP market. Regarding the renegotiations initiated by the private partners, we found that public agencies in the United States have demonstrated their willingness to let their private partners default, go bankrupt, or be bought out when the facilities are performing poorly in terms of usage. Notably, these events did not involve risking the public sector funds, except in one case (South Bay Expressway and TIFIA). With respect to the renegotiations initiated by the public sector, we find that the changes to the PPP schemes have often been claimed to be beneficial for society, when careful evaluation is actually necessary to make such claims. The critical issue that we find is the need for public education to promote a sound understanding of how PPPs work and what the implications for the public of each renegotiation may be.

Rather than jumping to conclusions, we need to recognise that the cases reviewed in this chapter demonstrate the effect of multiple factors in leading to unexpected contractual renegotiations. The existing body of literature provides poor guidelines to disentangle the complexity behind each

renegotiation case and to distinguish the effect of one hypothesis from another. Therefore, the analysis in this study highlights the need for scholars to continue developing analytical frameworks by which such insight can be effectively drawn from the experiences. It is equally important to emphasise the need for policy makers to reasonably disclose PPP information to allow these analyses.

The United States infrastructure PPP market is relatively new and still growing. The experience of PPP renegotiations may be a reflection of the learning curve that policy makers are climbing before a robust market emerges, with reasonable returns to both public and private partners. One may find in the literature a number of proposals to manage the undesirable consequences of PPP renegotiations (e.g. Engel, Fischer and Galetovic, 2006). Yet, the analysis in this chapter points to the need for a continuing evaluation of PPP management and renegotiations, in a manner that is sensitive to the unique characteristics of the United States.

Notes

1. We provide two examples. First, the United States has a very active tax-exempt municipal bond market which makes buy-out a relevant event to take into consideration. In the case of a negative, exogenous shock, a contract modification may be avoided if a new private partner is willing to take a higher risk or is willing to introduce new management that may be able to manage the impact of the shock. This would be a renegotiation in the sense that the private partner's asset ownership has changed. Second, the US has a different legal framework in terms of bankruptcy procedures. While in the US the bankruptcy framework primarily serves to protect the debtors, aiming to help companies survive liquidity events, in the EU the institutional framework is more lender-friendly (Cirmizi, Klapper and Utamchandani, 2012). The former favours the debtor to keep control of the company during the bankruptcy event and even allows the debtor to acquire additional debt to restructure the company. The latter focuses on paying back the debtor as soon as possible, implying an emphasis on quick liquidation of the company. This difference has practical implications in the highway PPP market, as pointed out recently by a leader in the US market (Nicolás Rubio, US President, Cintra, personal communication, November 20, 2014).

2. All references are in nominal US dollars unless otherwise indicated.

3. Another potential explanation was discussed during the ITF Roundtable where a draft of this research was presented. Renegotiations may be Pareto-enhancing to all the parties involved. This could happen with an unexpectedly high tax collection that is used to lower toll rates, permanently or temporarily.

4. Price-capping refers to a regulation developed "*to squeeze out inefficiencies (…) by forcing transport industries to provide their services at increasingly lower real prices*" (Button, 2010, 470).

5. According to the authors, renegotiation is easier in civil law countries because legislation is the primary source of law. The court system must ponder and evaluate different codes, many of which may contain contradictory principles. In contrast, legal cases provide the primary source of law in common law countries, so contradictory statutes are less common (Athias and Nuñez, 2009, 18-19).

6. See, for example, its project pipeline here: http://www.vappta.org/projects.asp

7. In the United States, public agencies may issue tax-exempt municipal bonds, enabling more cost-effective financing of public projects. Under the Internal Revenue Service Rule 63-20 and Revenue Proclamation 82-26, non-profit public benefit corporations ("63-20 corporations") are also allowed to issue tax-exempt bonds. As a result, groups can establish 63-20 corporations that then form concession agreements with private firms to deliver, for instance, design-build-operate-maintain stages of an infrastructure facility. While the private partner usually arranges financing, the 63-20 corporation issues the debt (FHWA, 2014b).

8. The criteria used by Caltrans included: the importance of the transportation need served, the ease of implementation, the experience of the consortium, the promotion of economic development and how innovative it was (Wang, 2010).

9. South Bay Expressway: here, a tariff decrease occurred after the local government took charge of the road.

10. The former makes reference to the differences in the incentives faced by the roving and stationary bandit (Olson, 2000). The latter makes reference to third-party opportunism and political contestability explored for public contracts (Moszoro and Spiller, 2012).

11. The evidence of private-sector renegotiation experience is inconclusive because it applies not only to private companies but to lenders also, as most of the banks involved in the highway PPP market in the US are foreigners. As lenders lose from private opportunism this would help diminish its occurrence.

12. The interest-rate swap is a financial instrument used for hedging the risk of rising interest rates. In the case of ITR, if the interest rates had increased, it would have been protected. However, as the interest rates decreased instead of increased, it put the project under stress.

13. The fractionalisation index follows this formula: $FRACT_j = 1 - \sum_{i=1}^{N} s_{ij}^2$, where sij is the proportion that any particular racial group has in state j. This index follows the work by (Alesina *et al*., 2003).

14. This component evaluates states based on five dimensions (Barrett and Greene, 2008): i) the state regularly conducts a thorough analysis of its infrastructure needs and has a transparent process for selecting infrastructure projects; ii) the state has an effective process for monitoring infrastructure projects throughout their design and construction; iii) the state maintains its infrastructure according to generally recognised engineering practices; iv) the state comprehensively manages its infrastructure; v) the state creates effective intergovernmental and interstate infrastructure co-ordination networks. The evaluation takes into consideration academics' and journalists' expert knowledge of the area and the states.

15. In November 2014, the OPT3 changed its name to the Virginia Office of Public-Private Partnerships.

16. During the ITF Roundtable where a draft of this research was presented it was argued that this behaviour could also be interpreted as “aggressive bidding” a form of private opportunism, where a company bids to obtain the contract, hoping to obtain better conditions afterwards, via renegotiations. In that regard, SBX had not occurred, so there was not a highly publicised highway PPP bankruptcy case showing that the US public sector would behave differently from that of Latin America.

Annex 4.A1

Tables

Table 4.A1.1. **Outcome of renegotiations in Latin America and the Caribbean (1985-2000)**

Renegotiation outcome	Percentage of renegotiated concession contracts with the given outcome
Delays on investment obligations targets	69
Acceleration of investment obligations	18
Tariff increases	62
Tariff decreases	19
Increase in the number of cost components with an automatic pass-through to tariff increases	59
Extension of concession period	38
Reduction of investment obligations	62
Adjustment of canon – annual fee paid by operator to government: favourable to operator	31
Adjustment of canon – annual fee paid by operator to government: unfavourable to operator	17
Changes in the asset-capital base: favourable to operator	46
Changes in the asset-capital base: unfavourable to operator	22

Source: Guasch, 2004.

Table 4.A1.2. **Geographic distribution of United States PPPs, renegotiations and our case studies**

State	P3 Highways	P3 Highways Facing Renegotiations					Cases Under Analysis				
		Contract modification	Default	Bankruptcy	Buy-out	Total Projects	Contract modification	Default	Bankruptcy	Buy-out	Total Projects
Alaska	1	0	0	0	0	0	0	0	0	0	0
California	4	1	1	1	2	2	1	1	1	2	2
Colorado	2	0	0	0	1	1	0	0	0	0	0
Florida	13	0	0	0	1	1	0	0	0	0	0
Georgia	1	0	0	0	0	0	0	0	0	0	0
Indiana	2	1	1	1	1	1	1	1	1	1	1
Massachusetts	1	0	0	0	0	0	0	0	0	0	0
Michigan	1	0	0	0	1	1	0	0	0	0	0
New Mexico	1	1	0	0	0	1	0	0	0	0	0
North Carolina	1	0	0	0	0	0	0	0	0	0	0
South Carolina	1	0	1	1	0	1	0	0	0	0	0
Texas	10	1	1	1	3	4	0	0	0	0	0
Virginia	6	3	2	1	3	5	2	2	1	1	3
TOTAL	45	7	6	5	12	17	4	4	3	4	6

Sources: Public Works Financing Newsletter, 2014, InfraDeals, 2014.

Table 4.A1.3. **Summary of United States PPP renegotiation cases (1995-2013)**

Project	State	Main Revenue Source	Contract Type	Original Cost Estimate	Final Construction Cost	Purchase Price From Original Private Partners
Dulles Greenway	Virginia	Toll	DBFOM	350 million (1993)	338 million	617.5 million (2005)
Pocahontas Parkway	Virginia	Toll	DBFOM	381 million (1998)	314 million (2002)	611 million (2006)
Elizabeth River Crossings	Virginia	Toll	DBFOM	2 089 million	n/a	n/a
State Route 91	California	Toll	DBFOM	88.3 million (1990)	130 million (1995)	207.5 million (2003)
South Bay Expressway[a]	California	Toll	DBFOM	400 million (1990)	722 million (2007)	351.7 million (2011)
Indiana Toll Road[c]	Indiana	Toll	DBFOM + OM	n/a	n/a	n/a

Source: Compiled by authors from multiple sources.
Note: DBFOM: Design, Build, Finance, Operate and Maintain. OM: Operate and Maintain
a) Includes the construction of non-toll 3.2 miles (5 km).
b) Construction of 1.2 miles (1.9 km) of tunnel and 1 mile (1.6 km) of highway. Maintenance of 50 lane mile.
c) Acquisition required the construction of 10 miles (16.1 km). The upfront payment was USD 3 778 million.

Table 4.A1.4. **Complexity in the design and construction of PPP cases**

Project	State	Constructed Length miles (km)	Bridges	Tunnels
Dulles Greenway	Virginia	14 (22.5)	Yes	No
Pocahontas Parkway	Virginia	8.8 (14.1)	Yes	No
Elizabeth River Crossings	Virginia	2.2 (3.5)	Yes	Yes
State Route 91	California	10 (16.1)	No	No
South Bay Expressway	California	12.7 (20.4)	Yes	No
Indiana Toll Road	Indiana	10 (16.1)*	No	No

Source: Compiled by authors from multiple sources.
Note: Indiana Toll Road includes the operation and maintenance of the originally constructed 2+2 lanes for 156 miles (251km). In addition it includes the design, construction, finance, operation and maintenance of a third line, in each direction, for 10 miles (16.1km).

Table 4.A1.5. **Summary of PPP renegotiation cases (1993-2013)**

Project	Return	Tolls	Problems	Dates	Relevant dates
Dulles Greenway	From 30% down to 14%	Tolls regulated by Virginia State Corporation Commission	Demand lower than expected	1993	Financial close
				1993	Construction starts
				1995	Opening year
				1995	Tolls decreased. Owners default on debt.
				1997	Tolls increased. Speed limit increased (65 mph)
				1999	Debt restructured. Project modified: from 2*2 lanes to 3*3.
				2001	Extension of concession period (20 years)
				2004	Variable peak and discounted off-peak point-to-point rates
				2005	Macquarie Infrastructure Group purchases PPP
				2013	Tolls (2013-2020): the higher of CPI plus 1%, real GDP, or 2.8%.
Pocahontas Parkway	Originally not-for-profit	First 2 years in contract. VDOT adjusts afterwards	Demand lower than expected	1998	Financial close
				1998	Construction starts
				2002	Opening year
				2006	Transurban USA purchases the contract for: Lease Develop-Operate
					Extension of concession period (to 99 years)
					Additional investments: 1.6-mile (2.6km), four-lane (Airport Connector) and electronic tolling
				2012	Transurban USA writes off its equity on the parkway to zero.
				2014	Transurban USA transfers the operation to DBi Services
Elizabeth River Crossings	Revenue-sharing after threshold	Highest of 3.5% or CPI	Community opposition	2012	Financial close
				2012	Construction starts
				2012	Delays tolling until 2014 in exchange for USD 125 million. Private partners increased equity by USD 207 million.
				2014	Tolls are decreased. Compensation USD 82.5.
				2017	Expected opening

Table 4.A1.5. (*cont'd*) **Summary of PPP renegotiation cases (1993-2013)**

Project	Return	Tolls	Problems	Dates	Relevant dates
State Route 91	17%		Non-compete clause	1993	Financial close
				1993	Construction starts
				1995	Opening year
				2003	Orange County (OCTA) purchases it to eliminate non-compete clause
South Bay Expressway	18.50%	-		2002	Macquarie Infrastructure Group (MIG) purchases CTV
				2003	Financial close
				2007	Opening year
				2010	Files for bankruptcy
				2011	Exits Chapter 11 as San Diego Association of Governments (SANDAG) purchases it. Tolls are decreased.
Indiana Toll Road	-	Inflation cap	-	2006	Financial close
				2006	Opening year
				2006	"Toll freeze" until electronic tolling is in place. State reimbursement amounts to USD 60 million
				2006	Reduction on investment obligations
				2007	Construction starts
				2007	Delays in certain investments until 2010
				2008	State reimbursement amounts to USD 60 million due to lost
				2010	Delays in certain investments until 2011
				2014	Filed for bankruptcy

Source: Compiled by authors from multiple sources.

Table 4.A1.6. **Outcome of renegotiations in the United States highway PPP cases (1995-2013)**

Renegotiation Outcome	Dulles Greenway	Pocahontas Parkway	Midtown and Downtown Tunnels	State Route 91	South Bay Expressway	Indiana Toll Road
Delays on investment obligations targets	No	No	No	No	No	Yes
Acceleration of investment obligations	No	No	No	No	No	No
Tariff increases	Yes	No	No	No	No	No
Tariff decreases or freeze or delay	Yes	No	Yes	No	Yes	Yes
Increase in the number of cost components with an automatic pass-through to tariff increases	No	No	No	No	No	No
Extension of concession period	Yes	Yes	No	No	No	No
Reduction of investment obligations	No	No	No	No	No	Yes
Adjustment of canon –annual fee paid by operator to government: favourable to operator	No	No	No	No	No	No
Adjustment of canon –annual fee paid by operator to government: unfavourable to operator	No	No	No	No	No	No
Changes in the asset-capital base: favourable to operator	No	No	No	No	No	No
Changes in the asset-capital base: unfavourable to operator	No	No	Yes	No	No	No
Other: increase speed	Yes	No	No	No	No	No
Other: private partner changes	Yes	Yes		Yes	Yes	No
Other: additional investment	Yes	Yes	No	No	No	No
Other: decrease in investment	No	No	No	No	No	Yes
Other: eliminate non-compete clause	No	No	No	Yes	No	No
Renegotiation initiated by	Private	Private	Public	Public	Private	Private

Sources: IFA (2014); Levy (2011); FHWA (2014); Wang (2010).
Note: Designed based on Guasch, 2004

Table 4.A1.7. **Changes in the majority party, state executive and legislative branches**

State	Years of changes in Governor's Party	Years of changes in State Senate Majority Party	Years of changes in State House Majority Party
Virginia	1993, 2002, 2009	1995, 2008, 2011	1997
California	1999, 2003, 2011	None	1995, 1997
Indiana	2004	None	1994, 1999, 2004, 2010

Source: Lucy Burns Institute, 2014; *Ballotpedia*, 2014.

Table 4.A1.8. **Primary private owners and their road asset portfolio facing renegotiations**

Project	Dates	Main Private Stockholders Behind the Project	Asset Portfolio of Other Roads of Stockholders (2012)	Asset Portfolio of Other Roads Facing renegotiation (2012)
Dulles Greenway	1993	Shenandoah Group, Kellog Brown & Root	None	None
	1995			
	1997			
	1999			
	2001			
	2004			
	2005	Macquarie Infrastructure Group (now Macquarie Atlas Roads)	B103, Indiana Toll Road, M6 Motorway Toll, Societes des Autoroutes Paris-Rhin-Rhone	Indiana Toll Road, M6 Motorway Toll, Societes des Autoroutes Paris-Rhin-Rhone
	2006 2013	Macquarie Infrastructure Group and Macquarie Infrastructure Partners	B103, Indiana Toll Road, M6 Motorway Toll, Societes des Autoroutes Paris-Rhin-Rhone, Autoroute A25	Indiana Toll Road, M6 Motorway Toll, Societes des Autoroutes Paris-Rhin-Rhone
Pocahontas Parkway	1998	Fluor Daniel and Morrison Knudsen	A59 Motorway Project, I-495 Capital Beltway HOT Lane Project, I-95 HOV/HOT Lanes Project, Windsor-Essex Parkway	A59 Motorway Project
	2006			
	2012	Transurban DRIVe (owned by Transurban Group and Capital Partners, now CP2)	I-495 Capital Beltway HOT Lane Project, I-95 HOV/HOT Lanes Project	None
	2014	Dbi Services	None	None
State Route 91	1993	Level 3 Communications, Inc., Compagnie Financière et Industrielle des Autoroutes (Cofiroute owned by Vinci Autoroute) and Granite Construction Inc.	None	None
	2003	N/A	None	None
Elizabeth River Crossings	2012	Skanska Infrastructure Development, Macquarie Infrastructure Partners II and Macquarie Mercer Infrastructure Trust	A1 Motorway, Antofagasta Regional Highway, M25 Widening Scheme,	A1 Motorway, Antofagasta Regional Highway
	2012			
	2014			

Table 4.A1.8. (*cont'd*) **Primary private owners and their road asset portfolio facing renegotiations**

Project	Dates	Main Private Stockholders Behind the Project	Asset Portfolio of Other Roads of Stockholders (2012)	Asset Portfolio of Other Roads Facing Renegotiation (2012)
South Bay Expressway	1991	Parsons Brinkerhoff, Egis Projects, Fluor Daniel and Prudential Bache	A59 Motorway Project, HSL/Zuid, I-495 Capital Beltway HOT Lane Project, I-95 HOV/HOT Lanes Project, Windsor-Essex Parkway, A2 Motorway PPP Phase 1, A24/IP3 Viseu-Chaves, A28 Rouen-Alencon Motorway, A63 Highway, A8, A88 Motorway Falaise-Sées, L2 Bypass Marseille, M25 Widening Scheme, M6 Motorway Phase III, North Luzon Expressway, Ostregion PPP Package 1	A59 Motorway Project
	1992	Parsons Brinkerhoff and Egis Projects	A2 Motorway PPP Phase 1, A24/IP3 Viseu-Chaves, A28 Rouen-Alencon Motorway, A63 Highway, A8 (Augsburg-Munich), A88 Motorway Falaise-Sées, L2 Bypass Marseille, M25 Widening Scheme, M6 Motorway Phase III, North Luzon Expressway, Ostregion PPP Package 1	A2 Motorway PPP Phase 1, A24/IP3 Viseu-Chaves, A8 (Augsburg-Munich),
	1997	Parsons Brinkerhoff, Egis Projects and Koch Industries	A2 Motorway PPP Phase 1, A24/IP3 Viseu-Chaves, A28 Rouen-Alencon Motorway, A63 Highway, A8, A88 Motorway Falaise-Sées, L2 Bypass Marseille, M25 Widening Scheme, M6 Motorway Phase III, North Luzon Expressway, Ostregion PPP Package 1	A2 Motorway PPP Phase 1, A24/IP3 Viseu-Chaves, A8 (Augsburg-Munich),
	2002	Macquarie Infrastructure Group	B103, Indiana Toll Road, M6 Motorway Toll, Sociétés des Autoroutes Paris-Rhin-Rhone	Indiana Toll Road, M6 Motorway Toll, Sociétés des Autoroutes Paris-Rhin-Rhone
	2003			
	2010			
	2011	Banks: DEPFA Bank plc, Allied Irish, Bank of Ireland, BNP Paribas, Commonwealth Bank, DVB Bank, DZ Bank and HSH Nordbank	None	None

Table 4.A1.8. (*cont'd*) **Primary private owners and their road asset portfolio facing renegotiations**

Project	Dates	Main Private Stockholders Behind the Project	Asset Portfolio of Other Roads of Stockholders (2012)	Asset Portfolio of Other Roads Facing Renegotiation (2012)
Indiana Toll Road	2006	Cintra Concesiones de Infraestructuras de Transporte, Macquarie Infrastructure Partners, and Macquarie Atlas Roads	A-22 Algarve Shadow Toll Road, A-27/28 Norte Litoral Shadow Toll Road, A-66 Motorway - Benavente to Zamora, Acores Shadow oll Road, AP-36 Ocana-La Roda Highway, C-16 Sant Cugat-Terrassa-Manresa Highway, Central Greece E-65 Highway Project, Costa del Sol Hghway - Ausol II, Costa del Sol Highway - Ausol I, Highway 407, Highway 407 East to Highway 35/115, I-635, Ionian Roads Project, M-203 Alcalá O´Donnell Highway, M-30 Ring Road PPP, M3 Clonee-Kells, Madrid-Ocaña Highway Concession, N4/N6 PPP, North Tarrant Expressway, North Tarrant Expressway Segments 3A and 3B, Trans-Texas Corridor SH130 SEg 5&6, B103, Dulles Greenway, M6 Motorway Toll, Societes des Autoroutes Paris-Rhin-Rhone, Autoroute A25, Dulles Greenway	A-22 Algarve Shadow Toll Road, A-27/28 Norte Litoral Shadow Toll Road, AP-36 Ocana-La Roda Highway, C-16 Sant Cugat-Terrassa-Manresa Highway, Highway 407, M-203 Alcalá O´Donnell Highway, Madrid-Ocaña Highway Concession, Dulles Greenway
	2006			
	2006			
	2007			
	2008			
	2009	Ferrovial, Macquarie Infrastructure Partners, and Macquarie Atlas Roads	A-22 Algarve Shadow Toll Road, A-27/28 Norte Litoral Shadow Toll Road, A-66 Motorway - Benavente to Zamora, Acores Shadow oll Road, AP-36 Ocana-La Roda Highway, C-16 Sant Cugat-Terrassa-Manresa Highway, Central Greece E-65 Highway Project, Costa del Sol Hghway - Ausol II, Costa del Sol Highway - Ausol I, Highway 407, Highway 407 East to Highway 35/115, I-635, Ionian Roads Project, M-203 Alcalá O´Donnell Highway, M-30 Ring Road PPP, M3 Clonee-Kells, Madrid-Ocaña Highway Concession, N4/N6 PPP, North Tarrant Expressway, North Tarrant Expressway Segments 3A and 3B, Trans-Texas Corridor SH130 SEg 5&6, B103, Dulles Greenway, M6 Motorway Toll, Societes des Autoroutes Paris-Rhin-Rhone, Autoroute A25, Dulles Greenway	A-22 Algarve Shadow Toll Road, A-27/28 Norte Litoral Shadow Toll Road, AP-36 Ocana-La Roda Highway, C-16 Sant Cugat-Terrassa-Manresa Highway, Highway 407, M-203 Alcalá O´Donnell Highway, Madrid-Ocaña Highway Concession, Dulles Greenway
	2010			
	2014			

Source: InfraDeals, 2014.

Table 4.A1.9. **Contract complexity of PPP cases**

Project	State	Type of Contract	Original Contract Duration (years)	Is the contract available online?	Original Contract Length (pages without exhibits)
Dulles Greenway	Virginia	DBFOM	40	Yes	61
Pocahontas Parkway	Virginia	Original: DBOT. Modified: BOT	30	Yes	96
Elizabeth River Crossings	Virginia	DBFOM	75	Yes	160
State Route 91	California	BTO	35	No	*
South Bay Expressway	California	BTO	35	No	*
Indiana Toll Road	Indiana	DBFOM + OM	58	Yes	112

Source: Compiled by authors from multiple sources.
Note: No information was available on the California P3 highway contracts.

Table 4.A1.10. **Fractionalisation index for the United States (2010)**

US State	Ethnic Fractionalisation
Maine	0.1166
West Virginia	0.1391
North Dakota	0.2214
Minnesota	0.3431
Wisconsin	0.3464
Ohio	0.3495
Missouri	0.3564
Indiana	0.3733
Pennsylvania	0.4018
Tennessee	0.4364
Utah	0.4433
Oregon	0.4631
Arkansas	0.4717
Massachusetts	0.4790
Alabama	0.5113
Washington	0.5398
Mississippi	0.5439
South Carolina	0.5456
Louisiana	0.5547
Connecticut	0.5548
Delaware	0.5759
Colorado	0.5812
North Carolina	0.5829
Virginia	0.5831
Alaska	0.5915
Illinois	0.6362
Georgia	0.6370
Florida	0.6451
Maryland	0.6511
Arizona	0.7041
Texas	0.7238
Nevada	0.7440
Hawaii	0.7521
California	*0.7665*

Source: US Census Bureau, 2013.

Table 4.A1.11. **Ethnic fractionalisation of select countries**

	Country	Ethnic Fractionalisation
Maximum value	Uganda	0.9302
Percentile 90	Gambia	0.7864
Percentile 75	Nepal	0.6625
Percentile 50	Palau	0.4342
Percentile 25	El Salvador	0.1984
Percentile 10	Cyprus[1]	0.0938
Minimum value	Comoros	0.0000

Source: Alesina et al., 2003.

[1]. Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Table 4.A1.12. **The state management report card: Infrastructure grade, states with PPP enabling legislation**

US States	1999	2005	2008
Alabama	1	2	6
Alaska	6	6	4
Arizona	3	7	7
Arkansas	5	6	6
California	4	5	7
Colorado	5	6	6
Connecticut	6	6	6
Delaware	8	9	9
Florida	5	9	10
Georgia	5	6	8
Illinois	7	6	5
Indiana	5	7	9
Louisiana	8	6	6
Maine	4	8	6
Maryland	10	10	9
Massachusetts	9	4	3
Minnesota	10	8	6
Mississippi	8	6	6
Missouri	10	7	9
Nevada	9	9	7
North Carolina	9	6	7
North Dakota	9	7	7
Ohio	8	10	7
Oregon	7	8	6
Pennsylvania	8	9	7
South Carolina	7	6	4
Tennessee	7	7	8
Texas	5	7	8
Utah	10	11	11
Virginia	11	10	9
Washington	11	8	9
West Virginia	6	5	4
Wisconsin	10	5	7

References

Alesina, A., R. Baqir and W. Easterly (1999), "Public Goods and Ethnic Divisions", *The Quarterly Journal of Economics*, 114 (4): 1243-84.

Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat and R. Wacziarg (2003), "Fractionalization", *Journal of Economic Growth*, 8 (2): 155-94.

Alesina, A., E. Glaeser and B. Sacerdote (2001), "Why Doesn't the US Have a European-Style Welfare System?" *NBER Working Paper 8524*, National Bureau of Economic Research, http://www.nber.org/papers/w8524

Alesina, A. and E. La Ferrara (2000), "Participation in Heterogeneous Communities", *The Quarterly Journal of Economics*, 115 (3): 847-904.

Athias, L. and A. Nuñez (2009), "The More the Merrier? Number of Bidders, Information Dispersion, Renegotiation and Winner's Curse in Toll Road Concessions", http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1269630

Barrett, K. and R. Greene (2008), "Measuring Performance, The State Management Report Card 2008", *Governing*, March.

Beck, T., A. Demirgüç-Kunt and R. Levine (2003), "Law and Finance: Why Does Legal Origin Matter?" *Journal of Comparative Economics*, 31 (4): 653-75. http://dx.doi.org/10.1596/1813-9450-2904.

Button, Kenneth (2010), *Transport Economics*, 3rd edition, Aldershot, Northampton: Edward Elgar.

Caltrans (2009), "Toll Road Fact Sheet. AB 680 Private Toll Road Program", http://www.dot.ca.gov/hq/paffairs/about/toll/status.htm (accessed February 2016).

Chapter 11. Case No. 10-04516-LA11. Declaration of Anthony G. Evans, Chief Financial Officer of South Bay Expressway, LP, in support of the debtor´s chapter 11 petitions and first day motions, 2010, US Bankruptcy Court, Southern District of California.

Cirmizi, E., L. Klapper and M. Uttamchandani (2012), "The Challenges of Bankruptcy Reform", *The World Bank Research Observer*, 27 (2): 185-203. http://dx.doi.org/10.1596/1813-9450-5448.

Commonwealth of Virginia (2012), "PPTA Implementation Manual and Guidelines", The Commonwealth of Virginia, http://www.p3virginia.org/publications/ (accessed February 2016).

De Brux, J. (2010), "The Dark and Bright Sides of Renegotiation: An Application to Transport Concession Contracts", *Utilities Policy*, 18 (2): 77-85: http://dx.doi.org/10.1016/j.jup.2009.07.003

Department of the Treasury (2014), *Expanding Our Nation's Infrastructure through Innovative Financing*, Washington, DC: US Department of the Treasury, https://www.treasury.gov/press-center/press-releases/Documents/Expanding%20our%20Nation's%20Infrastructure%20through%20Innovative%20Financing.pdf

Engel, E., R. Fischer and A. Galetovic (2001), "Least-Present-Value-of-Revenue Auctions and Highway Franchising", *Journal of Political Economy*, 109 (5): 993-10250.

Engel, E., R. Fischer and A. Galetovic (2006), "Privatizing Highways in the United States", *Review of Industrial Organization*, 29 (1-2): 27-53. http:/dx.doi.org/10.1007/s11151-006-9108-6

Engel, E., R. Fischer and A. Galetovic (2009), *Soft Budgets, Renegotiations and Public-Private Partnerships*, 15300, NBER Working Paper, National Bureau of Economic Research, http://www.nber.org/papers/w15300

FHWA (2014a), "Project Profiles: Dulles Greenway" https://www.fhwa.dot.gov/ipd/project_profiles/va_dulles_greenway.aspx

FHWA (2014b), "P3 Defined: 63-20 Nonprofit Public Benefit Corporation", http://www.fhwa.dot.gov/ipd/p3/defined/dbfo_6320.aspx

FHWA (2014c), "Project Profiles: Pocahontas Parkway", http://www.fhwa.dot.gov/ipd/project_profiles/va_pocahontas.aspx.

FHWA (2014d), "Project Profiles: Downtown Tunnel/Midtown Tunnel/MLKI Extension", http://www.fhwa.dot.gov/ipd/project_profiles/va_midtown_tunnel.aspx.

FHWA (2014e), "Project Profiles: 91 Express Lanes", http://www.fhwa.dot.gov/ipd/project_profiles/ca_91expresslanes.aspx.

FHWA (2014f), "Project Profiles: South Bay Expressway", http://www.fhwa.dot.gov/ipd/project_profiles/ca_southbay.aspx.

Fretz, D. (2010), "PFI - First US TIFIA Road Files for Protection", *Reuters*, March 24, http://www.reuters.com/article/2010/03/24/idUSLDE62N29I20100324.

Gilroy, L. and D. Aloyts (2013), "Leasing the Indiana Toll Road: Reviewing the First Six Years Under Private Operation", 108, Policy Brief.

Giuliano, G., L. Schweitzer, K. Holliday and T. Minch (2012), "Public Private Partnerships in California. Phase II Report, Section VII: California Political Environment", https://www.metrans.org/sites/default/files/research-project/Section_VII_California_political_environment.pdf

Government Performance Project (2005), *Grading the States 2005: A Look inside,* Government Performance Project, http://www.pewtrusts.org/~/media/legacy/uploadedfiles/wwwpewtrustsorg/reports/government_performance/gppreport2005pdf.pdf

Guasch, J.L. (2004), "Granting and Renegotiating Infrastructure Concessions: Doing It Right". Washington, DC: World Bank.

Guasch, J.L., J.-J. Laffont and S. Straub (2003), "Renegotiation of Concession Contracts in Latin America", *World Bank Policy Research Working Paper 3011*, Washington, DC: World Bank. http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-3011.

Guasch, J.L, J.-J Laffont and S. Straub (2006), "Concessions of Infrastructure in Latin America: Government-Led Renegotiation", *Working Paper*, University of Edinburgh.

Guasch, J.L, J.-J Laffont and S. Straub (2007), "Concessions of Infrastructure in Latin America: Government-Led Renegotiation", *Journal of Applied Econometrics*, 22 (7): 1267-94.

Guasch, J.L., J.-J. Laffont and S. Straub (2008), "Renegotiation of Concession Contracts in Latin America", *International Journal of Industrial Organization*, 26 (2): 421-42. http:/dx.doi.org/10.1016/j.ijindorg.2007.05.003.

Hart, O. and J. Moore (1988), "Incomplete Contracts and Renegotiation", *Econometrica*, 56 (4): 755-85.

Hawkins, R. (2011), "SANDAG Officially Takes over South Bay Toll Road", *U-T San Diego*, December 21, http://www.utsandiego.com/news/2011/dec/21/sandag-officially-takes-over-south-bay-toll-road/

IFA (2013), "Other Bids", http://www.in.gov/ifa/files/Other_Bids.pdf.

InfraDeals (2014), "Assets Owners Database", http://www.infra-deals.com/public/ (accessed February 2016).

Jensen, R. (2011). "Tollway Exits Chapter 11", *The Bond Buyer*, May 5. http://www.bondbuyer.com/issues/120_87/south_bay_expressway_bankruptcy-1026333-1.html.

Katsivela, M. (2007), "Contracts: Force Majeure Concept or Force Majeure Clauses", *Uniform Law Review*, 12 (1): 101-19.

King, D., R.G. Zeckhauser and M.T. Kim (2004), "The Management Performance of the US States", *Harvard Kennedy School Research Faculty Working Paper Series*. http://www.hks.harvard.edu/fs/rzeckhau/GradingStatesv1.pdf.

Klein, B., R.G. Crawford and A.A. Alchian (1978), "Vertical Integration, Appropriable Rents and the Competitive Contracting Process", *Journal of Law and Economics*, 21 (2): 297-326.

KPMG (2013), "Massachusetts Department of Transportation (MassDOT), P3 Program Comparison", http://www.massdot.state.ma.us/Portals/0/docs/infoCenter/boards_committees/PublicPrivate/P3_Comparison_101113.pdf.

La Porta, R., F. Lopez-de-Silanes and A. Shleifer (2008), "The Economic Consequences of Legal Origins", *Journal of Economic Literature*, 46 (2): 285-332, http://dx.doi.org/10.1257/jel.46.2.285.

Levey, Bob and Jane Freundel Levey (2000), "End of the Roads: In the Interstate Era, Congress Ruled Washington like a Fiefdom. Then a Fight over Some Freeways Inspired a Biracial, Neighborhood-

Level Movement to Fight the Federal Power", *The Washington Post*, November 26, Final Edition, sec. Magazine.

Levy, S.M. (2011), Public-Private Partnerships: Case Studies on Infrastructure Development, Reston, VA: ASCE Press.

Macquarie Atlas Roads (2009), "Macquarie Atlas Roads Prospectus", https://www.macquarie.com/dafiles/Internet/mgl/mig/docs/prospectus.pdf.

Martz, M. (2014), "Pocahontas 895 Toll Road under a New Operator", *Richmond Times*, June 17, http://www.timesdispatch.com/news/pocahontas-toll-road-under-a-new-operator/article_94f7e91f-e346-57c4-807d-fd7c60fcdb64.html.

Meeks *v.* Elizabeth River Crossings OPCO, LLC and Virginia Department of Transportation, 2013 VA App. 2013, Circuit Court of the City of Portsmouth.

Metro ExpressLane (2014), *Debt Capacity Assessment*, Metro ExpressLane, http://media.metro.net/projects_studies/expresslanes/images/public_reports_exlattachmentc_04-2014.pdf.

Moszoro, M. and P. Spiller (2012), "Third-Party Opportunism and the Theory of Public Contracts: Operationalization and Applications", in: Eric Brousseau and Jean-Michel Glachant (eds.), *Manufacturing Markets: Legal, Political and Economic Dynamics*, Cambridge, UK: Cambridge University Press.

OECD/ITF (2008), Transport Infrastructure Investment: Options for Efficiency, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789282101568-en

Office of Governor (2014), "Governor McAuliffe Announces Initial Toll Rates Will Be Cut in Half for the Downtown/Midtown Tunnels Project in Hampton Roads", Virginia Department of Transportation, January 15, http://www.virginiadot.org/newsroom/statewide/2014/governor_mcauliffe_announces_initial70257.asp.

Olson, Mancur (2000), Power and Prosperity: Outgrowing Communist and Capitalist Dictatorships, New York: Basic Books.

OTP3 (Office of Transportation Public-Private Partnership) (2014), *Office of Transportation Public-Private Partnerships*. Accessed October 1, http://www.p3virginia.org/ (accessed February 2016).

Poythress, K. (2012), "Traffic up on South Bay Expressway", *U-T San Diego,* August 20, http://www.utsandiego.com/news/2012/aug/20/traffic-up-on-south-bay-expressway/.

Qian, Y. and B. Weingast (1997), "Federalism as a Commitment to Preserving Market Incentives", *The Journal of Economic Perspectives*, 11 (4): 83-92.

Reinhardt, W.G. (2012), "Midtown Financial Close Ignites Virginia Politics", *Public Works Financing*, April, http://www.pwfinance.net/document/research_reprints/1_Midtown_corrected.pdf

Rich, R. and J. Tracy (2013), "Early Contract Renegotiation: An Analysis of US Labor Contracts, 1970-1995", *Journal of Labor Economics*, 31 (4): 825-42, http://dx.doi.org/10.1086/669965.

RoadTraffic-Technology (2012), "South Bay Expressway, San Diego County, CA – Road Traffic Technology", *RoadTraffic-Technology*. Accessed December 12. http://www.roadtraffic-technology.com/projects/stateroute125/.

Roberts, M.R. and A. Sufi (2009), "Renegotiation of Financial Contracts: Evidence from Private Credit Agreements", *Journal of Financial Economics*,93 (2): 159-84. http://dx.doi.org/10.1016/j.jfineco.2008.08.005.

Samuel, P. (2011), "South Bay Expressway Reorganised out of Bankruptcy", *Toll Roads News*, April 16.

Samuel, P. (2012), "Virginia Gone to Financial Close on USD 2.1b Norfolk Crossings P3, Compromises on Toll Timing, Coverage", *Toll Roads News*, April 20,.

Samuel, P. (2013), "Pocahontas Parkway Turned over to Lenders ADDITIONS", *Toll Roads News*, June 14.

Saussier, S., C. Staropoli and A. Yvrande-Billon (2009), "Public-Private Agreements, Institutions and Competition: When Economic Theory Meets Facts", *Review of Industrial Organization*, 35 (1-2): 1-18, http://dx.doi.org/10.1007/s11151-009-9226-z.

Small, K.A. (2010), "Private Provision of Highways: Economic Issues", *Transport Reviews*, 30 (1): 11–31, http://dx.doi.org/10.1080/01441640903189288.

Soule, B. and D. Tassin (2007), "The Otay River Bridge", *Structure Magazine*, July.

Tanner, D. (2013), "Virginia Cites High Toll Rates in Proposed 'Buyback' of Private Toll Road", *Land Line Magazine*, January 15, http://www.landlinemag.com/Story.aspx?StoryID=24653.

Thaler, Richard H. (1988), "Anomalies: The Winner's Curse", *The Journal of Economic Perspectives*, 2 (1): 191-202.

USGAO (US Government Accountability Office) (2004), *Highways and Transit. Private Sector Sponsorship of and Investment in Major Projects Has Been Limited*, USGAO, http://www.gao.gov/new.items/d04419.pdf.

VDOT (2006), *The History of Roads in Virginia,* Virginia Department of Transportation, http://www.virginiadot.org/about/resources/historyofrds.pdf.

VDOT (2014), "Governor McAuliffe Announces Initial Toll Rates Will Be Cut in Half for the Downtown/Midtown Tunnels Project in Hampton Roads", *Virginia Department of Transportation,* January 15, http://www.virginiadot.org/newsroom/statewide/2014/governor_mcauliffe_announces_initial70257.asp.

Vining, A.R., A.E. Boardman and F. Poschmann (2005), "Public-private Partnerships in the US and Canada: 'There Are No Free Lunches'", *Journal of Comparative Policy Analysis: Research and Practice*, 7 (3): 199-220, http://dx.doi.org/10.1080/13876980500209363.

Wang, Y. (2010), "Recent Experience in the Utilization of Private Finance for American Toll Road Development", University of Southern California, http://digitallibrary.usc.edu/cdm/ref/collection/p15799coll127/id/345049.

Wee, J. (2012), "Public-Private Partnerships: The Project Financing of the Indiana Toll Road", Harvard Business School Publishing, https://cb.hbsp.harvard.edu/cbmp/content/INS190-PDF-ENG.

Williamson, O.E. (1996), *The Mechanisms of Governance*, New York, NY: Oxford University Press.

Chapter 5

Institutional and political determinants of private participation in infrastructure

Marian Moszoro, University of California, Berkeley and Kozminski University, Poland

Gonzalo Araya, Ministry of Transport and Telecommunications, Chile

Fernanda Ruiz-Nuñez and Jordan Schwartz, World Bank

This chapter brings together a large panel of project-level technical and financial data and country-level economic, institutional, political and governance variables, to assess the determinants of private financing of infrastructure in emerging markets and developing economies.

Controlling for economic characteristics, we find that overall private participation of infrastructure financing increases with freedom from corruption, rule of law, quality of regulations, and decreases with court disputes. We provide plausible explanations of deviations from this pattern when data is disaggregated at the sectoral level. We also found that legal systems — types of democracy or dictatorship — do not play a role in whether the private sector invests in infrastructure. Our results do not vary when controlling for income inequality and across quartiles of experience, country wealth and wealth per capita. The research shows that upstream "enabling" institutions, policies and regulations and sector economics need to be addressed simultaneously to facilitate private infrastructure investment financing.

The links between infrastructure and development are well established. They include the impact of infrastructure on poverty alleviation, equity, growth, and specific development outcomes such as job creation, market access, health and education (Straub, 2008; Calderón and Servén, 2004, 2008, 2010). These relationships are complex and dynamic; even with respect to growth and job creation; infrastructure's effects are felt through multiple channels[1]. The demand for infrastructure is rising with the accelerating pace of globalisation and urbanisation. Every month in the developing world, more than five million people migrate to urban areas. This trend is compounded by the growing need for low CO_2 and climate-resilient investments to combat the challenges of climate change (Fay and Toman, 2010; Bhattacharya and Romani, 2013).

As a result of the fiscal constraints in many economies caused by the onset of the global financial crisis, government budgets - traditionally, the major source of financing for infrastructure - cannot alone be expected to finance the infrastructure needs in emerging markets and developing economies (EMDEs). Yet the volume of private participation in financing infrastructure projects in EMDEs remains modest.

While private-sector financial commitments to infrastructure projects have risen to about USD 181 billion per year in EMDEs, this is less than 20% of the overall current infrastructure investment in these economies. There has been an important increase in private participation in infrastructure financing (PPI) over the last two decades[2]. Annual commitments[3] to PPI projects have increased from USD 22 million in 1990 to USD 181 million in 2012 (see Figure 5.1). Importantly, most of this growth since 2000 has been mainly in the energy and transport sectors (see Figure 5.2).

There are a number of current and emerging challenges that are expected to undermine the attractiveness of long-term private investments, such as furthering infrastructure. The weakness in and deleveraging of commercial banks and the regulatory constraints, such as Basel III, are likely to persist into the medium term, which implies a growing mismatch between the time horizon of available capital and that of productive long-term investment projects (World Bank, 2013).

Even under more normal credit conditions, the costs and risks faced by private investors in infrastructure are high, particularly in EMDEs, where economic and financial conditions tend to be weaker and less stable. Another critical and overarching pre-condition to attract private investors is an enabling institutional framework, including peace and stability, the rule of law, good governance with accountability and transparency, the absence of corruption, clear property rights and enforceable contracts.

From a public policy perspective, given the positive economic, social and environmental externalities that quality infrastructure can provide, efforts to lower the overall riskiness of infrastructure investments and enhance the availability of efficient risk-sharing instruments can have important implications in efficiency and distribution. At the same time, there is a need to ensure that efforts to encourage private-sector participation in infrastructure offer optimal benefits but do not impose an inappropriate burden on the public sector.

Figure 5.1. **Private investment in infrastructure in low- and middle-income countries**

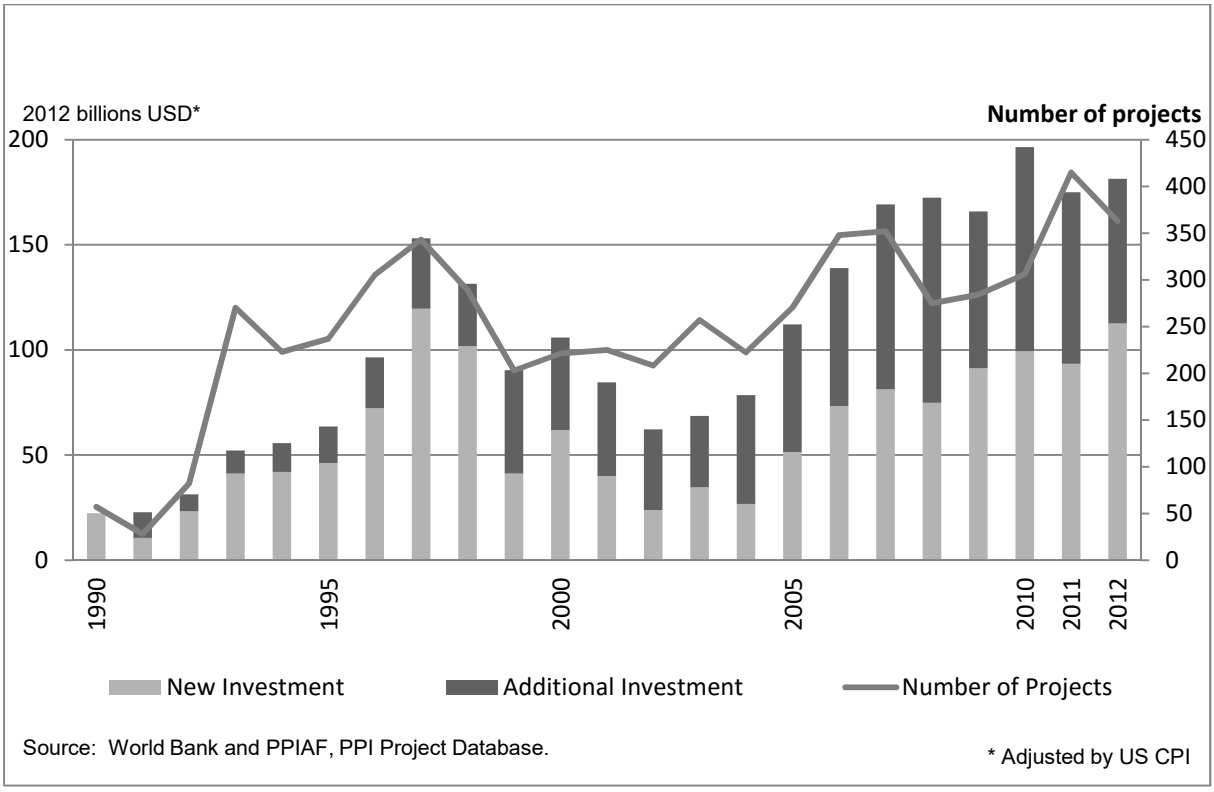
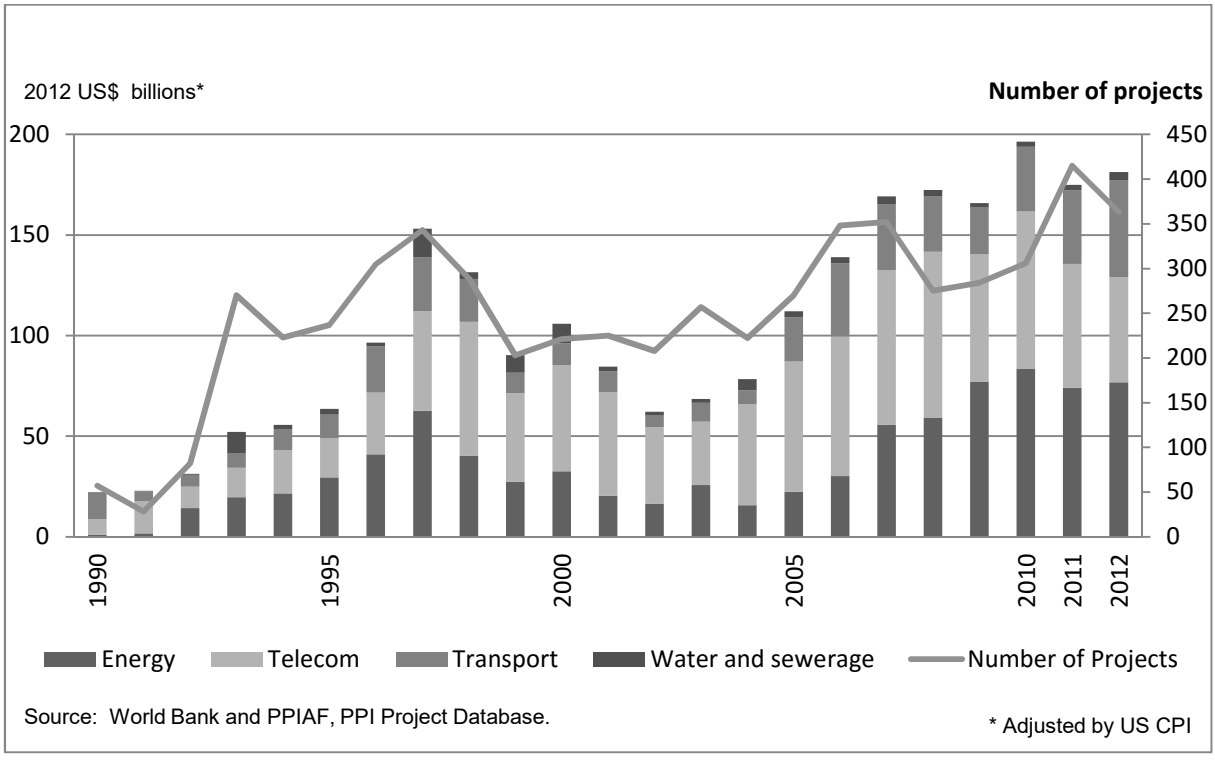


Figure 5.2. **Private investment in infrastructure in low- and middle-income countries, by sector**



Against this background, this chapter aims to assess the determinants of private financing of infrastructure with a special focus on institutional, political and governance characteristics. It then identifies areas in which additional efforts are required if the private sector were to play a larger role in financing infrastructure development in EMDEs.

Theoretical background to understand the determinants of PPI

Existing literature

There exists considerable economic and financial literature attempting to explain the determinants of investment and the relationship between investment and risk. Most of the theoretical literature points to access to capital, investment efficiency, the social (as opposed to the financial) discount rate, operational efficiency, bundling of investment and operations, risk allocation and contract flexibility as the main economic drivers of private investment in infrastructure (see Annex 5.1 for a literature taxonomy and mapping of these drivers).

The empirical literature is focused on foreign direct investment (FDI) rather than infrastructure investments, and most of the works utilise cross-country specifications. For example, Chakrabarti (2001) concludes that market size is a robust determinant of FDI, and Nunnenkamp (2002) identifies exchange rate, openness, growth rate and trade balance as determinants of overall investment levels.

The literature on infrastructure investments and risk is thinner. Araya *et al.* (2013) analyse the relationship between private participation in infrastructure and country risk. They show that a difference of one standard deviation in a country's sovereign risk score is associated with a 27% increase in the probability of having private participation in infrastructure commitment and a 41% higher level of investment, in dollar terms, in the energy sector (among infrastructure sectors) and concessions (among contractual types). They also show that conflict-affected countries typically require six to seven years to attract significant levels or forms of private investments in infrastructure from the day that the conflict is officially resolved. Private investments in sectors in which assets are more difficult to secure — such as water, power distribution or roads — are slower to appear or simply never materialise.

Hammami *et al.* (2006) use the World Bank PPI Database to analyse the determinants of PPI and conclude that lower levels of corruption and more effective rule of law are associated with more public-private partnership projects. This study captures the effect on the number of projects committed, but not the investment levels *per se*, leaving room for further study, especially if we consider that bigger projects (committing more resources) may be more sensitive to the risk of the country.

The empirical evidence on determinants of PPIs uses a cross-country panel regression approach, looking at whether indicators of macroeconomic stability, measures of institutional and regulatory quality, and a variety of other controls, impact the total amount of PPI received by a country. For example, Pragal (2003) and Kirpatrick *et al.* (2006) look at the importance of the regulatory framework as a determinant of PPI, respectively, for Latin America and the Caribbean (LAC) and the broader set of developing countries. Pragal (2003) finds that the most significant determinant of PPI is the passage of legislation liberalising the investment regime, while Kirpatrick *et al.* (2006) find that institutional framework and regulation matter most. Similarly, Banerjee *et al.* (2006) look at the question of whether institutions matter for PPI. While their results indicate that property rights and bureaucratic quality play a significant role in promoting PPI, they find that countries with higher levels of corruption attract more PPIs.

A study by Tewodaj (2013) analyses the determinants of private participation in infrastructure, comparing Sub-Saharan Africa (SSA) with low- and middle-income countries (LMICs). The study finds that PPI investments in LMICs seem to be, in principle, determined by the expected factors (i.e. larger, open, more developed democracies, with a lower tax burden and a more stable macroeconomic environment, receive more PPI), PPI into SSA countries is — from a social planner's perspective — sub-optimally allocated. In particular, when it comes to larger PPI investments the findings suggest that corrupt countries with inefficient governments seem to attract more PPI in infrastructure. Basilio (2011) shows that market size and purchasing power are critical determinants of infrastructure flows. The institutional quality matters mostly for the decision to invest in emerging countries, but it is less important with regard to the intensity of the investment than financial and economic conditions.

Jensen *et al.* (2005) analyse the institutional determinants of private-sector participation in the water and sanitation sector in 60 developing countries. The regression results provide support for the hypothesis that PPI is greater in larger markets where the ability to pay is higher and where governments are fiscally constrained. The protection of property rights and the quality of the bureaucracy emerge as the most important institutions that encourage PPI. Gasmi *et al.* (2010) assess the extent to which the level of development of the financial sector is a determinant of private investment in the power sector in 37 developing countries. The results suggest that investors tend to take countries' governance quality into account in their decisions to invest. The empirical results highlight that the development of the financial sector also plays a significant role in private investors' decisions to enter infrastructure sectors.

The objective of this research is to contribute to the literature by disentangling the relevant institutional, political and governance determinants of country risk at a granular level, through providing a theoretical framework to derive the testable hypotheses, using a novel dataset on quality of governance and on number of PPI disputes[4], and extending previous analyses with a cross-country panel for the period 1984-2012[5].

Methodology

To identify the determinants of PPI, we construct a toy model that captures institutional and political variables along with economic and financial variables.

Let us assume a three-stage investment, predictable cash flows and terminal value model:

- In t_0, the public agent and/or private investor invest *I* with certainty (construction risks are absorbed by the constructor; there may be a differential in investment efficiency though);
- In $t_{1,2,...,n}$, predictable cash flows *CF* are realised (in financial modeling, these are cash flows broken down year by year, e.g. 5-8 years);
- In $t_{n+1,...,\infty}$, the terminal value (*TV*) is realised with uncertainty (in a Discount Cash Flow -- DCF — valuation, the *TV* accounts for ca. 40-70% of the present value of the asset, depending on the discount rate)[6];
- The public agent, unlike the private investor, can receive transfers *TR* conditional on states of *TV*: if *TV* is low, the public agent can levy taxes from the public at large and subsidise the project; if *TV* is high, the public agent will lower prices (directly or through regulation) to gain political support;
- *TR* have an expected value of zero, so that the public agent's *TV* + transfers (*TR)* have the same expected value, but lower volatility than *TV* alone; i.e. $E(TV+TR) = E(TV)$ and $SD(TV+TR) < SD(TV)$.

The *TV* is relevant for the private investor inasmuch as he has a stake in the long-term operations of the asset. For institutional arrangements (e.g. joint ventures), the private investor has an interest in preserving the value of the assets. For finite-time contractual arrangements (e.g. concessions), the salvage value of the asset for the private investor is not greater than its market value. Therefore, from the public agent's standpoint, the volatility of the *TV* increases in private ownership and decreases in contract duration, in line with assumption (5).

From Assumptions (1)-(5), the Net Present Value for public investments equals:

$$NPV_{pu} = -I_{pu} + \sum_{j=1}^{n} \frac{CF_{pu,j}}{(1+r_{pu})^{j}} + \frac{TV + TR|TV}{(1+r_{pu})^{n}} \quad (1)$$

and for private investments:

$$NPV_{pr} = -I_{pr} + \sum_{j=1}^{n} \frac{CF_{pr,j}}{(1+r_{pu})^{j}} + \frac{TV}{(1+r_{pu}+r_{premium})^{n}} = \\ = -I_{pr} + \sum_{j=1}^{n} \frac{CF_{pr,j}}{(1+r_{pu})^{j}} + \frac{TV}{(1+r_{pr})^{n}} \quad (2)$$

where r_{pu} is the social discount rate and r_{pr} is the private discount rate equal to the social discount rate plus a risk premium for higher variance (higher *beta*) of *TV* without *TR*. Under these assumptions, the discount rate during the predictable period *n* is the same for both the public and private sectors; the risk premium is only realised in the terminal value. The risks during the predictable period are absorbed in the expected value of the cash flows, not the discount rate. If the distribution of the cash flows is unknown, then *n* should be shortened and the discount rate adjusted.

Arguably, if investments and cash flows are different under public and private provision, so are cash flows after period *n* captured in the terminal value *TV*. For simplicity, we assume that *TV* are equal under public and private provision (secular trend) and all rents from the private to the public sector are extracted through transfers *TR*, in accordance with assumption (4).

At the margin (i.e. where the choice between traditional procurement and PPI is indifferent), $NPV_{pu} = NPV_{pr}$, therefore:

$$-I_{pu} + \sum_{j=1}^{n} \frac{CF_{pu,j}}{(1+r_{pu})^{j}} + \frac{TV + TR|TV}{(1+r_{pu})^{n}} = -I_{pr} + \sum_{j=1}^{n} \frac{CF_{pr,j}}{(1+r_{pu})^{j}} + \frac{TV}{(1+r_{pr})^{n}} \quad (3)$$

$$I_{pu} - I_{pr} + \sum_{j=1}^{n} \frac{CF_{pr,j}}{(1+r_{pu})^{j}} - \sum_{j=1}^{n} \frac{CF_{pu,j}}{(1+r_{pu})^{j}} = \frac{TV + TR|TV}{(1+r_{pu})^{n}} - \frac{TV}{(1+r_{pr})^{n}} \quad (4)$$

Since $SD(NPV_{pu}) < SD(NPV_{pr})$, in equilibrium $r_{pu} < r_{pr}$ (conf. CAPM; otherwise no investor would invest in a riskier project).

Normalising by $I_{pu} - \sum_{j=1}^{n} CF_{pu,j}/\left(1 + r_{pu}\right)^{j} = (TV + TR|TV)/\left(1 + r_{pu}\right)^{n}$:

$$\frac{I_{pr} - \sum_{j=1}^{n} \frac{CF_{pr,j}}{\left(1 + r_{pu}\right)^{j}}}{I_{pu} - \sum_{j=1}^{n} \frac{CF_{pu,j}}{\left(1 + r_{pu}\right)^{j}}} = \frac{TV \cdot \left(1 + r_{pu}\right)^{n}}{(TV + TR|TV) \cdot \left(1 + r_{pr}\right)^{n}} \quad (5)$$

Given that *TR* is a mean-preserving spread [E(*TR*) = 0],

$$\frac{I_{pr} - \sum_{j=1}^{n} \frac{CF_{pr,j}}{\left(1 + r_{pu}\right)^{j}}}{I_{pu} - \sum_{j=1}^{n} \frac{CF_{pu,j}}{\left(1 + r_{pu}\right)^{j}}} = \left(\frac{1 + r_{pu}}{1 + r_{pr}}\right)^{n} \quad (6)$$

i.e. the preference for private participation in infrastructure will be given by:

$$\frac{\sum_{j=1}^{n} \frac{CF_{pr,j}}{\left(1 + r_{pu}\right)^{j}} - I_{pr}}{\sum_{j=1}^{n} \frac{CF_{pu,j}}{\left(1 + r_{pu}\right)^{j}} - I_{pu}} + \left(\frac{1 + r_{pu}}{1 + r_{pr}}\right)^{n} > 0 \quad (7)$$

This toy model yields the following comparative statics:

Variable	Meaning	Preference for PPI $Pr[NPV_{pr} > NPV_{pu}]$	Captured econometrically by
$1 - I_{pr}/I_{pu}$	Investment efficiency	+	Country dummies and subsample sector regressions; GDP per capita controls
CF_{pr}/CF_{pu}	Productivity differential	+	Country dummies and subsample sector regressions; GDP growth control
n	Industry stability (inverse of industry risk)	+	Subsample sector regressions; regulatory quality
r_{pu}/r_{pr}	Political stability (inverse of political risk)	+	Political variables: rule of law, corruption perception, regulatory quality and number of disputes; corporate taxation and country exchange rate volatility controls

Controlling for economic and industry factors, we derive a number of testable predictions:

- **Prediction 1:** An increase in the rule of law — following North and Weingast (1999) — will be associated with a lower differential in the public and private discount rates and thus higher PPI.
- **Prediction 2:** An increase in regulatory quality will be associated with higher predictability of cash flows and thus higher PPI.
- **Prediction 3:** An increase in freedom from corruption will be associated with a lower political risk premium and thus higher PPI.
- **Prediction 4:** An increase in the number of disputes will be associated with a higher political risk premium and thus lower PPI.

Data description

Data is an unbalanced panel assembled from the World Bank's Private Participation in Infrastructure dataset, Quality of Government dataset, UNCTAD Database of Treaty-based Investor-State Dispute Settlement Cases, and country-level economic variables from the World Development Indicators Database.

In order to obtain PPI levels, we utilised the World Bank PPI Database. This source offers detailed information by year, country, sector and form of public-private partnership. Within sectorial categories, it distinguishes among primary and secondary sectors by investment[7]. It also provides the form of private investments, so we can distinguish between greenfield projects and concessions of existing assets among other types of partnerships and investments.

The database, however, captures both public contributions to the infrastructure investments as well as private contributions. That is, the database notes total project size in commitments, later adjusted to actual disbursements, investments or transfers, where information is available. Those commitments combine private and, in many cases, public sources. Only projects that have come to financial closure are included in the database. If a purely public investment is carried out in tandem with a private operator or a private management contractor, the database does not include them. All project figures are noted in the year that the project comes to financial closure.

For the purpose of this research, the PPI database is an appropriate source of information because it reports the commitments of the investments for each year by country and by sector once a contract has come to financial closure; that is, a licence, sale, concession, lease, BOT or other contractual agreement is signed by both parties and financial arrangements have been secured. Having the commitments instead of the actual investments allows us to establish a clearer relationship between investments and institutional, political and governance variables at a given point in time. The decision of investing (commitment) and the willingness of financiers to come to closure on that commitment are made, *inter alia*, in the context of the political conditions, economic performance, sovereign credit worthiness and fear of expropriation at the time of financial closure. Because there may be exogenous reasons for differentiation between an original commitment to invest and the eventual disbursement levels — including external shocks, canny renegotiations or changes in tariffs or relative prices — the best time to value an investment relative to country risk is the moment at which the commitment comes to financial closure.

Taking the data from the PPI database, we gather information regarding 130 developing countries from 1990 to 2010. The panel data were complemented by data from World Development Indicators with variables such as GDP, GDP growth, inflation, country openness and population.

The Quality of Governance Standard Database (Teorell *et al.*, 2013) is panel data that draws on a number of freely-available data sources related to quality of governance and its correlates. This is our main source for the following variables: freedom from corruption, rule of law, quality of regulations, bureaucracy quality and political regimen, parliamentary democracy, mixed (semi-presidential) democracy, presidential democracy, civilian dictatorship, military dictatorship and royal dictatorship. A detailed description of these variables is presented in Annex 2.

Furthermore, we rely on the UNCTAD Database of Treaty-based Investor-State Dispute Settlement Cases to construct the variables on a number of disputes and average time to solve them by sector and country. This database has 394 observations covering disputed cases pending and concluded, which were disclosed by the parties or arbitral institutions from 1987 to 2010.

Summary statistics and the correlation of independent variables are presented in Annex 5.A3, Tables 5.A3.1 and 5.A3.2.

Results

The model is specified in logarithms. We use a moving average of 15 years for water projects, ten years for energy (plants and transmission) projects, eight years for transport projects and five years for telecom projects - roughly one-third of the depreciation time estimated by the World Bank, i.e. arguably an approximation of refurbishing time - to account for the fact that data is on discrete observations of commitments.

We explore the intensity of the different determinants, given that a country has received private investments in infrastructure. We run the following OLS regression with country-fixed effect and year dummies to capture for changes over time that are common across countries (e.g. the financial crisis):

$$\begin{aligned}\log PPI_{it} = \alpha_i &+ \beta_1 \log GDP_{it-1} + \beta_2 \log POP_{it} + \beta_3 \log GROWTH_{it-1} \\ &+ \beta_4 \log INFLATION_{it-1} + \beta_5 \log OPENNESS_{it-1} \\ &+ \beta_6 \log DEBT_{it-1} + \beta_7 \log ACCESSTOFINANCE_{it-1} \\ &+ \sum \beta_j \log X_{itj} + \varepsilon_{it}\end{aligned} \quad (8)$$

Equation (8) shows that log PPI_{it} equals logarithms of the levels of the moving average of private investment in infrastructure for country *i* at the period *t*. Most econometric specifications dealing with GDP and investments suffer from endogeneity. We address this problem by assuming that the investments are being affected by events of the previous year. GDP_{it-1} is the Gross Domestic Product purchasing power parity in current USD millions for the country *i* in the year *t–1*. $GROWTH_{it-1}$ is the GDP's growth and both are expected to have a positive impact on investment levels. POP_{it} captures the size of the population and $INFLATION_{it-1}$ captures the monetary instability for the country *i* in the year *t–1* and is expected to have a negative impact. $OPENNESS_{it-1}$ is a proxy of the openness of the country calculated as the sum of exports and imports over the GDP; $ACCESSTOFINANCE_{it-1}$ captures the access to commercial bank credit for the country *i* in the year *t-1* and is expected to have a positive impact; and X_{itj} are the political and institutional variables, including for country *i* at time *t*: (a) freedom from corruption; (b) government effectiveness; (c) rule of law; (d) quality of regulations; and (e) number of court disputes.

The regression results are presented in Tables 5.A3.3 – 5.A3.7. All specifications control for the main characteristics of the economies as commonly used in the previous literature:

- Size of the market: GDP and population. PPI tends to be more common in larger markets where demand is larger.
- Inflation: PPI is more prevalent in countries with more stable macroeconomic conditions. Higher inflation is less attractive for investors as it imposes an inflation risk premium.
- Openness (proxied by trade): more open countries are more likely to attract big foreign investors.
- Debt: countries with higher levels of debt are more likely to require the private sector to invest in infrastructure. However, they could be seen to indicate a higher risk of default by the private sector. As a debt measure we use the total debt service divided by the gross national income.
- Access to finance, i.e. access to commercial bank credit.

Table 5.A3.3 presents the results using country-fixed effect and year dummies. In these specifications, the overall R-squared is around 50%, a high value for a panel data model[8].

The coefficients associated with large markets, stable inflation, access to finance, freedom from corruption, rule of law, quality of regulations and number of disputes, are statistically significant indicating that they are relevant channels for the determination of investments in PPIs.

Interestingly, the political regimens such as parliamentary democracy, mixed (semi-presidential) democracy, presidential democracy, civilian dictatorship, military dictatorship and royal dictatorship do not affect significantly the level of PPI infrastructure investment.

Countries with large markets and high demand for infrastructure (larger population and higher lagged GDP) tend to have more PPI.

Governments with less inflation have a more stable environment fostering private-sector investments in infrastructure PPIs.

The higher a country score on freedom from corruption, the higher the average level of investments with private participation in infrastructure. Decreasing corruption by ten points can increase PPI by 6.7%. That is, if a country like Serbia can lower its corruption level and become like South Africa (which has similar GDP per capita), the private sector will invest 7% more[9].

The higher a country score on rule of law, the higher the average level of investments with private participation in infrastructure. Improving rule of law by one standard deviation (i.e. by 0.1) can increase PPI by 4.3%. That is, if a country like Bhutan can improve its environment of property rights and enforceability of contracts and become like Jordan (which has a similar GDP per capita), the private sector will invest 4% more[10].

Breach of contract and regulatory issues remain the most important political risk concerns for investors into developing economies, according to the annual MIGA-EIU Political Risk Survey. In developing countries 45% of investors named breach of contract and 58% named adverse regulatory changes as the most important political risks they will face in the next three years; 40% of the survey respondents mentioned that they experienced financial losses through adverse regulatory changes and 34% through breach of contract over the past three years. Therefore, it is not surprising to observe that both quality of regulations and number of previous disputes are statistically significant.

The model also shows that an improvement of one standard deviation (0.1) in quality of regulation produces an average increase of 3.2% in the level of infrastructure investment in PPIs. For example, if we consider two countries with the same level of GDP per capita such as Mexico and Turkey, Mexico can gain a 3% increase in infrastructure investment in PPIs if the country achieves the quality of regulations of Turkey[11].

On disputes, the estimation indicates that the higher the number of disputes, the lower the level of investments. Having one more project going to court decreases investments by 4%[12]. We presumed that the number of disputes could have a non-linear effect on private investments (e.g. no disputes could also reflect an anticipation of risk and therefore lack of private investments); however, adding disputes squared was found to be statistically not significant. Unfortunately, the variable on time to solve a dispute was incomplete for half of the sample, impeding its proper use.

We estimate the determinants of PPI by sector to see whether the impacts vary among the energy, transport, telecom and water sectors (see Table 5.A3.4). Freedom from corruption is statistically significant for all sectors except for transport. While corruption generally reduces the prospects for investment in all sectors, the lack of sensitivity of the transport sector could be explained by the fact that corruption matters primarily regarding investors deciding to *enter* the transport market, not the subsequent level of investment, which may indicate that the investors are protected against such risks once they do invest.

Transport is one of the most corrupt sectors of infrastructure. Kolstad and Wiig (2013) find that "increased corruption within a country is associated with increased extractive industry FDI, but at a diminishing rate as corruption increases grow large." Thus, while threats to ownership rights deter investment in resource sectors (Bohn and Deacon, 2000; Cust and Harding, 2013), increased corruption would not follow this "rule", as available measures of (perceived) corruption do not capture such a threat, because corruption has been a means of securing ownership rights or because countries perceived as becoming more corrupt offered better opportunities for FDI beyond ownership rights (such as geological

prospects and reduced regulatory constraints). Although corruption may be costly, it is a cost that also offers flexibility and has helped secure deals for companies to maximise profits (Shaxson, 2007).

Rule of law is statistically significant for overall PPI, but it is not significant at the sector level. The coefficients are of almost the same magnitude but not significant due to smaller sample size when we run regressions at the sector level.

Quality of regulation is statistically significant for all sectors except water. Regulatory quality includes measures of the incidence of price controls and perceptions of the burdens imposed by excessive regulation. Improving the quality of regulations in a country can attract more private investors to infrastructure PPIs, but since water is a socially sensitive sector and very likely to be politically influenced, investors may prefer price controls and strong regulation, as they limit, ex ante, the risk of domestic politics around water[13].

The coefficient on disputes is statistically significant for all sectors except for energy. PPI investments in telecoms and water are particularly sensitive to the accumulated number of disputes in that particular sector. Having one additional dispute can decrease PPI investments in those sectors by approximately 12%.

Variables in institutional and political regimens, such as parliamentary democracy, mixed (semi-presidential) democracy, presidential democracy, civilian dictatorship, military dictatorship and royal dictatorship were also included as controls, but none of them were statistically significant.

As a robustness check, we have run the regressions without year dummies (see Tables 5.A3.5 and 5.A3.6). Insignificant changes in the main results were found.

We expected that countries with more experience on PPIs and higher income would have PPI investments less sensitive to institutional and governance variables. However, we found that results did not vary by quartile of experience, GDP and GDP per capita (see Table 5.A3.7). According to field experts, it is not the quantity but the *quality* of experience (i.e. successful projects) that matters, for which we do not control.

Conclusions

Fostering private-sector investment in infrastructure depends on investors facing an appropriate investment climate. Currently, private-sector investment is a small portion of the total infrastructure investment (less than 20%). The costs and risks faced by investors are high, particularly in EMDEs where the economic, institutional and financial conditions are weaker and less predictable. One of the main concerns of private-sector investors, considering investment in infrastructure in EMDEs, is the quality of the underlying investment climate.

A supportive enabling environment reduces the costs and risks of investing in infrastructure. The investment climate is affected by many factors, including political instability, regime uncertainty, rule of law and property rights, government regulations, government transparency and accountability. The existence of a stable and predictable environment, in which both domestic and foreign investors can operate, is vital for providing confidence to investors.

This chapter provides empirical evidence of the relationship between institutional, political and governance variables and the level of PPI investments in infrastructure in developing countries. Our

results support the arguments that industry and political stability are key ingredients to increase the level of PPI investments in infrastructure.

We conclude that PPI investment in infrastructure is highly sensitive to the quality of government variables, such as freedom from corruption, rule of law, quality of regulations and the number of disputes in the sector: decreasing corruption by ten points can increase PPI by 6.7%: improving rule of law by one standard deviation (i.e. by 0.1) can increase PPI by 4.3%; improving quality of regulation by one standard deviation (0.1) produces an average increase of 3.2% in the level of infrastructure investment in PPIs; and having one more project going to court decreases investments by 4%.

These results hold when data is disaggregated at the sectoral level. However, transport investments are not found to be sensitive to improvements in "freedom from corruption", water investments to improvements in quality of regulations, and energy investments to the number of accumulated disputes in the sector: more work needs to be done to understand the cause of these discrepancies.

Importantly, the evidence does not show any significant difference in the results across experience and economic level quartiles.

A sound investment climate is a critical factor affecting the supply of infrastructure investment financing. The challenges from upstream "enabling" institutions, policies and regulations and sector economics, down to pipeline development, need to be addressed simultaneously. Tackling such a complex and interconnected agenda requires analysis of synergies and adoption of a holistic approach to infrastructure development.

Notes

1. See Agénor and Moreno-Dodson (2006) for an overview, and Estache *et al.* (2013) and Schwartz *et al.* (2009) for a treatment of infrastructure's effects on jobs and growth.

2. Private participation in infrastructure can be treated as equivalent to public private partnerships.

3. Investment in this paper refers to the resources the project company commits to invest in facilities during the contract period. Investments can be either in new facilities or in the expansion and modernisation of existing facilities. Data entry varies across sectors. For projects other than telecommunications and large energy utilities, the total cost of developing or expanding the facility during the contract period is entered as investment data during the year of financial closure (for which data are typically available). For telecommunications projects and some large energy utilities, annual investments in facility expansion and modernisation are entered as investment data in the year of investment when information is publicly available. Investments are recorded in millions of US dollars in either the year of financial closure or the year of investment, as indicated above.

4. Previous literature has only used the number of calendar days to resolve a payment through the courts [Djankov *et al.* (2007)], but not PPI disputes specifically.

5. The latest study is by Tewodaj (2013) and uses data up to 2008.

6. The following stylised numerical example illustrates this point: let us assume a series of USD 100 perpetual cash flows (*CF*), discounted at a rate (*r*) of 10% annually. The first ten years (*n*) account for 61% of the present value, while the terminal value --i.e. the cash flows from year 11 onwards -- accounts for 39% of the present value. The shorter the period accounted for the foreseeable cash flows, the lower the discount rate; and the higher the terminal value cash flows' growth in perpetuity, the higher the proportion the terminal value will have in the present value. For example, for $n = 5$ and $r = 7\%$, the terminal value represents 71% of the present value.

7. As examples, energy and transport are "primary sectors", whereas electricity distribution and airports are "secondary sectors".

8. Values over 10% are accepted in the common literature, due to the bi-dimensional nature (countries and time) of the panel data model.

9. In the year 2011, Serbia had a GDP per capita of USD 9 687 and a freedom-of-corruption index of 35, while South Africa had a GDP per capita of USD 9 830 and a freedom-of-corruption index of 45.

10. In the year 2011, Bhutan had a rule-of-law index of .12 and a GDP per capita of USD 5 162, while Jordan had a rule-of-law index of .22 with a GDP per capita of USD 5 268.

11. In the year 2011, Mexico and Turkey had a GDP per capita of USD 12 813 and USD 13 468, respectively, while their quality-of-regulation indexes were .34 and .42, respectively

12. We used the number of disputes in the last ten years before the commitment in order to capture the countries' reputation in this matter.

13. For a robustness check, we have added the Gini coefficient as an explanatory variable, expecting that, when controlling for income inequality, the coefficient will become significant for water. However, it is still not significant.

Annex 5.A1

Table 5.A1.1. **Determinants of PPI -- literature taxonomy and mapping**

<table>
<tr><th colspan="2" rowspan="2"></th><th colspan="3">Theoretical Framework</th><th rowspan="2">Empirical Studies</th></tr>
<tr><th>Economics/Finance</th><th>Political Economy</th><th>Institutional Analysis</th></tr>
<tr><td rowspan="11">Variables</td><td>Discount rate</td><td>Social discount rate (Arrow & Lind, 1970); interest rate differential (Moszoro, 2014a)</td><td rowspan="4">Lower government beta and access to capital vs. investment efficiency and productivity differential (Grout, 2003)</td><td></td><td></td></tr>
<tr><td>Access to capital</td><td>Access to external financing (Esty, 2011)</td><td></td><td></td></tr>
<tr><td>Investment efficiency</td><td>Lower investment outlays and shorter investment period (Moszoro, 2014a)</td><td></td><td></td></tr>
<tr><td>Productivity differential</td><td>Lower operational costs (Moszoro, 2014b)</td><td></td><td></td></tr>
<tr><td>Bundling</td><td>Incentive theory and economies of scope (Iossa & Martimort, 2013)</td><td rowspan="3">Expropriation risk and LPVR (Engel, Fischer & Galetovic, 2001)</td><td rowspan="3">Incomplete contract theory: bundling of investment and operations (Hart 2003; Hart, Shleifer &Vishny 1997); governance of hybrids and boundaries of bureaucracy (Williamson 1979, 1999)</td><td></td></tr>
<tr><td>Risk allocation</td><td rowspan="4">Post-tender renegotiations (Iossa & Martimort, 2011)</td><td></td></tr>
<tr><td>Contracting flexibility & regulation</td><td rowspan="3">Regulatory and institutional framework (Pragal 2003; Kirpatrick et al. 2006; Basilio 2011); property right and quality of the burocracy (Jensen et al. 2005).; corruption and rule of law (Hammami et al., 2006); bureaucratic quality (Barnejee et al. 2006; Gasmi et al., 2010; Tewodaj, 2013)</td></tr>
<tr><td>Corruption, political stability & rule of law</td><td colspan="2" rowspan="2">Low third-party opportunism risk (Moszoro & Spiller, 2014)</td></tr>
<tr><td>Bureaucracy</td></tr>
</table>

Annex 5.A2

Definition of Variables

- **Quality of Government** is the mean value of the ICRG variables "Corruption," "Law and Order" and "Bureaucracy Quality", scaled 0-1. Higher values indicate higher quality of government.
- **Freedom from Corruption** relies on Transparency International's Corruption Perceptions Index (CPI), which measures the level of corruption in 152 countries to determine the freedom from corruption scores of countries that are also listed in the *Index of Economic Freedom*. The CPI is based on a 10-point scale, in which a score of 10 indicates very little corruption, and a score of 0 indicates a very corrupt government. In scoring freedom from corruption, the authors convert each of these raw CPI data to a 0-100 scale by multiplying the CPI scores by 10.
- **Government Effectiveness** combines, into a single grouping, responses on the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures and the credibility of the government's commitment to policies. The main focus of this index is on the "inputs" required for the government to be able to produce and implement good policies and deliver public goods.
- **Rule of Law** includes several indicators which measure the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of crime, the effectiveness and predictability of the judiciary and the enforceability of contracts. Together, these indicators measure the success of a society in developing an environment in which fair and predictable rules form the basis for economic and social interactions and the extent to which property rights are protected.
- **Regulatory Quality** includes measures of the incidence of market-unfriendly policies, such as price controls or inadequate bank supervision as well as perceptions of the burdens imposed by excessive regulation in areas such as foreign trade and business development.

  Regimen Institutions: The classification contains the following regimes: parliamentary democracy, mixed (semi-presidential) democracy, presidential democracy, civilian dictatorship, military dictatorship and royal dictatorship. This classification is elaborated by Cheibub, Gandhi and Vreeland (2010).

Annex 5.A3

Table 5.A3.1. **Summary statistics**

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
ln GDP_1	7 388	22.76985	2.411881	15.99307	30.33849
ln Inflation_1	6 588	1.95406	1.402989	-13.4379	10.19474
ln Trade_1	6 938	4.141784	0.638758	-1.17505	6.13225
Debt_1	4 242	4.927175	6.766934	0	208.0971
Growth_1	7 140	2.05112	6.012271	-50.2904	92.58597
ln Population	8 178	15.33762	2.106291	8.982059	21.01901
Access to finance	2 291	7.47474	17.92406	0	150
Free of corruption	2 987	40.07265	23.22481	0	100
Govt. effectiveness	2 437	-0.05928	0.997779	-2.45416	2.407654
Rule of law	2 492	-0.06741	0.993558	-2.67015	2.001923
Regulatory quality	2 438	-0.06711	0.991987	-2.67544	2.247345
Gini coefficient	2 710	41.53993	9.80825	20.96	74.33
Disputes	4 780	0.687657	3.303972	0	65

Table 5.A3.2. **Correlation of independent variables**

	ln GDP_1	ln Inflation_1	ln Trade_1	Debt_1	Growth_1	ln Population	Access to finance	Free of corruption	Government effectiveness	Rule of law	Regulation quality	Gini coefficient	Disputes
ln GDP_1	1.00												
ln Inflation_1	0.02	1.00											
ln Trade_1	-0.30	0.02	1.00										
Debt_1	0.01	0.05	0.19	1.00									
Growth_1	0.06	-0.02	0.17	-0.02	1.00								
ln Population	0.80	0.07	-0.48	-0.06	0.03	1.00							
Access to finance	0.28	-0.04	0.06	0.21	-0.06	0.10	1.00						
Free of corruption	0.23	-0.12	0.12	0.13	-0.06	-0.09	0.18	1.00					
Government effectiveness	0.42	-0.14	0.06	0.08	0.02	0.10	0.26	0.72	1.00				
Rule of law	0.22	-0.14	0.11	0.07	0.01	-0.04	0.20	0.72	0.85	1.00			
Regulatory quality	0.31	-0.21	0.06	0.08	-0.01	-0.01	0.28	0.66	0.81	0.74	1.00		
Gini coefficient	0.04	-0.10	-0.09	0.01	-0.20	-0.12	-0.02	0.25	0.22	0.11	0.25	1.00	
Disputes	0.43	0.02	-0.21	0.05	0.05	0.32	0.09	0.06	0.20	0.06	0.09	0.11	1.00

Main results

Table 5.A3.3. **Determinants of private participation in infrastructure.**
Dependent variable: Log of total private investments in infrastructure.
Specification with country fixed effects and year dummies

VARIABLES	(1) ln_PPI	(2) ln_PPI	(3) ln_PPI	(4) ln_PPI	(5) ln_PPI	(6) ln_PPI
ln GDP_1	0.699***	0.605***	0.694***	0.104	0.103	0.579***
	(0.145)	(0.152)	(0.144)	(0.180)	(0.208)	(0.150)
ln Inflation_1	-0.0561*	-0.0242	-0.0504*	-0.0643*	-0.0732**	-0.0173
	(0.0305)	(0.0309)	(0.0302)	(0.0331)	(0.0368)	(0.0305)
ln Trade_1	0.0736	-0.147	0.141	-0.115	-0.150	-0.0775
	(0.183)	(0.186)	(0.182)	(0.209)	(0.230)	(0.184)
Debt_1	-0.00509	-0.000334	-0.00444	-6.26e-05	-0.00268	-2.83e-05
	(0.00553)	(0.00561)	(0.00548)	(0.00608)	(0.00619)	(0.00554)
Growth_1	-0.0161**	-0.00844	-0.0130**	0.00111	-0.00243	-0.00409
	(0.00643)	(0.00669)	(0.00641)	(0.00745)	(0.00840)	(0.00668)
ln Population	2.304***	1.434**	2.062***	0.716	0.116	1.189*
	(0.610)	(0.639)	(0.607)	(0.692)	(0.792)	(0.633)
Freedom from corruption	0.00718*	0.0166***	0.00669*	0.0110**	0.0161***	0.0155***
	(0.00406)	(0.00420)	(0.00402)	(0.00459)	(0.00497)	(0.00416)
Government effectiveness	0.0587	-0.107	0.120	-0.109	0.0178	-0.0461
	(0.178)	(0.180)	(0.177)	(0.201)	(0.215)	(0.179)
Rule of law	0.404**	0.279	0.431**	0.463**	0.436**	0.325*
	(0.180)	(0.179)	(0.178)	(0.201)	(0.219)	(0.177)
Quality of regulation	0.431***	0.638***	0.317**	0.660***	0.598***	0.515***
	(0.152)	(0.150)	(0.153)	(0.173)	(0.185)	(0.150)
Access to finance	0.00455**	0.00539***	0.00355*	0.00205	0.00251	0.00405**
	(0.00196)	(0.00195)	(0.00195)	(0.00220)	(0.00244)	(0.00195)
Gini coefficient		0.00318			0.00757	-0.000675
		(0.00967)			(0.0116)	(0.00959)
Disputes (moving sum)			0.0385***	-0.0378***	0.0350***	-0.0380***
			(0.00908)	(0.0104)	(0.0105)	(0.00844)
Dispute time				0.0335	0.0237	
				(0.0223)	(0.0227)	
Constant	-50.19***	-33.81***	-46.44***	-10.15	-0.475	-29.32**
	(10.74)	(11.57)	(10.67)	(12.26)	(14.47)	(11.46)
Observations	1,041	867	1.041	771	651	867
R-squared	0.487	0.547	0.497	0.528	0.540	0.559
Number of countries	111	98	111	108	95	98

Table 5.A3.4. **Determinants of private participation in infrastructure by sector.**
Dependent variable: Log of total private investments in infrastructure by sector.
Specification with country fixed effects and year dummies

VARIABLES	(7) ln_PPI_ energy	(8) ln_PPI_ energy	(9) ln_PPI_ energy	(10) ln_PPI_ energy	(11) ln_PPI_ transport	(12) ln_PPI_ transport	(13) ln_PPI_ transport	(14) ln_PPI_ transport
ln GDP_1	0.510**	0.415*	0.506**	0.406*	0.518**	0.399	0.567**	0.455*
	(0.213)	(0.229)	(0.213)	(0.229)	(0.257)	(0.258)	(0.256)	(0.258)
ln Inflation_1	-0.0349	0.00567	-0.0347	0.00601	-0.0840*	-0.0377	-0.0754	-0.0299
	(0.0453)	(0.0478)	(0.0453)	(0.0478)	(0.0499)	(0.0499)	(0.0497)	(0.0497)
ln Trade_1	-0.0952	-0.286	-0.0910	-0.281	1.337***	1.323***	1.374***	1.367***
	(0.268)	(0.285)	(0.268)	(0.285)	(0.296)	(0.300)	(0.295)	(0.299)
Debt_1	0.00177	0.00279	0.00181	0.00282	0.00420	0.0213	0.00510	0.0217
	(0.00685)	(0.00749)	(0.00686)	(0.00749)	(0.0115)	(0.0146)	(0.0115)	(0.0145)
Growth_1	-0.0162*	-0.00894	-0.0158	-0.00822	-0.0586***	-0.0431***	-0.0540***	0.0389***
	(0.00955)	(0.0100)	(0.00963)	(0.0101)	(0.0113)	(0.0116)	(0.0114)	(0.0116)
ln Population	-2.214**	-3.010***	-2.237**	-3.052***	0.152	-0.818	0.152	-0.785
	(0.988)	(1.070)	(0.992)	(1.073)	(1.229)	(1.217)	(1.221)	(1.211)
Freedom from corruption	0.0121**	0.00811	0.0120**	0.00782	0.00217	0.00617	0.00259	0.00688
	(0.00567)	(0.00605)	(0.00569)	(0.00608)	(0.00777)	(0.00801)	(0.00772)	(0.00797)
Government effectiveness	-0.218	-0.297	-0.217	-0.298	-0.500*	-0.771***	-0.484*	-0.753**
	(0.243)	(0.260)	(0.243)	(0.260)	(0.291)	(0.294)	(0.290)	(0.293)
Rule of law	-0.115	0.160	-0.112	0.172	0.359	0.176	0.501*	0.326
	(0.252)	(0.268)	(0.253)	(0.269)	(0.297)	(0.302)	(0.301)	(0.307)
Quality of regulation	0.466**	0.460**	0.455**	0.438*	1.081***	1.500***	0.995***	1.415***
	(0.214)	(0.224)	(0.218)	(0.228)	(0.236)	(0.238)	(0.237)	(0.239)
Access to finance	0.00553**	0.00435*	0.00549**	0.00426*	0.0108***	0.00972***	0.00984***	0.00886**
	(0.00243)	(0.00250)	(0.00243)	(0.00250)	(0.00264)	(0.00257)	(0.00265)	(0.00259)
Gini coefficient		0.0369**		0.0361**		0.0215		0.0166
		(0.0144)		(0.0145)		(0.0150)		(0.0150)
Number of disputes energy sector			-0.00626	-0.0119				
			(0.0208)	(0.0210)				
Number of disputes transport sector							-0.0676**	-0.0589**
							(0.0262)	(0.0250)
Constant	27.64	42.96**	28.09	43.92**	-17.41	0.429	-18.76	-1.420
	(17.71)	(19.74)	(17.79)	(19.82)	(22.43)	(22.64)	(22.31)	(22.53)
Observations	754	660	754	660	577	512	577	512
R-squared	0.249	0.280	0.249	0.281	0.275	0.327	0.285	0.335
Number of countries	87	75	87	75	76	67	76	67

Table 5.A3.4 (cont'd). **Determinants of private participation in infrastructure by sector.**
Dependent variable: Log of total private investments in infrastructure by sector.
Specification with country fixed effects and year dummies

VARIABLES	(7) ln_PPI_ energy	(8) ln_PPI_ energy	(9) ln_PPI_ energy	(10) ln_PPI_ energy	(11) ln_PPI_ transport	(12) ln_PPI_ transport	(13) ln_PPI_ transport	(14) ln_PPI_ transport
ln GDP_1	0.579***	0.528***	0.590***	0.529***	0.671***	0.657**	0.731***	0.701***
	(0.152)	(0.173)	(0.151)	(0.172)	(0.250)	(0.263)	(0.247)	(0.259)
ln Inflation_1	-0.0323	-0.0283	-0.0305	-0.0249	-0.00966	0.00134	0.00749	0.0153
	(0.0316)	(0.0349)	(0.0315)	(0.0349)	(0.0510)	(0.0528)	(0.0506)	(0.0522)
ln Trade_1	0.161	-0.0617	0.163	-0.0560	1.441***	1.134***	1.627***	1.328***
	(0.193)	(0.216)	(0.192)	(0.215)	(0.324)	(0.337)	(0.324)	(0.339)
Debt_1	0.00187	0.00583	0.00278	0.00618	0.0118	0.0255*	0.0120	0.0255*
	(0.00577)	(0.00625)	(0.00577)	(0.00624)	(0.0101)	(0.0152)	(0.00999)	(0.0150)
Growth_1	0.00335	0.00173	0.00436	0.00334	-0.0251**	-0.0211*	-0.0189*	-0.0141
	(0.00669)	(0.00759)	(0.00669)	(0.00761)	(0.0110)	(0.0115)	(0.0110)	(0.0116)
ln Population	2.572***	1.904**	2.649***	1.912***	-2.784**	-2.941**	-2.920**	-2.938**
	(0.653)	(0.741)	(0.653)	(0.740)	(1.250)	(1.313)	(1.232)	(1.293)
Freedom from corruption	0.0129***	0.0231***	0.0129***	0.0229***	0.0165**	0.0161**	0.0164**	0.0154*
	(0.00450)	(0.00497)	(0.00449)	(0.00496)	(0.00745)	(0.00815)	(0.00734)	(0.00803)
Government effectiveness	-0.294	-0.321	-0.258	-0.277	0.239	0.414	0.324	0.483
	(0.189)	(0.205)	(0.189)	(0.206)	(0.338)	(0.359)	(0.334)	(0.355)
Rule of Law	0.350*	0.276	0.298	0.234	0.296	0.339	0.357	0.395
	(0.192)	(0.207)	(0.193)	(0.208)	(0.298)	(0.306)	(0.294)	(0.302)
Quality of regulation	0.548***	0.570***	0.566***	0.579***	-0.183	-0.208	-0.285	-0.298
	(0.159)	(0.170)	(0.159)	(0.170)	(0.231)	(0.248)	(0.230)	(0.246)
Access to finance	0.00155	0.00237	0.00115	0.00194	0.000438	-0.000832	-4.93e-05	-0.00135
	(0.00203)	(0.00219)	(0.00203)	(0.00220)	(0.00271)	(0.00285)	(0.00268)	(0.00281)
Gini coefficient		-0.0122		-0.0124		0.0178		0.0205
		(0.0112)		(0.0112)		(0.0171)		(0.0169)
Number of disputes telecom sector			-0.142**	-0.141**				
			(0.0614)	(0.0689)				
Number of disputes water sector							-0.122***	0.120***
							(0.0399)	(0.0406)
Constant	-53.31***	-40.45***	-54.85***	-40.63***	26.47	30.14	26.43	27.98
	(11.49)	(13.35)	(11.48)	(13.32)	(24.30)	(25.63)	(23.94)	(25.25)
Observations	977	821	977	821	334	308	334	308
R-squared	0.493	0.492	0.496	0.495	0.452	0.473	0.470	0.490
Number of countries	106	91	106	91	40	36	40	36

Table 5.A3.5. **Determinants of private participation in infrastructure.**
Dependent variable: Log of total private investments in infrastructure.
Specification with country fixed effects (no year dummies**)**

VARIABLES	(1) ln_PPI	(2) ln_PPI	(3) ln_PPI	(4) ln_PPI	(5) ln_PPI	(6) ln_PPI
ln GDP_1	0.830***	0.843***	0.863***	0.801***	0.856***	0.874***
	(0.0795)	(0.0798)	(0.0801)	(0.0942)	(0.101)	(0.0803)
ln Inflation_1	-0.138***	-0.137***	-0.140***	-0.148***	-0.171***	-0.141***
	(0.0284)	(0.0288)	(0.0283)	(0.0313)	(0.0338)	(0.0287)
ln Trade_1	0.298*	0.201	0.366**	0.296	0.311	0.273
	(0.170)	(0.178)	(0.171)	(0.204)	(0.228)	(0.179)
Debt_1	0.000734	0.00780	0.00130	0.00493	0.00396	0.00805
	(0.00562)	(0.00581)	(0.00560)	(0.00635)	(0.00643)	(0.00579)
Growth_1	-0.0128**	-0.00323	-0.0113*	-0.00323	-0.00163	-0.00153
	(0.00631)	(0.00652)	(0.00631)	(0.00750)	(0.00824)	(0.00653)
ln Population	4.337***	4.466***	4.401***	4.245***	3.999***	4.569***
	(0.497)	(0.524)	(0.496)	(0.590)	(0.674)	(0.523)
Freedom from corruption	0.00720*	0.0159***	0.00692*	0.0111**	0.0169***	0.0153***
	(0.00417)	(0.00442)	(0.00416)	(0.00484)	(0.00527)	(0.00441)
Government effectiveness	0.197	0.124	0.241	-0.109	0.120	0.171
	(0.182)	(0.188)	(0.182)	(0.210)	(0.226)	(0.188)
Rule of law	0.387**	0.267	0.395**	0.408*	0.466**	0.285
	(0.183)	(0.187)	(0.182)	(0.209)	(0.227)	(0.186)
Quality of regulation	0.227	0.419***	0.140	0.465***	0.388**	0.332**
	(0.153)	(0.155)	(0.155)	(0.178)	(0.192)	(0.158)
Access to finance	0.00126	0.00211	0.000943	0.00246	0.00239	0.00174
	(0.00154)	(0.00162)	(0.00153)	(0.00185)	(0.00207)	(0.00162)
Gini coefficient		0.00454			0.00257	0.00139
		(0.0100)			(0.0120)	(0.0101)
Number of disputes			-0.0256***	-0.0234**	-0.0214**	-0.0237***
			(0.00917)	(0.0109)	(0.0109)	(0.00872)
Dispute time				0.0755***	0.0653***	
				(0.0226)	(0.0230)	
Constant	-86.38***	-89.73***	-88.43***	-83.75***	-81.97***	-92.26***
	(6.838)	(7.458)	(6.853)	(8.221)	(9.777)	(7.484)
Observations	1.041	867	1.041	771	651	867
R-squared	0.446	0.483	0.451	0.458	0.468	0.488
Number of countries	111	98	111	108	95	98

Table 5.A3.6. **Determinants of private participation in infrastructure by sector.**
Dependent variable: Log of total private
Investments in infrastructure by sector. Specification with country fixed effects (no year dummies)

VARIABLES	(7) ln_PPI_ energy	(8) ln_PPI_ energy	(9) ln_PPI_ energy	(10) ln_PPI_ energy	(11) ln_PPI_ transport	(12) ln_PPI_ transport	(13) ln_PPI_ transport	(14) ln_PPI_ transport
ln GDP_1	0.625***	0.688***	0.624***	0.685***	0.515***	0.556***	0.532***	0.569***
	(0.111)	(0.115)	(0.112)	(0.115)	(0.133)	(0.130)	(0.133)	(0.130)
ln Inflation_1	-0.130***	-0.116**	-0.130***	-0.115**	-0.115**	-0.0886**	-0.117***	-0.0907**
	(0.0421)	(0.0448)	(0.0422)	(0.0449)	(0.0452)	(0.0449)	(0.0450)	(0.0448)
ln Trade_1	0.344	0.232	0.341	0.226	1.500***	1.489***	1.516***	1.505***
	(0.244)	(0.262)	(0.246)	(0.264)	(0.272)	(0.274)	(0.271)	(0.273)
Debt_1	0.00716	0.00859	0.00715	0.00859	0.0128	0.0353**	0.0137	0.0360**
	(0.00703)	(0.00767)	(0.00704)	(0.00767)	(0.0114)	(0.0143)	(0.0114)	(0.0142)
Growth_1	-0.0116	-0.00905	-0.0116	-0.00920	-0.0491***	-0.0393***	-0.0467***	-0.0375***
	(0.00903)	(0.00937)	(0.00907)	(0.00940)	(0.0101)	(0.00999)	(0.0101)	(0.0100)
ln Population	1.395*	1.414*	1.392*	1.403*	0.843	0.816	0.974	0.923
	(0.771)	(0.833)	(0.773)	(0.836)	(0.918)	(0.890)	(0.917)	(0.889)
Freedom from corruption	0.00996*	0.00747	0.00998*	0.00756	0.00173	0.00551	0.00222	0.00601
	(0.00587)	(0.00629)	(0.00588)	(0.00631)	(0.00779)	(0.00800)	(0.00776)	(0.00798)
Government effectiveness	0.00755	-0.0750	0.00752	-0.0744	-0.296	-0.505*	-0.263	-0.472
	(0.248)	(0.267)	(0.248)	(0.267)	(0.290)	(0.291)	(0.289)	(0.291)
Rule of law	-0.0307	0.164	-0.0314	0.161	0.310	0.0489	0.415	0.150
	(0.260)	(0.277)	(0.260)	(0.277)	(0.296)	(0.297)	(0.298)	(0.302)
Quality of regulation	0.125	0.0560	0.128	0.0649	0.888***	1.296***	0.808***	1.226***
	(0.215)	(0.226)	(0.219)	(0.231)	(0.232)	(0.233)	(0.234)	(0.236)
Access to finance	0.000128	0.00139	0.000128	0.00139	0.00368*	0.00496**	0.00327*	0.00456**
	(0.00189)	(0.00201)	(0.00189)	(0.00201)	(0.00191)	(0.00194)	(0.00191)	(0.00195)
Gini coefficient		0.0520***		0.0524***		0.0297**		0.0265*
		(0.0146)		(0.0147)		(0.0148)		(0.0149)
Number of disputes energy sector			0.00178	0.00431				
			(0.0212)	(0.0214)				
Number of disputes transport sector							-0.0579**	-0.0452*
							(0.0262)	(0.0248)
Constant	-35.66***	-39.25***	-35.57***	-38.98***	-29.01**	-31.27**	-31.63**	-33.28**
	(10.97)	(12.10)	(11.03)	(12.18)	(13.19)	(12.99)	(13.19)	(13.01)
Observations	754	660	754	660	577	512	577	512
R-squared	0.170	0.196	0.170	0.196	0.230	0.285	0.238	0.291
Number of countries	87	75	87	75	76	67	76	67

Table 5.A3.6 (cont'd). **Determinants of private participation in infrastructure by sector.**
Dependent variable: Log of total private
Investments in infrastructure by sector. Specification with country fixed effects (no year dummies)

VARIABLES	(7) ln_PPI_ energy	(8) ln_PPI_ energy	(9) ln_PPI_ energy	(10) ln_PPI_ energy	(11) ln_PPI_ transport	(12) ln_PPI_ transport	(13) ln_PPI_ transport	(14) ln_PPI_ transport
ln GDP_1	0.860***	0.872***	0.870***	0.878***	0.474***	0.519***	0.485***	0.529***
	(0.0809)	(0.0874)	(0.0811)	(0.0878)	(0.122)	(0.128)	(0.123)	(0.129)
ln Inflation_1	-0.0993***	-0.114***	-0.101***	-0.115***	-0.125**	-0.117**	-0.126**	-0.118**
	(0.0293)	(0.0319)	(0.0293)	(0.0320)	(0.0500)	(0.0519)	(0.0500)	(0.0520)
ln Trade_1	0.404**	0.295	0.414**	0.304	1.690***	1.395***	1.734***	1.445***
	(0.176)	(0.200)	(0.176)	(0.200)	(0.284)	(0.307)	(0.295)	(0.318)
Debt_1	0.00559	0.0114*	0.00631	0.0116*	0.0180*	0.0407***	0.0182*	0.0412***
	(0.00579)	(0.00629)	(0.00581)	(0.00629)	(0.0105)	(0.0156)	(0.0106)	(0.0156)
Growth_1	-0.000759	-8.70e-05	-3.02e-05	0.000437	-0.0332***	-0.0289***	-0.0326***	-0.0282***
	(0.00645)	(0.00717)	(0.00647)	(0.00721)	(0.0102)	(0.0106)	(0.0103)	(0.0106)
ln Population	4.505***	4.383***	4.629***	4.449***	0.187	0.761	0.278	0.896
	(0.538)	(0.607)	(0.545)	(0.614)	(0.932)	(0.999)	(0.946)	(1.024)
Freedom corruption	0.0132***	0.0235***	0.0132***	0.0234***	0.0174**	0.0149*	0.0175**	0.0147*
	(0.00457)	(0.00507)	(0.00457)	(0.00507)	(0.00777)	(0.00850)	(0.00778)	(0.00852)
Government	-0.174	-0.117	-0.146	-0.0966	0.669*	0.760**	0.702**	0.792**
effectiveness	(0.190)	(0.207)	(0.190)	(0.209)	(0.346)	(0.369)	(0.351)	(0.373)
Rule of law	0.278	0.206	0.247	0.191	0.603*	0.641**	0.622**	0.659**
	(0.194)	(0.210)	(0.195)	(0.211)	(0.308)	(0.318)	(0.310)	(0.320)
Quality of regulation	0.423***	0.401**	0.426***	0.399**	-0.545**	-0.569**	-0.577**	-0.602**
	(0.158)	(0.171)	(0.158)	(0.171)	(0.233)	(0.250)	(0.240)	(0.256)
Access to finance	0.00175	0.00174	0.00145	0.00161	-0.00415**	-0.00539***	-0.00422**	-0.00544***
	(0.00158)	(0.00177)	(0.00159)	(0.00178)	(0.00189)	(0.00204)	(0.00190)	(0.00204)
Gini coefficient		-0.0145		-0.0146		0.0315*		0.0321*
		(0.0113)		(0.0113)		(0.0177)		(0.0178)
Number of disputes			-0.0869	-0.0498				
telecom sector			(0.0614)	(0.0692)				
Number of disputes							-0.0238	-0.0260
water sector							(0.0404)	(0.0417)
Constant	-91.61***	-89.87***	-93.89***	-91.12***	-19.26	-30.47*	-21.22	-33.24**
	(7.488)	(8.700)	(7.656)	(8.873)	(14.14)	(15.64)	(14.54)	(16.27)
Observations	977	821	977	821	334	308	334	308
R-squared	0.465	0.454	0.466	0.455	0.352	0.367	0.353	0.368
Number of countries	106	91	106	91	40	36	40	36

Table 5.A3.7. **Determinants of private participation in infrastructure by quartile of experience and GDP.**
Dependent variable: Log of total private investments in infrastructure by quartile of experience and GDP.
Specification with country fixed effects and year dummies

	EXPERIENCE				GDP				GDP per capita			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
VARIABLES	ln_PPI	ln_PPI	ln_PPI	ln_PPI	ln_PPI	ln_PPI	ln_PPI	ln_PPI	ln_PPI	ln_PPI	ln_PPI	ln_PPI
ln GDP_1	-2.818***	-0.260	1.360***	0.662***	-1.111	0.218	1.361***	0.870***	0.395	1.458***	0.592**	0.855***
	(0.802)	(0.422)	(0.382)	(0.141)	(0.839)	(0.399)	(0.253)	(0.241)	(0.464)	(0.286)	(0.259)	(0.312)
ln Inflation_1	-0.0446	0.0228	-0.118*	-0.00677	-0.0748	-0.0610	-0.121***	0.0200	0.0107	0.0394	0.00834	-0.148***
	(0.0996)	(0.0480)	(0.0672)	(0.0294)	(0.144)	(0.0701)	(0.0457)	(0.0523)	(0.0809)	(0.0461)	(0.0539)	(0.0543)
ln Trade_1	-4.217***	-1.226***	0.338	0.318*	-1.613	-1.135**	0.449	0.668**	0.148	-0.989***	-0.275	1.743***
	(1.006)	(0.385)	(0.506)	(0.175)	(0.994)	(0.457)	(0.310)	(0.315)	(0.377)	(0.306)	(0.330)	(0.481)
Debt_1	0.0969**	0.0119	-0.00242	0.000204	0.00247	0.0398	-0.0296**	0.00572	0.00175	0.0242	0.0201	-0.0202*
	(0.0452)	(0.0221)	(0.00633)	(0.00719)	(0.00857)	(0.0286)	(0.0124)	(0.0138)	(0.00752)	(0.0176)	(0.0189)	(0.0114)
Growth_1	-0.0420**	-0.0210*	-0.0354***	-0.00495	-0.0140	-0.00375	-0.0443***	-0.0108	0.0274	-0.00949	-0.0217**	-0.0653***
	(0.0208)	(0.0123)	(0.0121)	(0.00634)	(0.0250)	(0.0136)	(0.0126)	(0.0108)	(0.0186)	(0.00995)	(0.00982)	(0.0128)
ln Population	0.792	-0.822	3.914*	-0.397	6.224**	1.256	7.124***	0.254	6.589**	6.065***	-0.103	-3.833**
	(6.280)	(2.706)	(2.350)	(0.801)	(2.948)	(1.548)	(1.177)	(1.220)	(2.976)	(1.269)	(1.035)	(1.506)
Freedom from corruption	-0.0361	0.00768	-0.00848	-0.00907*	0.0459*	0.0171	0.0120*	0.0168**	0.00433	0.00494	0.00869	-0.00896
	(0.0221)	(0.00901)	(0.0104)	(0.00544)	(0.0230)	(0.0104)	(0.00673)	(0.00703)	(0.00987)	(0.00730)	(0.00650)	(0.00780)
Government effectiveness	-0.315	-0.300	0.522	0.0248	0.676	-0.0960	1.527***	-0.440	-0.0386	0.405	0.179	0.509
	(0.688)	(0.438)	(0.476)	(0.191)	(0.735)	(0.468)	(0.340)	(0.282)	(0.489)	(0.279)	(0.275)	(0.384)
Rule of law	-0.102	-0.101	0.679	0.110	1.090	0.288	1.144***	-0.175	0.193	0.110	0.287	0.812**
	(0.724)	(0.394)	(0.467)	(0.182)	(0.771)	(0.474)	(0.333)	(0.270)	(0.412)	(0.307)	(0.292)	(0.388)
Quality of regulation	-0.137	0.216	-0.0276	0.648***	-1.302	0.384	-0.688***	0.731***	-0.192	0.729***	0.320	-0.137
	(0.541)	(0.394)	(0.351)	(0.151)	(0.894)	(0.459)	(0.236)	(0.222)	(0.390)	(0.278)	(0.236)	(0.271)
Access to finance	0.00586	-0.000321	0.000102	0.00173	0.0255	0.00472	-0.00287	0.00637**	0.0215**	0.00503	0.00303	0.00501
	(0.00601)	(0.00608)	(0.00435)	(0.00157)	(0.0178)	(0.00629)	(0.00328)	(0.00255)	(0.00925)	(0.00309)	(0.00348)	(0.00327)
Constant	69.54	25.25	-89.58**	-4.662	-55.09	-17.75	-141.5***	-24.02	-114.8**	-125.5***	-7.397	40.06
	(98.53)	(40.77)	(39.31)	(14.84)	(43.07)	(26.06)	(19.90)	(23.85)	(46.29)	(23.02)	(18.15)	(28.19)
Observations	120	206	320	392	90	234	341	365	184	267	245	334
R-squared	0.661	0.461	0.227	0.499	0.580	0.494	0.610	0.494	0.635	0.750	0.579	0.410
Number of countries	55	79	82	63	19	35	43	38	26	38	39	43

References

Araya, G., J. Schwartz and L. Andrés (2013), "The Effects of Country Risk and Conflict on Infrastructure PPIs", *World Bank Policy Research Working Paper No. 6569*.

Arrow, K. and R.C. Lind (1970), "Uncertainty and the evaluation of public investment decisions", *American Economic Review*, 60, 364-378, June.

Basilio, Maria (2011), "Infrastructure PPP investments in Emerging Markets", REPEC, May.

Barnejee, S.G., J.M. Oetzel and R. Ranganathan (2006), "Private Provision of Infrastructure in Emerging Markets: Do Institutions Matter?" *Development Policy Review*, 24 (2): 175-202.

Bhattacharya, A. and M. Romani (2013), "Meeting the Financing Challenge for Sustainable Infrastructure", Paper prepared for the Global Green Growth Summit, Incheon City, 10-11 June.

Calderón, C. and L. Servén (2004), "The Effects of Infrastructure Development on Growth and Income Distribution", *World Bank Policy Research Working Paper No. 3400*.

Calderón, C. and L. Servén (2008), "Infrastructure and Economic Development in Sub-Saharan Africa", *World Bank Policy Research Working Paper No. 4712*.

Calderón, C. and L. Servén (2010), "Infrastructure in Latin America", *World Bank Policy Research Working Paper No. 5317*.

Chakrabarti, A. (2001), "The Determinants of Foreign Direct Investments: Sensitivity Analyses of Cross-Country Regressions", *Kyklos*, 54: 89-114. http://dx.doi.org/10.1111/1467-6435.00142

Esty, B. (2011), "An overview of project finance & infrastructure – 2009 update", Harvard Business School, Technical Note HBS 210-061.

Fay, M. and M. Toman (2010), "Infrastructure and Sustainable Development". Submitted to the Korea-World Bank High-Level Conference on Post-Crisis Growth and Development, co-organised by the Presidential Committee for the G20 Summit and the World Bank with the support of the Korea Institute for International Economic Policy.

FSB (Financial Stability Board) (2013), "Financial Regulatory Factors Affecting the Availability of Long-term Investment Finance", Report to G20 Finance Ministers and Central Bank Governors.

Gasmi, F., B. Lika and P. Noumba Um (2010), "Is the Level of Financial Sector Development a Key Determinant of Private Investment in the Power Sector?" *Policy Research Working Paper No. 5373*, The World Bank.

Grout, P.A. (2003), "Public and private sector discount rates in Public-Private Partnerships", *The Economic Journal,* 113, 486, C62-C68.

Jensen, O. and F. Blanc-Brude (2005), "The Institutional Determinants of Private Sector Participation in the Water and Sanitation Sector in Developing Countries", Applied Infrastructure Research.

Hammami, M., J.F. Ruhashyankiko and E.B. Yehoue (2006), "Determinants of Public-Private Partnerships in Infrastructure", *IMF Working Paper*, WP/06/99, International Monetary Fund.

Hart, O. (2003), "Incomplete contracts and public ownership: remarks and an application to Public-Private Partnerships", *The Economic Journal*, 113, 486, C69-C76.

Hart, O., A. Shleifer and R.W. Vishny (1997), "The proper scope of government: theory and an application to prisons", *Quarterly Journal of Economics*, 112, 4, 1127-1161.

Iossa, E. and D. Martimort (2011), "Post-tender corruption and risk allocation: implications for public-private partnerships", *CEIS Tor Vergata Research Paper Series* 5: 195.

Iossa, E. and D. Martimort (2013), "Corruption in PPIs, Incentives and Contract Incompleteness", *CEIS Research Paper 317*, Tor Vergata University, CEIS, revised 18 Jul 2014.

Kirkpatrick, C., D. Parker and Y. Zhang (2006), "Foreign Direct Investment in Infrastructure in Developing Countries: Does Regulation Make a Difference?" *Transnational Corporations*, 15, No. 1, 143-71.

MIGA, World Bank Group (2013), "World Investment and Political Risk 2013", Washington DC.

Moszoro, M. (2014a), "Efficient Public-Private Capital Structures", *Annals of Public and Cooperative Economics*, 85, 1, 103-126.

Moszoro, M. (2014b), "Public-Private Monopoly", Working Paper SSRN http://dx.doi.org/10.2139/ssrn.2383309.

Moszoro, M. and P. Spiller (2014), "Third-Party Opportunism and the Theory of Public Contracts: Operationalization and Applications", in: Eric Brousseau and Jean-Michel Glachant (eds.), *The Manufacturing of Markets: Legal, Political and Economic Dynamics*, Cambridge University Press.

North, D.C. and B.R. Weingast (1989), "Constitutions and commitment: the evolution of institutions governing public choice in seventeenth-century England", *Journal of Economic History,* 49.04: 803-832.

Nunnenkamp, P. and S. Spatz (2002), *Determinants of FDI in Developing Countries: Has Globalization Changed the Rules of the Game?*, Open Access Publications, 2976, Kiel Institute for the World Economy (IfW).

Pragal, S. (2003), "Regulation and Private Sector Participation in Infrastructure", *Policy Research Working Paper No. 3037.*

Straub, S. (2008), "Infrastructure and Growth in Developing Countries: Recent Advances and Research Challenges", *World Bank Policy Research Working Paper No. 4460*.

Teorell, J., N. Charron, S. Dahlberg, S. Holmberg, B. Rothstein, P. Sundin and R. Svensson (2013), "The Quality of Government Dataset", version 20, Dec 13. University of Gothenburg: The Quality of Government Institute, http://qog.pol.gu.se/ (accessed February 2016).

Tewodaj, M. (2013), "Determinants of private participation in infrastructure in low and middle income countries (LMICs)", Pardee RAND Graduate School.

UNCTAD Database of Treaty-based Investor-State Dispute Settlement Cases. This database is publicly available at: http://iiadbcases.unctad.org/ (accessed February 2016)

Williamson, O. (1979), "Transaction-Cost Economics: The Governance of Contractual Relations", *Journal of Law and Economics*, 22, 2, 233-261.

Williamson, O. (1999), "Public and private bureaucracies: a transaction cost economics perspectives", *Journal of Law, Economics and Organization*, 15, 1, 306-342.

World Bank (2013), "Long-term Investment Financing for Growth and Development: Umbrella Paper", Presented at Meeting of the G20 Ministers of Finance and Central Bank Governors, Moscow, Russia, February.

World Bank (2013), PPI Database. http://ppi.worldbank.org (accessed February 2016)

List of participants

Mr. Michael Burnett **Chair**

Director, European PPP Forum
European Institute of Public Administration
O.L. Vrouweplein 22
P.O. Box 1229
NL-6211 HE Maastricht
The Netherlands

Professor Jonathan Gifford **Rapporteur**

Director, Center for Transportation Public-Private Partnership Policy
George Mason University
School of Policy, Government, and International Affairs
3401 Fairfax Drive
22201 Arlington, VA
USA

Mr. Daniel Benitez **Co-Rapporteur**

Senior Economist LCSTR
The World Bank
1818 H Street, NW
20433 Washington D.C.
USA

Mr. Lincoln Flor **Co-Rapporteur**

Senior Transport Economist, LCSTR
The World Bank
1818 H Street, NW
20433 Washington D.C.
USA

Prof. José-Louis Guasch **Co-Rapporteur**

The World Bank
1818 H Street, NW
20433 Washington D.C.
USA

Prof. Ronald Fischer **Co-Rapporteur**

Dept. Ingenieria Industrial
University of Chile
Republica 701
Santiago
Chile

Prof. Marian Moszoro **Co-Rapporteur**

Haas School of Business
F402 Institute for Business Innovation
University of California at Berkeley
Berkeley, CA 94720
USA

Ms. Fernanda Ruiz Nunez **Co-Rapporteur**

The World Bank
1818 H Street, NW
20433 Washington D.C.
USA

Participants:

Prof. Akintola Akintoye

Dean
The Grenfell-Baines School of Architecture, Construction and Environment
University of Central Lancashire
Preston PR1 2HE
United Kingdom

Dr. Julie De Brux

EPPP Research Chair
IAE Sorbonne Business School
21 rue Broca
F-75005 Paris
France

Mr. Fernando Crespo Diu

Director of UTAP
Technical Support Unit for PPP Projects (UTAP)
Ministry of Finance
Rua Braamcamp, 90 – 6o piso
P-1250 052 Lisbon
Portugal

Mr. Gajendra Haldea

Adviser to the Government of Rajasthan (Infrastructure & PPP)
Planning Department
Government of Rajasthan
D-II/37 Kaka Nagar
110003 NEW DELHI
India

Mr. Patrick Harder

Chair, Infrastructure Practice Group
Nossaman LLP
777 Figueroa Street, 34th Floor
LOS ANGELES, CA 90017
USA

Dr. Björn Hasselgren

Senior Advisor/Research Fellow
KTH Royal Institute of Technology
School of Architecture and the Built Environment
Division of Urban Planning and Environment
Drottning Kristinas väg 30
SE-100 44 Stockholm
Sweden

Mr. Douglas Koelemay

Director
Virginia Office of Public-Private Partnerships
600 East Main Street, Suite 2120
Richmond, VA 23219
USA

Mr. Jorge Kogan

Senior Advisor, Infrastructure
CAF – Development Bank of Latin America
Av. Luis Roche, Torre CAF, Piso 11
Altamira, Chacao (1060)
Caracas
Venezuela

Mr. Joung Lee

Deputy Director, Management & Program Finance
American Association of State Highway and Transportation Officials (AASHTO)
444 North Capitol St. NW, Ste 249
Washington DC 20001
USA

Mr. Tiago Martins

Associate Partner, Infrastructure Advisory
KPMG II – Consultores de Negocios, S.A.
Avenida Praia da Vitória 71A, 8o
P-1069-006 Lisbon
Portugal

Prof. Kazuaki Miyamoto

Tokyo City University
8-9-18 Todoroki, Setagaya-ku
Tokyo, 158-8586
Japan

Mr. Rui Monteiro

Senior Public-Private Partnerships Specialist
Public-Private Partnerships
The World Bank
1818 H Street, NW
20433 Washington D.C.
USA

Prof. Jan Eric Nilsson

VTI
Box 55685
SE-102 15 Stockholm
Sweden

Dr. Pythagoras Petratos

Lecturer
Saïd Business School
Oxford University
Park End Street
GB-Oxford OX1 1 HP
United Kingdom

Mr. Robert Poole

Director of Transportation Policy
Reason Foundation
140 West Tropical Way
Plantation, FL 33317
USA

Prof. Stephane Saussier

IAE Sorbonne Business School
21 rue de Broca
F-75005 Paris
France

Dr. Andrew S.J. Smith

Senior Lecturer in Transport Regulation and Economics
Institute for Transport Studies (ITS)
University of Leeds
GB-Leeds LS2 9JT
United Kingdom

Mr. Yoshiro Taguchi

Transportation Counselor
Embassy of Japan
2520 Massachusetts Avenue, NW
Washington D.C. 20008
USA

Prof. Roger Vickerman

University of Kent
School of Economics
Keynes College
GB-Canterbury CT2 7NP
United Kingdom

Mr. Porter Wheeler

Consultant, Center for Transportation P3 Policy
George Mason University
School of Policy, Government, and International Affairs
3401 Fairfax Drive
22201 Arlington, VA
USA

Prof. Shanjiang Zhu

Assistant Professor, Civil, Environmental & Infrastructure Engineering
George Mason University
Nguyen Engineering Building
4400 University Drive MSN: 6C1
Fairfax, VA 22030
USA

Mr. Robert Mariner

US Department of Transportation
Office of the Secretary
1200 New Jersey Avenue, SE W84-314
Washington, D.C. 20590
USA

Mr. Paul Baumer

Head of Department
Build America Transportation Investment Center
US Department of Transportation
1200 New Jersey Avenue, SE W84-314
Washington, D.C. 20590
USA

ITF Secretariat

Mr. Stephen Perkins

Head of Research
Joint OECD/ITF Transport Research Centre
International Transport Forum
2, rue André-Pascal
F-75775 Paris Cedex 16

Dr. Dejan Makovšek

Economist
Joint OECD/ITF Transport Research Centre
International Transport Forum
2, rue André-Pascal
F-75775 Paris Cedex 16

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where governments work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

The OECD member countries are: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The European Union takes part in the work of the OECD.

OECD Publishing disseminates widely the results of the Organisation's statistics gathering and research on economic, social and environmental issues, as well as the conventions, guidelines and standards agreed by its members.

OECD PUBLISHING, 2, rue André-Pascal, 75775 PARIS CEDEX 16
(74 2017 03 1 P) ISBN 978-92-82-10812-3 –

International Transport Forum

Public Private Partnerships for Transport Infrastructure

Renegotiation and Economic Outcomes

Public-private partnerships (PPPs) are an important vehicle for private participation in infrastructure investment, delivery and management. Renegotiations are an integral part of the PPP process but their prevalence varies markedly in different parts of the world. Renegotiations can be usefully employed to adjust the PPP contract to unforeseeable events, beyond the control of contractual parties. There is also a danger, however, that they will be used to change the initial balance of costs and benefits in the contract.

The purpose of this report was to provide an overview of the nature of PPP renegotiations in different regions of the world and at different times to help understand when PPP contract renegotiations are desirable and when they are not. In general it is concluded that when contracts are set up well, renegotiations should be few and far between.

OECD publishing
www.oecd.org/publishing

International Transport Forum
2 rue André Pascal
75775 Paris Cedex 16
France
T +33 (0)1 45 24 97 10
F +33 (0)1 45 24 13 22
Email : itf.contact@oecd.org
Web: www.itf-oecd.org

(742017031P1)
ISBN 978-92-821-0812-3