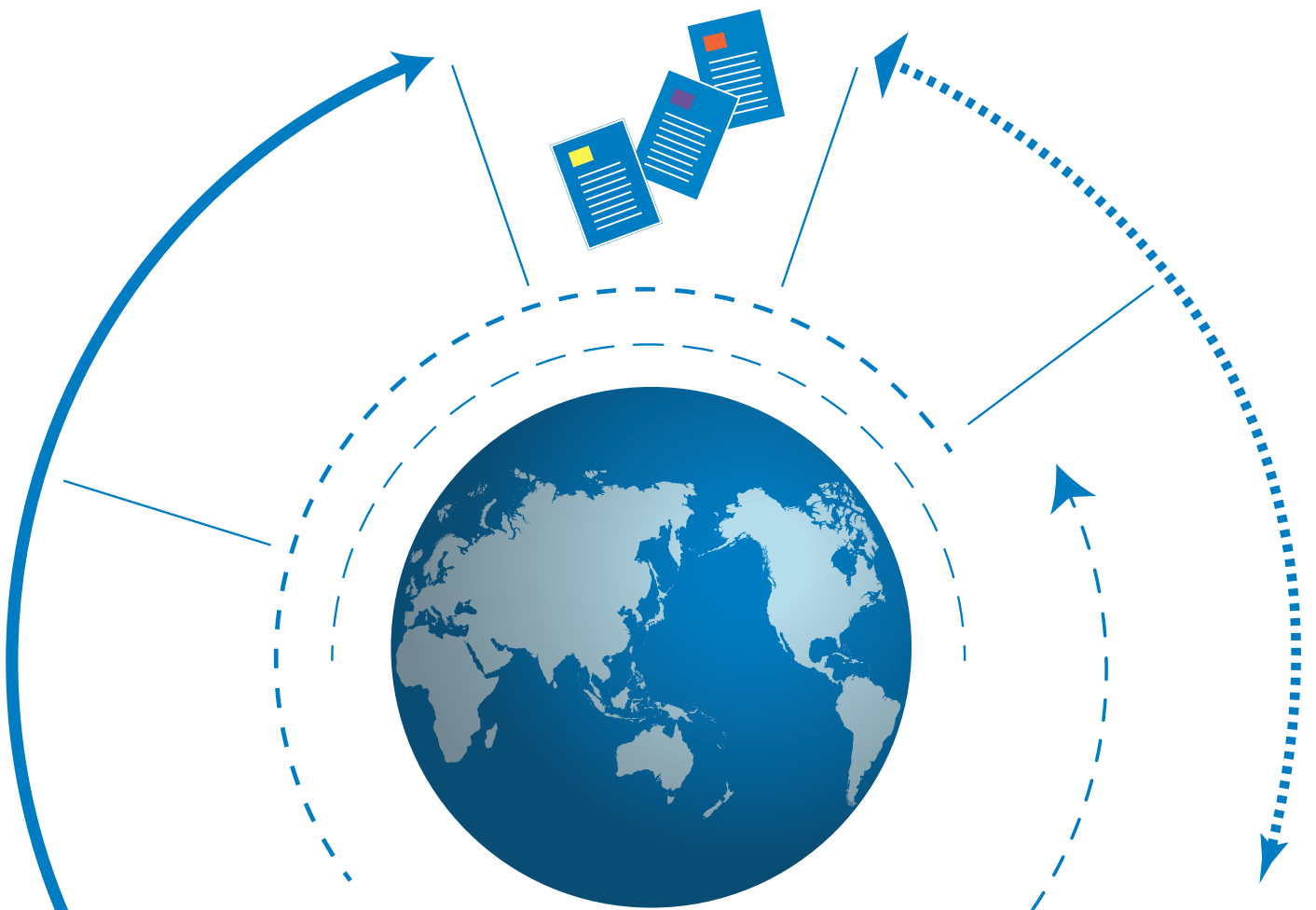




Opening the black box of contract renegotiations: An analysis of road concessions in Chile, Colombia and Peru

Eduardo Bitran, Sebastián Nieto-Parra and Juan Sebastián Robledo



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PREFACE

Effective private involvement in transport infrastructure is essential to boost economic growth. Public-private partnerships to build infrastructure projects have potential benefits in terms of lower costs and higher quality, as they draw from private sector expertise and create competition for the field. However, their success requires a clear legal framework, rigorous planning and design and well-equipped institutions in charge of their promotion and supervision.

Latin America's transport infrastructure lags behind other regions despite considerable private sector investment over the last two decades. Over that time period, some Latin American economies have attempted to close their infrastructure gap and create fiscal space by promoting greater private investment. However, road infrastructure in the region continues to lag well behind OECD countries and emerging regions such as Asia, calling for better policies to involve the private sector in transport infrastructure development.

This paper reviews road concession programmes in Chile, Colombia and Peru over the period 1993-2010 and analyses how their shortcomings have resulted in large extra fiscal costs. Weak State institutions, unclear legislation and deficient contract design have allowed for frequent and costly renegotiation of road concessions. In addition, a vast effort of data collection was conducted to analyse unexploited information and explore the determinants of renegotiation. The empirical results suggest that State-led renegotiations, which were more common than firm-led renegotiations, were often associated with the political cycle.

This research is part of the OECD Development Centre's efforts to identify best policies regarding transport infrastructure in developing countries. Although concession programmes in the three Latin American countries analysed have vastly improved, the results of this research suggests that policy challenges remain. For instance, PPP agencies in charge of planning projects need to conduct a more rigorous ex-ante evaluation that includes value-for-money analyses. Also, better accounting practices for public investment in PPPs are needed to prevent political bias towards PPPs. Finally, contract supervision and regulation could be conducted by an independent institution to avoid conflict of interests.

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RÉSUMÉ

Cet article étudie les renégociations des concessions routières au Chili, en Colombie et au Pérou pour la période 1993-2010. Il analyse d'abord le cadre juridique et institutionnel, ainsi que les types des concessions de ces pays, puis il utilise un ensemble de nouvelles données composées d'un échantillon de 61 des 62 contrats de concession du réseau routier afin d'examiner la renégociation de ces contrats. 50 contrats ont été modifiés au moins une fois, ce qui a entraîné plus de 540 renégociations. Tous les contrats modifiés ont été renégociés pour la première fois moins de trois ans après la signature initiale de la concession. L'analyse empirique suggère que les renégociations menées par l'État ont été plus fréquentes que les renégociations entamées par les entreprises et qu'elles ont été motivées par un comportement opportuniste des gouvernements. Les renégociations débutées par l'État qui ont ajouté de nouvelles tranches sur le réseau routier et qui ont inclus des travaux complémentaires pendant la dernière année au pouvoir ont été plus coûteuses que les autres renégociations. Enfin, les gouvernements ont reporté au futur une plus grande partie des coûts budgétaires quand les renégociations ont été motivées par l'État pendant la dernière année au pouvoir.

Classification JEL: D7, H11, H54, O54, P16, R42.

Mots-clés: contrats de concession, Amérique latine, partenariat public-privé, renégociation.

ABSTRACT

This paper studies the renegotiations of road concessions in Chile, Colombia and Peru for the period 1993-2010. First, it analyses the legal framework, the institutional design and the types of concessions of these countries and second, it uses a novel data composed of a sample of 61 of the 62 road concession contracts to explore the renegotiation of these concessions. 50 out of 61 contracts have been modified at least once, resulting in more than 540 renegotiations. All modified contracts were changed for the first time less than 3 years after the initial signing of the concession. Empirical analysis suggests that State-led renegotiations, which were more common than firm-led renegotiations, were motivated by the opportunistic behaviour of governments. State-led renegotiations that added new stretches of roads and that included additional complementary works during governments' last year in office were costlier than other renegotiations. Finally, governments deferred a larger share of renegotiation's fiscal costs in State-led renegotiations that took place during their last year in office.

JEL classification: D7, H11, H54, O54, P16, R42.

Keywords: concession contracts, Latin America, public-private partnerships, renegotiation.

I. INTRODUCTION

This paper analyses the renegotiation of road concession contracts in Chile, Colombia and Peru. It uses a sample of 543 contract changes made on 61 of the 62 road concession contracts signed between 1993 and 2010. The study finds that most concessions have been renegotiated at least once. Among renegotiated concessions, the first change has occurred on average only two years after the contracts are signed and each contract is renegotiated on average once a year. The costs of such renegotiations have included direct fiscal costs worth USD 7 billion, average increases in concessions' term of 20%, higher toll prices, greater risks faced by the State and delays in construction deadlines.¹ Furthermore, empirical analysis suggests that some renegotiations are associated with opportunistic behaviour by the government. State-led renegotiations that either appended new stretches of road to concession contracts or that added complementary works before elections were significantly costlier than other types of renegotiation. Also, the share of renegotiation costs deferred for future payment was significantly higher for State-led renegotiation that took place during governments' last year in office.

Concessions can have key potential benefits, especially when the government is inefficient in providing public services. First, compared to public works, concessions can prevent white elephants if faced with demand risk, because the private sector will have the incentive to carefully screen projects. Second, concessions with proper surveillance will improve maintenance, an area in which public sector performs poorly. Third, the competitive auctioning process can result in the selection of the most efficient operator as well as in optimal pricing, given that competition takes place before firms commit to investment (Guasch, 2004). Fourth, concession projects, including Design-Build-Operate-Transfer (DBOT), force the assessment of the entire life cycle of the project and thus consider the trade off between initial investment and maintenance and operation cost. Fifth, by insuring risks properly, concessions in transport infrastructure can allow countries that suffer natural disasters regularly to recover their infrastructure faster (Bitran and Villena, 2010).

However, the actual performance of concessions is determined by a number of 'designs' (Guasch, 2004). The first is the contract design, which includes the type of award process and criteria, prequalification requirements, investment obligations or output targets, guarantees to each party, concession length, termination and contingency clauses, conflict resolution mechanisms and allocation of risks. The second is the regulatory design, which in general refers to how those contracts are managed, supervised and reviewed. This includes the structure,

1. Not all renegotiated concessions saw their term increase. Among concessions that were extended, their term was increased by an average of 45%.

review and adjustment of toll prices, the valuation of assets, the quality of service standards and the information requirements. Finally, there is the institutional design of concession programmes, which defines the public entities in charge to plan, manage and supervise concessions. This final aspect is key since the understanding of the institutional context and its implications are crucial when designing a regulatory framework for developing countries (Estache and Wren-Lewis, 2009).

The public-private partnerships (PPPs) literature in Latin America has found that flaws in these designs have caused excessive contract renegotiations, both State-led and private-led (see OECD, 2011 for a review of this literature). Flaws in concession programmes are attributed to the governments' scarce experience with PPPs, the limited human and economic resources assigned to prepare projects and the fact that the political cycle forced concession programmes to be prepared hastily (Guasch, 2004). Renegotiation is to be expected in any concession due to their long term, irreversible investments and difficulties to foresee and consider all contingencies.² However, contract renegotiation in Latin America has been larger and more frequent than what theory and international experience suggest. The literature has associated this frequent renegotiation to, on the one hand, new governments that have tried to correct the initial flaws of concessions or change contract terms they oppose ideologically and, on the other hand, to private firms that have taken advantage of contract and regulatory flaws to secure larger rents (Engel *et al.*, 2009a; Guasch *et al.*, 2008; Guasch *et al.*, 2007; Guasch, 2004).

Renegotiation of concession contracts can entail large social costs. First, it is costly for the State because the private concessionaire can have more leverage during renegotiation than during the bidding process. Once the contract is signed, governments usually cannot afford the political cost of letting the concession fail, which generates hold up risk. Second, since renegotiation hampers competition, concession projects are more vulnerable to corruption and collusion among the parties. The prospect of renegotiation changes the incentives of the bidding process, possibly leading to adverse selection and undermining the benefits of creating competition for the field. If the likelihood of renegotiation is high, firms will have an incentive to make predatory bids.

In this context, the literature has explored how specific contractual, regulatory and institutional features affect the probability that a concession is renegotiated at least once (Guasch *et al.*, 2007; Guasch *et al.*, 2008). For instance, fixed-term contracts that assign the demand risk to concessionaires (which in turn ask for guarantees) or the lack of an independent regulator have been found to make renegotiation more likely (Engel *et al.*, 2003). Furthermore, the inclusion of a financial equilibrium clause has allowed firms to seek renegotiation after winning auctions with predatory bids (Guasch, 2004). Government-led renegotiation has also been associated to the entry of new administrations (Guasch *et al.*, 2007). These findings have led to recommendations on when and how PPPs should be employed to minimise the probability of renegotiation (Engel

2. The fact that contracts are intrinsically incomplete can be addressed with relational contracts, introducing more flexibility without the need for costly renegotiation (McNeil, 1978). Nevertheless, in the case of public contracts, relational contracts are vulnerable to "third party risks" and "government opportunism". This calls for public contracts to be more bureaucratic and rigid, making formal renegotiation necessary (Spiller, 2008).

et al., 2009a). Finally, stylised facts in Chile have been consistent with a model where governments increase spending and shift payments to future administrations by renegotiating road concessions (Engel *et al.*, 2009b).

This study explores whether frequent renegotiation is associated with opportunistic behaviour by the government. Two cases of State opportunism are considered. First, in order to accrue political benefits, governments grant concession contracts of projects that were not ready to be auctioned. This leads to flaws in the design of contracts that will have to be corrected later through renegotiations and is a case of dynamic inconsistent incentives, since the government incurs in long term costs to enjoy short-term political benefits. The second type of opportunistic behaviour is when governments renegotiate ongoing concessions that were signed by past administrations to contract additional and complementary works faster, avoiding lengthy public contracting regulations, accruing political capital in the short term and transferring the associated costs to future administrations and future users.

Both of these cases of opportunistic government behaviour differ from expropriation risk in that the private counterpart also benefits, as concessionaires receive additional contracts that they negotiate from a position of strength, allowing them to secure rents. Ultimately, it is future administrations and the users, not the concessionaires, who pay most of the costs of renegotiations. This mutual benefit from loopholes in contracts' design, the regulatory framework as well as the lack of transparency and check and balances in contract renegotiations could explain why many of those flaws have persisted over time. Therefore, when the lack of transparency and proper accountability are present, it is likely to observe collusion between the government and the concessioner to deceive public trust since the game is repeated over time.

This study uses unexploited data to test whether opportunistic behaviour is associated with the concession contract renegotiation in Chile, Colombia and Peru. To achieve this, the renegotiations of road concession in the three countries are first fully characterised in terms of their cost, frequency, nature, origin, recurrence and timing. It updates stylised facts previously identified in Chile (Engel *et al.*, 2009b) and extends the same approach to both Colombia and Peru. The empirical strategy determines the factors explaining the cost of renegotiation. This methodology allows analysing repeated renegotiation of a single concession project rather than the probability that a project is renegotiated or not. Simultaneously, this empirical analysis tests other factors that the literature has proposed as determinants of renegotiations, including hold up risk and the political cycle.

The remainder of this paper is organised as follows. Section II describes the features of the concession programmes in the three countries and their regulatory and institutional frameworks. Section III presents our data sample, some stylised facts and a full characterisation of the renegotiation activity experienced in each country. This sets the stage for the econometric analysis, which is studied in Section IV, along with our results. Section V concludes and provides policy recommendations.

II. CONCESSION PROGRAMMES

Chile, Colombia and Peru were chosen as sample countries for at least three reasons. The first is data availability.³ The second is that surveys of policymakers in the region had suggested that these three countries represented examples of low, high and medium incidence of public–private partnership renegotiation, respectively (Nieto-Parra *et al.*, 2013).⁴ Third, they have similar socio-economic and political conditions, cultural background and challenging geography for road construction, while the legal and institutional frameworks of concessions present significant differences. The remainder of this section provides an overview of the legal framework, institutional and contract design of concession programmes in the three countries, along with their evolution.

II.1. Chile

Legal framework

Chile's legal framework has conceived a well-defined and stable regulatory environment for its concession programme. In 1991, a specific legal framework for concessions was established through law 19.252. It was improved by law 19.460 of 1996, which addressed issues regarding private-proposed concession projects and the protection of creditors. Also, the General Concessions Coordinator (*Cordinación General de Concesiones*, CGC) was created within the Ministry of Public Works (*Ministerio de Obras Públicas*, MOP) as the main government agency in charge of concessions for road infrastructure. This entity centralised the entire project cycle, from project preparation to supervision and termination. The framework led to transparent and competitive tendering processes that used efficient criteria to select winners and a well-structured system to evaluate concessionaires' investments. In terms of renegotiations, it limited the amount of complementary works. The State could unilaterally add to the concession to 15% of the initial contract's value but such additions were not allowed during the second half of the concessions' term (Cepeda, 2009).⁵ Furthermore, any contractual change had to be approved by the Ministry of Finance, which entailed a more independent review of renegotiations.

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3. In the case of Colombia, we collected unexploited and key data that due to previous institutional weaknesses had been previously unfeasible to compile in a useful manner.
 4. However, even Chile presents a high level of renegotiations by international standards. While in Chile each contract has been renegotiated on average 3 times, the international average of renegotiations per contract is only 1.8 (Guasch, 2004).
 5. However, this legal framework allowed for some flexibility in the specific limits presented above. For some contracts, the limit of complementary works the State could add was set at 20% of the contract's

However, Chile's 1996 regulatory framework had some weaknesses. It allowed for unlimited addition of complementary works under direct negotiation and agreement by both parties. In addition, it established a general clause that allowed the concessioner to ask for compensations when adverse contingencies affected the economic equilibrium of the contract, allowing the transfer of commercial risk to the government. In addition, the existence of arbitration based on equity tended towards intermediate solutions to conflicts, which incentivised litigation because there was always some benefit to be obtained. Finally, the arbitration scheme had a conciliation phase that was sometimes used as a mechanism to formally ratify the renegotiation agreements made between the State and the concessionaires (Bitran and Villena, 2010).

Following the allegation of irregular contracts in 2003 within the Concession Unit (known as the MOP-GATE Affair), transparency on concession renegotiations has improved. In 2004, a Concession Board with independent directors was appointed to oversee each contract renegotiation. In 2006, the introduction of a new policy for all road and airport concessions based on present value of revenue reduced the need for contract renegotiations.⁶ In 2007, new administrative regulations established the obligation to auction any substantive construction work derived from a renegotiation of contracts. These administrative changes contributed to a broader regulatory improvement aimed to solve the aforementioned weaknesses; a new concession law sent to congress in 2007 and enacted in early 2010. It improved the risk assignment schemes of contracts and the supervision of the different stages of projects. Moreover, it established clear and more transparent rules for renegotiation that levelled the field between the concessionaires and other potential contractors of complementary works (Bitran and Villena, 2010). A crucial aspect of this effort was the creation, by law, of an expert council in charge of reviewing and evaluating the appropriateness of proposed renegotiations, increasing accountability. Additionally, the new law structured a more expedite arbitration system, featuring a permanent independent dispute resolution board, removed the perverse incentives discussed above.

Nevertheless, some challenges remain. There is no requirement to perform a value for money assessment of projects and concession projects are excluded from the National Public Sector Investment System. Thus, projects are not required to follow pre-feasibility investment studies of a traditional public investment project. Furthermore, the public accounting regulation considers concessions an off-balance sheet investment, even if is fully paid by deferred transfers from the government, giving policymakers a perverse incentive to execute projects through concessions in order to soften budgets (Bitran and Villena, 2010).

value. For other contracts, these types of additions were permitted up to two years before the end of the contract, in which cases the limit of total complementary works was decreased to 5% of the value of the contract.

6. Concession contracts based on present value of revenue with flexible term, allows for automatic adjustments in the contract's term when effective demand differ from the level expected prior to contracting.

Institutional design

There is an excessive concentration of responsibilities on the MOP. It is in charge of planning, designing, promoting and tendering projects as well as regulating and supervising their construction and operation. To carry out this role, the Ministry established the CGC in 1996. Since its creation, the CGC has evolved and now has a flexible structure adapted to the concession programmes' demands. Nevertheless, the technical capacity of the MOP to plan and structure projects is highly dependent on politics and the CGC remains relatively weak in overseeing and supervising the operation of concessions.

The Ministry of Finance participates in all stages of the concession programme, evaluating the fiscal risks and liabilities of projects. It also revises the tendering documents as well as the subscription of initial contracts and their modifications. However, some argue that the Ministry of Finance has only moderate resources to execute these responsibilities (Bitran and Villena, 2010). Also, there is no formal public information system related to the long-term fiscal costs generated by concessions.

Finally, Chile enjoys great judicial certainty. Arbitration tribunals fully protect concessionaires' rights to recover their investment and any alteration to those rights can be appealed through well-established mechanisms.

Types of concessions

Tendering processes have been well promoted and publicised, they are competitive and transparent and have enjoyed the participation of both national and international bidders. In terms of contract structure, the concession law gives the State flexibility both in the criteria to select winning bids and the modes of payment, which can include toll tariffs, minimum revenue guarantees, direct fiscal payments and others. Hence, the MOP has varied these conditions depending on the particular characteristics of each project. The concessions on the Ruta 5, a road that crosses the country from north to south, are an example of this. It was divided into eight difference concessions, but the entire route was taken into account in the economic design of the eight contracts, so that the concessionaires of high-demand stretches were required to pay retributions to the State that were used to compensate concessionaires of low-demand stretches (Cepeda, 2009).

From a general perspective, concession contracts in Chile can be divided into two broad groups; those with a fixed term and those with a variable term (Table 1). In both cases, concessionaires recover their investments mainly through tolls, for which regulation establishes an upper price limit.

Among fixed-term contracts, the main variable used to select winning bids depends on the self-sustainability of the projects. Projects with expected high demand were usually granted based on the lowest toll price required by the private party, but the tendering processes often considered other factors such as the proposed contract term.⁷ Projects with insufficient demand involved State contributions to the concessionaires, paid annually during 5 to 15 years. Most of

7. These factors were the contract term (taken into account in 3 projects) or State contributions (taken into account in 2 projects).

these projects were given out based on the smallest amount of State payments required by bids, sometimes also considering other factors, such as the proposed toll prices and the contract term. Payments were made only after the project was in operation, which assured that the State was paying for an asset that had already been built. In addition, there was one contract granted based on the shortest contract term proposed, considering the proposed toll tariffs (Cepeda, 2009).

In projects where the concessionaires received a considerable part of already built infrastructure, they were obliged to pay the State for it. Some of these contracts were granted based on the price bidders were willing to pay.⁸ However, the resulting liability for concessionaires made it harder for them to find financing. Consequently, in recent projects this was replaced by a payment of a different nature (Cepeda, 2009).

Recently, the CGC has been using variable term contracts, with a maximum of 30 years and without minimum traffic guarantees. In these contracts, it uses the Present Value of Revenue of bids as the single variable to determine winners. Namely, it selects the bid that requires the least total estimated revenue, discounted at a predefined rate, although other factors can be considered.⁹ In these contracts, the MOP supervises the concessionaires' yearly revenues and the contract expires when it has received the agreed revenue.

All contracts in Chile have attempted to assign risks to the party better suited to manage them, and their success in doing so has increased with improvements in the regulatory and institutional frameworks. The MOP is in general responsible to perform the environmental studies of projects, and usually acquires environmental permits before giving out contracts. Similarly, it is in charge of acquiring the land on which the road will be constructed. In that context, an expropriation law allows for expedite resolution of disagreements between the State and landowners. In general, concessions initiate construction only after a significant percentage of land has been acquired. Conversely, the private party assumes most of the engineering and construction risk. Finally, demand and financial risks are usually shared among both parties. Formerly, contracts included minimum revenue guarantees for the concessionaires that cover around 70% of the concessionaires' investment. The State provides instruments and guarantees to help concessionaires access financing. Long-term bonds with private credit enhancement have been structured to allow concessionaires to access the local capital markets as a source of financing. The State also pays concessionaires in such a way so they can use payment invoices certified by the Ministry of Finance to access bank financing.

8. In these cases, the proposed tariffs were also taken into consideration during the tendering process.

9. As suggested by Engel *et al.* (1997), the optimal contract can be implemented via a present-value-of-revenue auction when there is high demand. Others factors sometimes taken into account were State contributions (1 project), and both tariffs and concessionaires' payments to the State (4 projects).

Table 1. Main features of concession contracts in Chile

Type of concession	At the start of the contract	During the life of the contract
Fixed term contracts	<p>Contract award: Toll tariff, State contributions, Concessionaire retribution or term.</p> <p>Private: 100% initial investment.</p> <p>State: No initial contribution. Environmental permits. Land expropriation.</p>	<p>Private: Receives toll revenue. Supervision costs. Pay/receives transfers to/from State depending on demand.</p> <p>State: MRG payment after a certain point if necessary. Most construction over costs. Most complementary works.</p>
Variable term contracts	<p>Contract award: NPV: Least expected revenue for private.</p> <p>Private: 100% initial investment.</p> <p>State: No initial contribution. Environmental permits. Land expropriation.</p>	<p>Private: Receives toll revenue. Supervision costs. Contract term varied until expected revenue is achieved.</p> <p>State: MRG payment after a certain point if necessary. Most construction over costs. Most complementary works.</p>

Note: MRG stands for Minimum Revenue Guarantee.

Source: Authors based on Cepeda (2009) and Bitran and Villena (2010).

II.2. Colombia

Legal framework

Until 2011, the legal framework for concessions in Colombia was constituted indirectly by a disjoint set of laws and decrees that dealt either with contracting by the State in general or with a specific sector or industry. Law 80 of 1993, which regulates all government acquisitions, established the right to concession the provision of public services. Specifically to the transport sector, Law 105 of 1993 allowed national and sub-national governments to use and assign funds to concession contracts as a means to develop and provide services. In addition, Law 448 of 1998 established risk management policies in government contracting. Furthermore, considerable changes were later introduced in Law 1150 of 2007, which required all risks to be explicitly measured and assigned in concession contracts. In general, resolutions produced by the National Council for Economic and Social Policy (*Consejo Nacional de Política Económica y Social*, CONPES) frequently changed the entire framework (Benavides, 2010).

The lack of legislation specific to concession contracts resulted in an unclear, unstable and incomplete legal framework that established perverse incentives. For instance, Law 80 limited additional contracts or complementary works to 50% of the contract's value. However, due to vagueness about how to enforce this limit, most concessions had surpassed it by 2007. Furthermore, law 1150 of 2007 removed this ceiling, limiting only the increases in concession's term to 60% of their initial term. It also allowed works outside the initial contract specifications to be included as "progressive components" that could be added through renegotiation once demand justified the additional investment. Such direct negotiations, combined with the option

of enlarging works using the "Private Initiative Scheme" under the 2008 regulations issued by the Ministry of Transport (MOT), enabled a scenario whereby concessions could be expanded significantly without proper market competition. These regulatory changes and document CONPES No.3535 of 2008, stating several roads of national strategic importance, allowed for much bigger renegotiations. These additions were in many occasions bigger than the initial contract and were paid to a large extent with future fiscal funds. Finally, Law 80 compels the state to re-establish the balance of a project's economic equation, as defined in a project's contract, when unforeseen factors arise that alter it or which cannot be blamed upon the concessionaire.

The regulatory framework for PPPs has been enhanced recently. A new law dealing exclusively with PPPs was approved in December 2011, establishing clear limitations in both value and term of renegotiations and requiring value-for-money analysis to justify executing projects through a PPP instead of regular public procurement.

Institutional design

The National Institute for Concessions (*Instituto Nacional de Concesiones*, INCO) was created in 2003 to design, evaluate, auction, administrate and supervise concession projects in Colombia, replacing the National Road Institute (INVIAS) in these roles. The creation of INCO marked an improvement in the institutional muscle given that INVIAS was also in charge of public works. However, there is evidence INCO did not possess the human, technical and economic resources correctly perform all its tasks (Benavides, 2010; Rufián, 2002).

Furthermore, since INCO was the sole responsible agency for all purposes related to concession contracts, it posed serious conflicts of interests. Given that INCO reported to the MOT, it simultaneously acted as the institution responsible for supervising concessions and as the executive branch agency interested in their success. In addition, the lack of supervision faced by the institute left the door open for mismanagement of funds and even corruption. As a result, INCO had 14 different directors in eight years, several of which have been or are currently being investigated for serious irregularities during their tenure. It also subjected INCO to great instability in terms of leadership, staff and internal management and processes.

In line with improvements in the regulatory framework, Colombian authorities recently improved the institutional framework of PPPs. The National Infrastructure Agency (*Agencia Nacional de Infraestructura*, ANI) was created to replace the INCO, with greater administrative capacity and technical expertise in the design and monitoring of contracts. However, it is still too early to test whether these changes have been successful in reducing renegotiation of road concessions.¹⁰ The ANI is currently subordinated to the MOT, in contrast to OECD best practices.¹¹ Most PPP units in OECD countries answer to the Ministry of Finance, which helps ensure that value for money assessments are based on financial and economic criteria and are part of a broad government prioritisation process. Moreover, the appointment of the executives

10. See Steiner (2012) for an assessment of the recent changes in the regulatory and institutional frameworks for PPPs.

11. See Araujo and Sutherland (2010), OECD (2010), Egert *et al.*, (2009) and OECD (2008) for analyses of PPPs in OECD countries.

of the ANI is dependent on the political cycle. Finally, the National Planning Department does not have enough technical and human resources to evaluate the value-for-money analysis justifying the use of PPPs.

Other institutions are involved in Colombia's transport infrastructure development policy through PPPs. These include the national planning department (DNP) and the national council for economic and social planning (CONPES), which design the general policy for infrastructure development and helps co-ordinate the different sectors and formulate recommendations to improve the concession programme (Rufián, 2002). In addition, the Superior Council of Fiscal Policy (CONFIS), headed by the Ministry of Finance, approves and assigns any future fiscal funds to be used in concession contracts and public works. In general, the policy-making process (PMP) for transport infrastructure in Colombia has had key bottlenecks, in particular at the prioritisation and planning stage. The interaction of several actors without the technical capacity and expertise to plan transport infrastructure and the political cycle have hindered the effectiveness of public policies in this sector (Nieto-Parra *et al.*, 2013).

Types of concessions

Since their introduction, the design of concession contracts has changed greatly. They can be divided chronologically into four generations (Table 2). The first one included 11 projects awarded between 1994 and 1997. Under these contracts the private firm made all the initial investment and the government guaranteed minimum toll revenue thereafter. The second generation represented only two projects, and it presented an improvement in contract design with respect to the first generation. For instance, the concept of rate of return was introduced (and yearly minimum toll revenue guarantees were kept too). The third generation of contracts, a group of 10 concessions awarded from 2001 to 2007, were based on an expected rate-of-return assured to be achieved by varying the term of the concession.¹² The State made some contributions for the initial investment and more risks were transferred to the concessionaire (most notably, all construction risks). The fourth generation of contracts started in 2010, and under this framework it designed and auctioned the *Ruta del Sol* with the technical assistance of the International Finance Corporation (IFC). It leaves all initial investment and financing to the private firm, but involves large yearly future fiscal transfers on the part of the government, previously assigned by the CONFIS for that purpose. Also, a more active promotion of projects leads to the involvement of international bidders.

The concession contracts of the first generation had numerous flaws. Minimum revenue guarantees were calculated with traffic estimates from preliminary studies and were positively biased, leading to excessive guarantees.¹³ Auction processes were non-competitive and did not include international road-shows. As a result, seven of the auctions were ultimately declared deserted and contracts were negotiated bilaterally. There was no full definition and planning of the projects, including the exact routes, before signing the contracts. Environmental permits were not obtained and expropriation of land was not complete before contracts were awarded neither. In addition, there was a general negligence towards measuring and sharing risks. For instance,

12. These include a set of slightly different contracts dubbed the "third and a half" generation.

13. According to Engel *et al.* (2003), traffic was 40% lower than predicted.

the formula used to choose auction winners was easy to manipulate and the State supported most of the risks, including construction risks. Finally, there was no financial assessment of bidders and contracts lacked some important clauses like resolution mechanisms and rules for the payment of guarantees (Engel *et al.*, 2003; Benavides, 2010).

Table 2. Main features of concession contracts in Colombia

Type of concession	At the start of the contract	During the life of the contract
First generation 1994-1997	Contract award: Least value. Private: All initial investment. State: No initial contribution.	Private: Receives toll revenue. Construction over costs >50%. State: MRG payment if necessary. Construction over costs <50%. ^a 100% complementary works.
Second generation 1997-1999	Contract award: Least of LG+MRG+ER-additional work. ^b Private: All initial investment. State: Contributions to assure liquidity.	Private: Receives toll revenue. Construction over costs >50%. State: MRG payment. Construction over costs <50%. 100% complementary works.
Third and third-and-a-half generations 2001-2004 and 2004/2007	Contract award: Least expected revenue. ^c Private: Most of initial investment. State: Small initial contributions.	Private: Receives toll revenue. Most over costs. State: Small fiscal transfers. 100% complementary works. Term varied to reach expected income.
"Fourth" generation 2010	Contract award: least NPV(TR+FST). ^d Private: Most of initial investment. State: Contributions.	Private: Receives toll revenue. Most over costs. State: Large fiscal transfers. 100% complementary works.

Notes: a. The State was responsible for all over-costs up to 30% of the initial cost, then for 75% of the over-costs from 30 to 50% of the initial cost, and for nothing of over-costs greater than 50% of the initial cost.

b. LG, MRG and ER stand for Liquidity Guarantee, Minimum Revenue Guarantee and Expected Revenue.

c. In the third-and-a-half generation, there was also a preference for concessionaires made up of numerous companies, arguing the need "to democratise this sector". However, in complex infrastructure projects it can be preferable to have a unique specialised concessionaire with significant financial resources and experience rather than a group of small companies bundled together (Benavides, 2010).

d. TR and FST stand for Toll Revenue and Future State Transfers.

Source: Authors based on Benavides (2010) and information provided by INCO.

Despite the changes made in subsequent generations, concession contracts continued to have many weaknesses. The second generation of concessions introduced a simpler formula to choose the winning bids, but its manipulation was straightforward and led to predatory offers. For instance, one of the two concessions was cancelled shortly after the auction process as it became evident that the winning firm would be unable to abide its obligations under the bid's terms. In the case of the third generation, the winning bid was chosen solely on the least rate-of-return and demand risk was handled by varying the term of the contract. Although this

methodology is proposed by various experts (Engel *et al.*, 2003), the use of an appropriate discount rate is crucial for it to be successful. In Colombia, future flows were not discounted appropriately (Benavides, 2010). Finally, in the current generation of concessions, environmental and social assessments, including consultation processes with indigenous groups, are not performed rigorously and efficiently. In particular, these assessments are not established before granting contracts. In that context, the acquisition of environmental and land expropriation permits after signing contracts can cause long delays and cost overruns for road concessions.

II.3. Peru

Legal framework

Peru has developed a specific legislation to regulate concessions of public services and established incentives to attract both local and international private investors. The legislative decrees 662 and 757 of 1991 set up the framework for free and protected private investment in all sectors of the economy. In 1996, concession contracts were established as means to involve private investors in infrastructure and public service provision projects, while their entire legal and regulatory framework was consolidated under a unified text (TUO - *Texto Unico Ordenado* -). In 2008, without undermining concession contracts, another law established public-private partnerships as an alternative, more flexible contract structure to involve the private sector in the development of public infrastructure.

The legal framework for concessions in Peru is relatively clear and comprehensive. It regulates private initiatives for investment and the participation of public entities, such as ministries and sub-national authorities in the ex-ante evaluation, design and approval of projects. Also, it establishes principles for the distribution of risks according to the capacity of each actor to mitigate them and limits government compensations to the concessionaires based on the contracts' financial equilibrium. Finally, the law for PPPs introduced in 2008 reduced the red tape, improving the project cycle of concessions (Bitrán and Villaena, 2011; Rufián, 2002).

Institutional design

The Ministry of Transport and Communications (MTC) is the public counterparty of concessionaires. It participates in the prioritisation and designing of projects and is also in charge of the technical regulation of the transport sector. The agency for the promotion of investment (*Proinversión*) promotes projects among national and international investors, as well as designs, executes and manages their auctioning.¹⁴ Finally, the supervisory institution of investments on public transport infrastructure (*Organismo Supervisor de la Inversión en Infraestructura de Transporte de Uso Público*, OSITRAN) supervises and regulates contracts and adjusts tariffs (Flor and Rojas, 2007).

Created in January 1998, OSITRAN was intentionally conceived as both supervisor and regulator so that relevant information collected in its supervisory role would help it to perform better in its regulatory functions. The supervisor role includes the construction and operation phases of the contract. OSITRAN is in charge of assuring that all contracts are respected,

14. Regional councils perform this task for sub-national projects.

impartially taking into account the interests of the State, of investors and of the users. It also has a key role in regulating and auditing concession projects, solving disputes between parties and informing users of the progress and state of concessions. Furthermore, any modification to the contractual terms has to be previously presented to OSITRAN, which produces a technical report analysing the possible effects of such changes and makes recommendations to the MTC.

Although this represents a fairly complete institutional framework, the distribution of responsibilities among the different agencies can produce co-ordination failures. Inefficiencies can occur since the sector agencies responsible for providing the service are not involved in managing the concession through their life cycle. The lack of a life-cycle approach to contract management produces ambiguities on how to allocate responsibilities in case of irregularities or failures. In addition, OSITRAN's oversight role is undermined by its involvement in the contracts' management during construction and operation. *Proinversión*, which is responsible for transactions and project promotions, faces co-ordination challenges with the sector and OSITRAN. The division of responsibilities between the granting agency and *Proinversión* in project preparation is also subject to some debate (EIU, 2013).

Further challenges remain. All concession projects in Peru should be registered in the National Public Investment System (SNIP - *Sistema Nacional de Inversión Pública* -). The main purpose of this system is to increase the efficiency of the public investment and the evaluation of its benefits to the public interest (Carranza *et al.*, 2011). This includes a value-for-money analysis, in which all delivery options are considered before a decision can be made regarding whether a PPP is the best contracting option. This methodology forces a detailed structuring of Public Sector Comparator (PSC) for each project and a risk adjustment to PSC. It is a broader and more complex process than the risk assessments obtained from Cost Benefit Analysis.¹⁵ The institutional framework of value-for-money analysis in Peru is weak and politics can affect its application. Furthermore, although Law 28563 of 2008 allows the government to commit fiscal resources for concession projects up to a percentage of GDP, the figure can be modified every three years as proposed by the Ministry of Economy and Finance. In 2008, the limit was set at 5% of GDP for firm and contingent liabilities derived from PPP projects. In 2011, the limit was increased to 7% of GDP, which has led to a significant increase in PPP arrears. This accounting of PPP investment has the potential to distort the selection of contracting methods (EIU, 2010). Similarly to case of Chile and Colombia, Peru's accounting of PPPs in the fiscal budget is not consistent with accounting standards for the public sector.¹⁶

15. The value for money methodology proposes to add a cost to the PSC with variability risk included, and this is disregarding the possibilities of pooling and spreading risks in the public sector (see Arrow and Lind, 1970).

16. IPSAS (International Public Sector Accounting Standard) 32 concerns the *Service Concession Arrangements: Grantor* and was issued in October 2011. It establishes that if the government: *i*) controls or regulates what services the operator must provide with the asset and at what price; and *ii*) it controls any significant residual interest in the asset at the end of the term of the contract, investments should be considered in the balance sheet in a similar approach than a traditional public investments.

Types of concessions

The first contract, signed to rehabilitate the road between the port of Matarani and Arequipa (Peru's second biggest city), had an initial term of only 6 years. The contract was renegotiated six times, all of them involving an increase in the concession term and all made close to the end of the previous concession deadline. It ended in October 2007 after more than 13 years of concession.

All other concessions have been signed after 2003 and can be divided into four types defined by the Peruvian legislation. The first two types are used for roads with high demand. The only difference between these two types is whether the concessionaire pays retributions to the State, which is determined based on the expected traffic. The third type of contract is "co-financed" and is used for roads with low demand. The fourth is a "mixed" contract, with more features characteristics than the other types (see Table 3 for a description of high and low demand concessions).

In the case of the five high-demand projects, typically along roads that stem from Lima, the concessionaire's only source of revenue is road tolls. The State guarantees yearly minimum toll revenue but makes no other payments.¹⁷ Depending on the traffic expected over the duration of the concession, these contracts might also include concession fees paid by the concessionaire to the government and in some cases a share of the project's yearly toll revenue. This revenue is kept in a national road fund used to co-finance the low-demand projects.

The "co-financed" structure has been used for 12 projects with less traffic, typically roads that cross the Andes mountain range to link the coast with less wealthy regions in the Amazon and the Sierra. Under these contracts, the State pays a yearly amount to the firm, which typically consists of two types of payment. First, a payment for advancement on works (PAO - *Pago Anual por Obras* - or PPO - *Pago por Obras* -), paid either once or through the first years of the contract. Second, a payment for maintenance and operation (PAMO - *Pago Anual por Mantenimiento y Operaciones* -) paid from a certain point in the concession until its end. In addition, a system was introduced in 2006 under which OSITRAN issues a certificate that a certain percentage of total works has been completed, used by the State to issue a debt that the concessionaire can then sell to produce extra liquidity.

The entire initial investment and the supervision costs incurred by the regulator during the duration of the contract are the responsibility of the concessionaire in all the contracts described above. Regarding additional works, contracts allowed for new works to be given directly to the concessionaire if both parts agreed on their specifications and price, baring approval by OSITRAN. Otherwise, complementary or additional works had to be contracted through a new auction process in which the concessionaire could participate. An accurate ceiling was placed on these additions, often at 10% of the initial approved budget.

17. In contrast to the case of Colombia, up to now no concessionaire has had revenues below the minimum guaranteed by the State, and consequently the State has made no payments in this respect.

Table 3. Main features of concession contracts in Peru

Type of concession	At the start of the contract	During the life of the contract
"Self-sustainable" High demand projects	Contract award: Highest retribution to the State or most continuous km of double lane road over minimum. ^a Private: 100% initial investment. State: No initial contribution.	Private: Receives toll revenue. Supervision cost. May pay retributions to State. ^b State: MRG payment if necessary. Most construction over costs. Most complementary works.
"Co-financed" Low demand projects	Contract award: Lowest yearly payment by the State. Private: 100% initial investment. State: No initial contribution.	Private: Supervision cost. State: Yearly payment for construction. Yearly payment for maintenance and operation. Receives toll revenue. Most construction over costs. Most complementary works.

Notes: MRG stands for Minimum Revenue Guarantee.

- For *Red Vial 5* and *Red Vial 6*, the winning bid was chosen with the highest retribution to the State while in the *Red Vial 4* and *Autopista del Sol* the winning bid was chosen by the biggest amount of continuous double-lane road over the minimum established by the State.
- These normally include a small percentage of the initial investment budget as fee and can also include a certain percentage of toll revenue.

Source: Authors based on information provided by OSITRAN and MTC.

Peru has experienced modest renegotiation of concession contracts compared to other Latin American countries, partly due to its well-conceived concession, regulatory and institutional designs. This is also related to the particular way in which concession contracts are managed and renegotiations introduced. More precisely, changes in the expected investment required to perform all the construction work during: *i*) the contract award stage; *ii*) the establishment of the State co-financing; and *iii*) the approval of the final engineering study, are not included as a formal change to the initial contract. Any increase in total required investment during these stages is therefore not associated with a renegotiation even though they are not covered by the State contributions established in the initial contract and will have to be paid by the government later on. In addition, such investment increases and most of extra costs from additional works requested to the concessionaire throughout the construction phase are only reviewed, accounted formally as a contract change and paid through fiscal transfers *at the end* of the construction period. At that point, if additional works have been requested, the construction phase is often extended and extra fiscal funds are allocated. Because many concessions are still in the construction phase, these extra fiscal costs are not yet known. Finally, term increases are usually given only towards the end of the concession, if concessionaires have yet to receive a fair return for their investment.

III. DATA, STYLISTED FACTS AND CHARACTERISTICS OF RENEGOTIATIONS

III.1. Construction of the database

We analyse 61 contracts signed in Chile, Colombia and Peru from 1993 to 2010. We construct a dataset that details the characteristics of renegotiation such as the date and cause of renegotiation, whether it was done by mutual agreement or arbitration, whether the State or the concessionaire had the initiative, the cost accrued to the State and the payment mode (see Annex for the main characteristics of each concession contract).

Most of the data come from transport authorities. In the case of Chile, we use data provided by the MOP. In the case of Colombia, most of data are from INCO. For Peru, most documents come from OSITRAN and additional data come from the MTC. More than 700 official documents were analysed in total, including contracts, renegotiation contracts, official reports, yearly evaluations, agreements, arbitration sentences and other official files.¹⁸

The construction of this dataset constitutes in itself one of the main contributions of this work. While similar data are previously available for Chile for a shorter period, this is unprecedented in both Colombia and Peru. In the case of Colombia, although it was widely known that renegotiations were common and costly, institutional weaknesses had caused records on renegotiation to be unreliable, disorganised and disjoint. The continued updating of this dataset until concessions' maturity will provide a full-fledged panel that will allow for a comprehensive evaluation of their successes and shortcomings.

III.2. Stylised facts

Our sample accounts for 98% of road concession contracts awarded during the period 1993-2010. These concessions had an initial value of nearly USD 14 billion¹⁹, cover more than twelve thousand kilometres and have an average initial term of 21 years. The first contract was

18. It should be highlighted that we encountered numerous difficulties with data collection in Colombia. Bookkeeping procedures, rigorousness and accounting standards changed considerably over the studied years, first as projects were transferred from INVIAS to INCO and then as a consequence of numerous changes in the management of transport authorities. For the same reason, this data was formerly unavailable until recently. However, as part of INCO's transformation into the ANI, there have been large efforts of data recollection, organisation and standardisation, which have enabled us to build our database.

19. All figures in the study are presented in constant USD of December 2009.

signed in Chile in September 1993 and the last contract studied was signed in Peru in September 2010. The three countries analysed make for a diverse sample given the heterogeneity in concession and regulatory designs as well as the frequency and size of renegotiations (Table 4). These countries differed in the initial set up of concession programmes and have all evolved differently to their respective experiences.

Chile

Our sample includes all 21 interurban road concession contracts that have been signed in Chile from 1993 to December 2004. These concessions have an average term of 24 years and have been in place an average of 12 years. Their initial value adds up to almost USD 5 billion and they cover a total of 2 400 kilometres of road. In total, 60 contract changes have been made on 18 of the 21 projects, representing a total estimated value of USD 1.2 billion, including around USD 0.9 billion in fiscal costs and 17 years of additional concession term. Total additional compensation to the concessioners amounts to around 25% of the initial cost.²⁰ On average, each concession contract has been changed around 0.2 times per year.

Colombia

Our sample is constituted by 25 of the 27 concession contracts that have been signed to build, improve or maintain roads in Colombia from 1994 to December 2010.²¹ These concessions have an average contract term of 16 years and have been in place for an average of 9 years, the most recent being signed in August 2010. These contracts' initial value sum to a total of USD 6.5 billion and they cover 4 800 km of road. By excluding the four most recent projects signed in 2010, all concessions have seen their contracts renegotiated at least once. In total, there have been 430 contract changes representing fiscal costs worth USD 5.6 billion and 131 years of additional concession term. These have also added around 1 000 km of road to concessions contracts. On average, each concession contract has been changed around twice a year.

Peru

Our sample includes all 15 national road concession contracts that have been signed in Peru from 1994 to December 2010. These have an average contract term of 22 years and have been in place for an average of 4.6 years, the most recent signed in 2010. These contracts' initial value sum to a total of USD 2.3 billion and they cover around 5 500 km of roads. Eleven of the fifteen concessions have been renegotiated at least once, for a total of 53 changes. These changes have had a fiscal costs worth over USD 300 million and added 9 years of extra concession term. On average, each concession contract has been changed nearly once per year.

20. In interurban roads constructed as public works by private companies, with lump sum construction contracts, the average cost overrun is around 15%, lower than in concession contracts in the same sector.

21. Of the other two, one was cancelled due to contract breach and the other has already ended and no information is available.

Table 4. Sample's summary statistics per 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	430	53
Mean number of renegotiations per concession^a	3.3	20.5	4.8
Mean time of first renegotiation^a Years	2.7	1.0	1.4
Mean fiscal cost of renegotiations^a Constant USD Dec 2009, million	47.2	266.8	28.9
Mean fiscal costs/Initial value^a Percentage	17.4	282.8	13.4
Mean added term^a Years	0.9	6.3	0.8
Mean added length^a Km	0	54.6	0
Number of renegotiations/Concession years elapsed	0.2	1.9	0.9

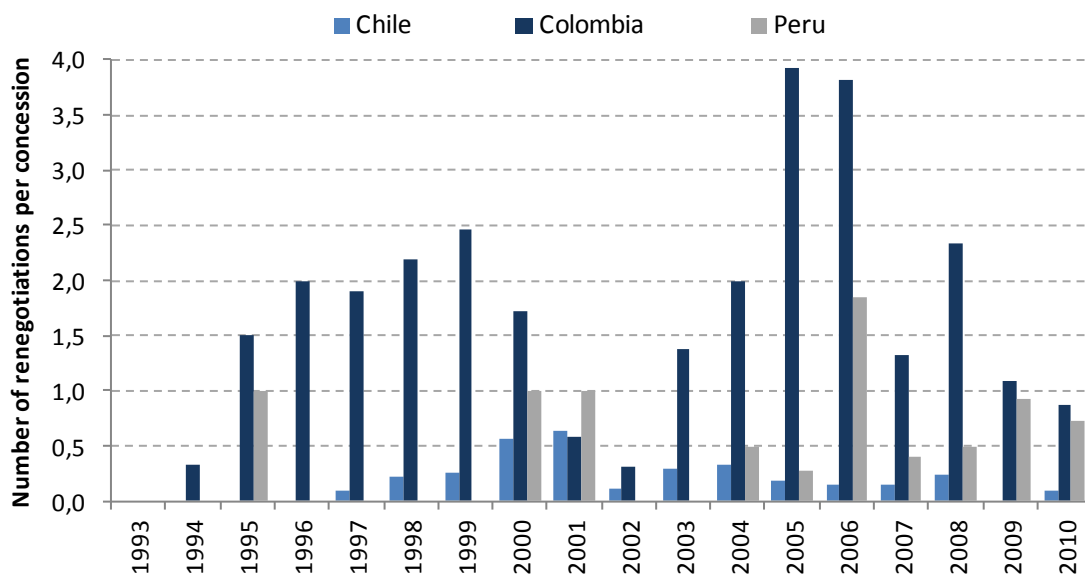
Notes: Million USD values are at constant December 2009 prices.

a. Among concessions that have been renegotiated at least once.

Source: Authors' calculations based on MOP (Chile), INCO (Colombia) and OSITRAN (Peru).

In total, 49 out of the 60 concession contracts were modified at least once, and there were a total of 543 changes over the 17 year period. Of these, 430 took place in Colombia, 60 in Chile and 53 in Peru. Moreover, Chile has been able to reduce renegotiations to around 0.1 per concession in 2010, after a peak of around 0.6 in 2001 (Figure 1). In the case of Peru, more concession contracts have led to more total renegotiation, but per concession levels have been kept to below 1, except for 2006. Renegotiations in Colombia have followed a cyclical pattern with peaks in 1998 and 2005 and overall levels are high. In addition, although the number of renegotiations per concessions has been brought down recently in Colombia, the value of each renegotiation has increased considerably (see Figure 5 below).

Figure 1. Number of renegotiations per concession by year in each country



Source: Authors' calculations based on MOP (Chile), INCO (Colombia) and OSITRAN (Peru).

III.3. The characteristics of renegotiations

Key questions about renegotiations are answered. How were renegotiations made? When did they occur? What were they made for? When were they paid? What types of costs did they entail? We follow the example of previous work on renegotiation in Chile to do this analysis (Engel *et al.*, 2009b). In addition, we also look at the types of costs of these renegotiations. Table 5 summarises our findings.

How were renegotiations made?

Most renegotiations took place through a bilateral agreement. All of Peru's contract changes and 98% of Colombia's came about in this manner, while in Chile 17% of contract changes had to go to arbitration. Governments tend to pay a larger fraction of renegotiation cost when they have to go to arbitration, while more of the cost is left to future administrations when a bilateral agreement is struck (Engel *et al.*, 2009b).

Around half of the renegotiations were an initiative of the State and a further third of were a joint initiative of both parties. The fact that the State is often the originator of renegotiations means that political opportunistic behaviour by the government could potentially be a key factor in explaining their frequency. In contrast, hold up risk, which entails private initiative, can only account for up to a fifth of total renegotiations.

Table 5. Characteristics of contract changes, 1993-2010

		Chile	Colombia	Peru
Total		60	403	44
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^a	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^b	Fiscal transfer	66%	48%	20%
	Increase concession term	12%	12%	14%
	Higher toll tariffs	24%	1%	0%
	Other types of payment	16%	0%	0%
	Without direct cost	15%	45%	77%

Notes: a. For Chile, these do not add up to 100% as most renegotiations paid with present fiscal transfers also included either deferred fiscal transfers or other forms of payment of indeterminate future cost.

b. Do not add up to 100%. Many renegotiations entailed more than one of these costs.

Source: Authors' calculations based on MOP (Chile), INCO (Colombia) and OSITRAN (Peru).

When did they occur?

Renegotiations should increase as concession time elapses, since the environment changes as times passes. Nevertheless, close to a half of renegotiations were done early in the concession. In Chile and Colombia, renegotiations during construction, which usually takes no more than 4 years, were slightly higher than 50%, while more than 60% in Peru. Furthermore, in the case of Colombia, the first change in the contract was on average less than a year after contracts were signed. The first changes in Peru and Chile occurred on average 1.4 years and 2.7 years after contracts were signed, respectively.

The early start of contract renegotiation could be the consequence of two shortcomings. First, governments could have the incentive to provide additional infrastructure services to surrounding communities with the goal of obtaining political benefits, taking advantage of having a concessionaire with machinery working at the site that could deliver the work quickly. Second, the very early start of renegotiation after contract signing can evidence that contracts were not thoroughly designed. This measure can be a proxy of how well-conceived concessions were.

What were they made for?

Renegotiations are divided between those that involve additional or complementary works and those that aim to change certain conditions in the contracts. Examples of the former are the construction of additional pedestrian bridges, road lanes and cycling routes that were not included in the initial contract. These can also be additional repair works following natural disasters when such risks had not been accounted initially. Renegotiations to change contract conditions can involve the introduction of work advance certificates that allow concessionaires to create liquidity from their advances in construction or changes in the position of toll cabins. Many changes of contract conditions also entail future costs, often difficult to quantify, to current and future administrations, users or the general public.

In addition, some renegotiations added stretches of road that were not included in the initial contract. For instance, in the case of Colombia, although only 5% of renegotiations correspond to this type of renegotiation, these account for a third of the total cost from renegotiations. This kind of renegotiation suggests that concession projects have been used to achieve objectives for which they were neither intended nor designed.²²

When were they paid?

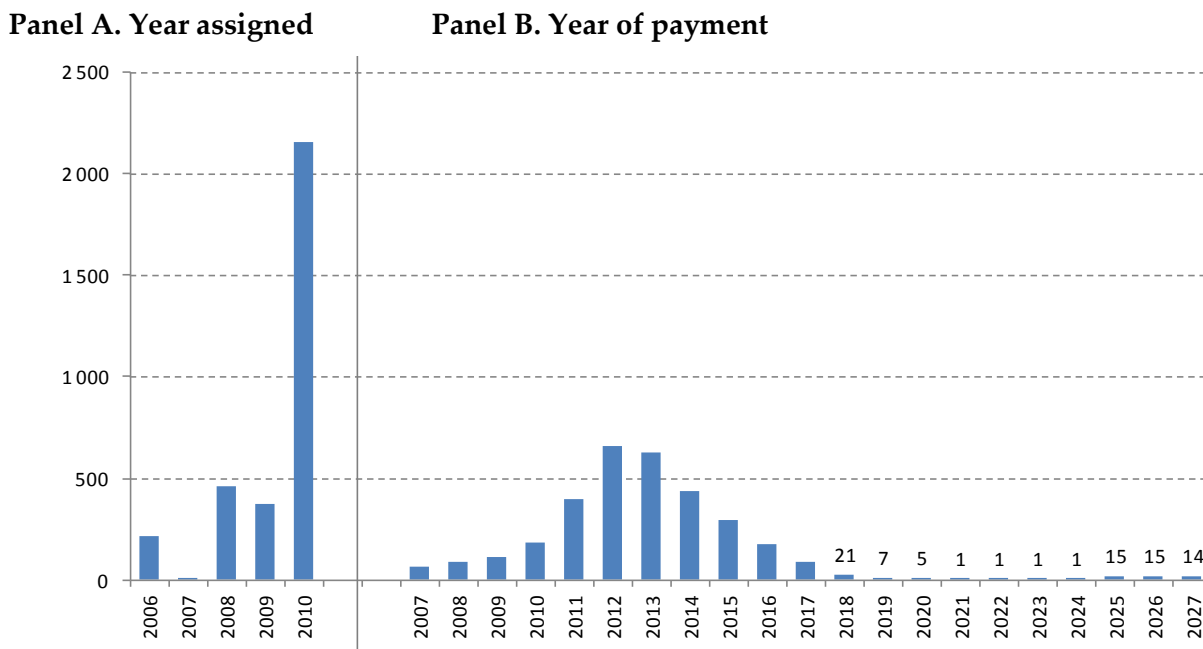
A large fraction of the cost of renegotiations is paid in fiscal years different from that in which the renegotiation was made. Only 14% of renegotiations in Peru are paid with current fiscal funds. In Chile, although 66% of renegotiations included present fiscal transfers, these transfers usually only represented a fraction of the total estimated cost of those renegotiations. Close to 90% of renegotiations in Chile were paid at least partly in the future by assigning future fiscal funds, such as increasing toll tariffs, extending the contract's term or transferring exchange risk to the State. Furthermore, around one third of renegotiations were paid exclusively in the future.

In the case of Colombia, although 88% of the renegotiations were paid with current fiscal transfers, their value only accounts for 40% of total fiscal costs. Although only 6% of all contract modifications assigned future funds to pay for them, the value of these renegotiations accounts for up to 60% of all fiscal transfers. These deferred transfers go as far as 2027 (Figure 2). The use of future funds to pay for concession contracts in Colombia started with the third generation of contracts, when some of the small initial State contributions were paid under this mechanism. Between 2008 and 2010 their use to pay renegotiations became commonplace, allowing for costlier renegotiations. In 2010, the average renegotiation had a fiscal cost equivalent to 65% of the average initial value of the contracts being renegotiated.

22. In fact, in the case of Colombia, the share of total renegotiation cost accounted by added stretches of road may be higher than a third. When construction or maintenance works are commissioned to a new stretch of road, the value of that contract modification is usually the initial estimated cost of those works. Later, additional and complementary works on that same stretch of road might be included as part of another renegotiation. This second renegotiation is included as a complementary work on the road in the contract. It does not appear as part of the cost for new stretches of road, even though such cost would have never been incurred if that stretch had not been added in the first place.

Figure 2. Future fiscal transfers to be paid in Colombia due to renegotiations

Constant million USD of December 2009



Source: Authors' calculations based on INCO.

In the case of these three countries, much of the renegotiation cost to be paid in the future through means different from fiscal transfers is particularly difficult to quantify. For instance, when renegotiations are paid in terms of extra concession term or tariff increases, calculations to evaluate those costs require several assumptions. In some cases in Chile, the government paid renegotiations by assuming part of the foreign exchange risks to which concessionaires were exposed to or by guaranteeing an increase in toll revenue from higher traffic levels following complementary works.

What types of costs did they entail?

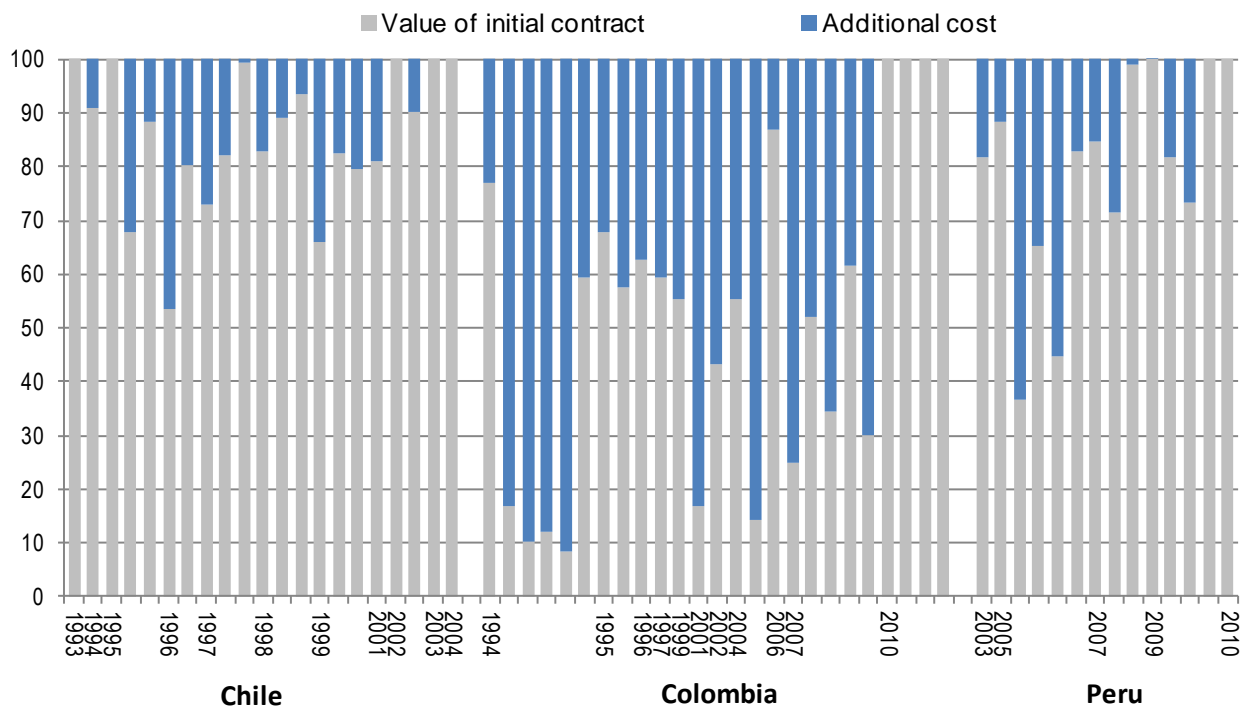
The types of cost of renegotiation differ significantly across the three countries. In Chile, two thirds of renegotiations resulted in a government payment to the concessionaire. However, other types of payments were used too, such as the increase in toll prices, the allocation of revenue guarantees or new risks covered by the government. While in Colombia roughly half of renegotiations saw the government make a fiscal transfer, only a fifth of them did it in Peru.²³ Finally in the three countries between 10% and 15% of renegotiations increased the concession term.

Costs due to contract changes represent roughly 55% of the total value of concession projects. However, there are large differences across the three countries (Figure 3). In Chile, costs

23. In addition, several renegotiations in Colombia and Peru could either not be predicted or known at the time of renegotiation or did not involve any cost.

due to renegotiation represent on average less than 20% of the total costs of projects. In only three projects the renegotiation cost exceeded 30% of the total cost and five projects did not see any additional cost. This contrasts with the case of Colombia where all projects signed before 2010 have experienced significant renegotiation costs, in most cases representing more than 40% of total costs. In six projects, renegotiation accounts for over 80% of total costs, meaning that contract changes have increased the initial value of the contracts by five.²⁴ In Peru, additional costs are roughly 20% of the total value of the projects, but in two projects that fraction is more than a half.²⁵

Figure 3. Additional cost versus initial value of the contract (%)



Note: The x-axis indicates the year in which the concession contract was initially signed. Years are mentioned only for the first concession signed.

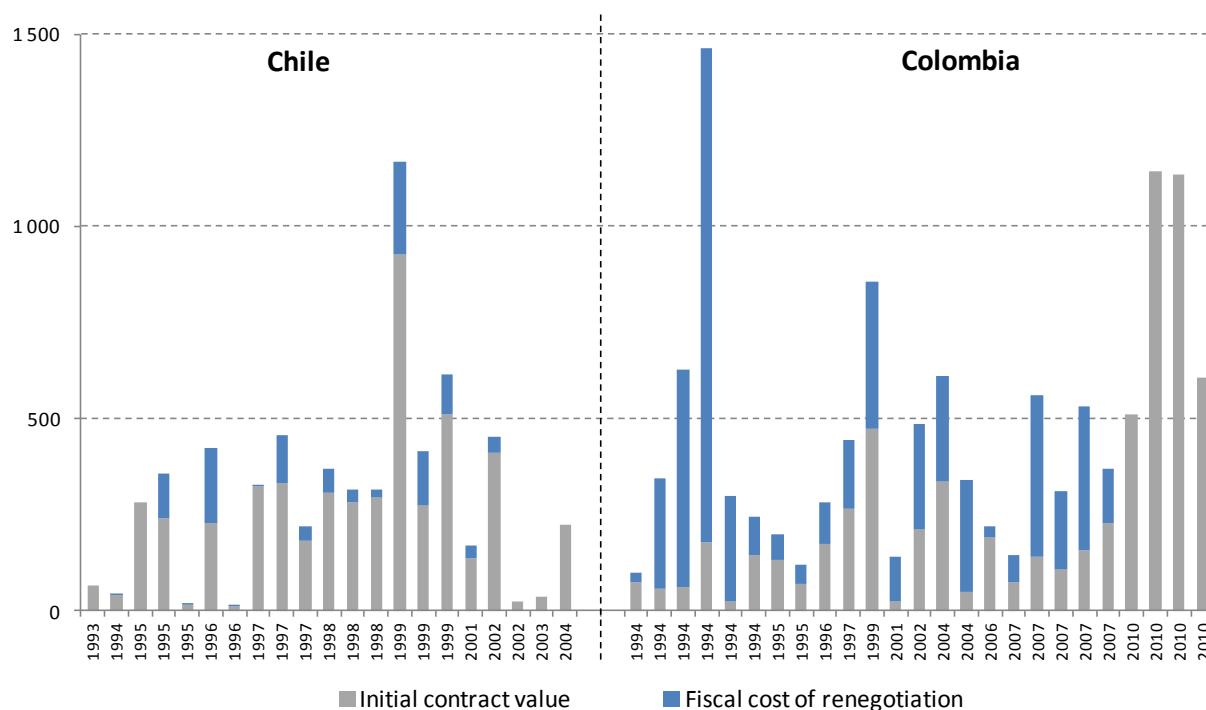
Source: Authors' calculations based on MOP (Chile), INCO (Colombia) and OSITRAN (Peru).

24. It should be noted that, given the framework used by INCO to track renegotiations, these costs only include direct fiscal transfers. The overall costs of renegotiations in Colombia are therefore likely to be higher, as they should include other costs such as large increase in concession terms and large delays in construction deadlines.
25. Given the particular approach to manage contracts, the costs of changes made to projects are not evident. Therefore, to calculate additional costs we calculate the difference between the investment required for the concessionaire to perform all works estimated in the initial contract and the total investment that concessionaires are currently responsible for. These differences are not necessarily due to changes made to the initial contract, such as additional or complementary works. Nevertheless, because the initial estimated investment was used as reference to calculate the contributions of the State in the initial contract, any extra investment with respect to this figure will have to be paid mostly by the State at some point (or the public in the form of extra concession term or higher tariffs).

We analyse below more closely both the direct fiscal costs and the increase in concession terms that have resulted from renegotiations. We study only Chile and Colombia given that costs in Peru due to changes in contract during construction are only accounted at the end of the construction stage (which in many projects has yet to take place) and term extensions are normally given towards the end of the contract. Direct fiscal costs were particularly high in Colombia. Although many contract changes in Chile required the State to make fiscal payments, in most concessions extra fiscal costs represented less than 10% of contracts' initial value. The size of those payments remained 40% below of the initial value of the contracts. Almost not small concession had extra fiscal costs, which suggests that extra costs due to renegotiations may be the result of some projects' scale and difficulty. In the case of Colombia, total fiscal transfers due to renegotiations add to USD 5.5 billion, which is more than the initial value of all contracts signed prior to 2010 (Figure 4). Most of these costs have taken place in recent years, with renegotiations in early 2010 costing USD 2 billion (Figure 5).²⁶

Figure 4. Fiscal costs of renegotiations in Chile and Colombia

Constant million USD of December 2009



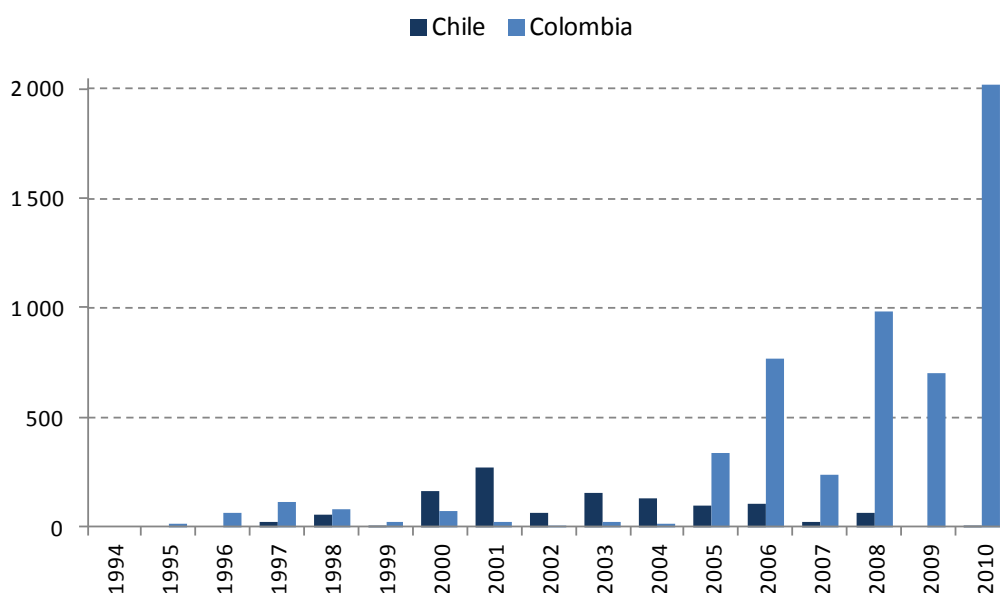
Note: The x-axis indicates the year in which the concession contract was initially signed.

Source: Authors' calculations based on MOP (Chile) and INCO (Colombia).

26. Over the entire sample, 13 renegotiations in Colombia had a cost higher than the value of the initial contract, all taking place in Colombia. 10 of these 13 contract changes took place between 2008 and 2010.

Figure 5. Total fiscal costs of renegotiations, by year

Constant million USD of December 2009

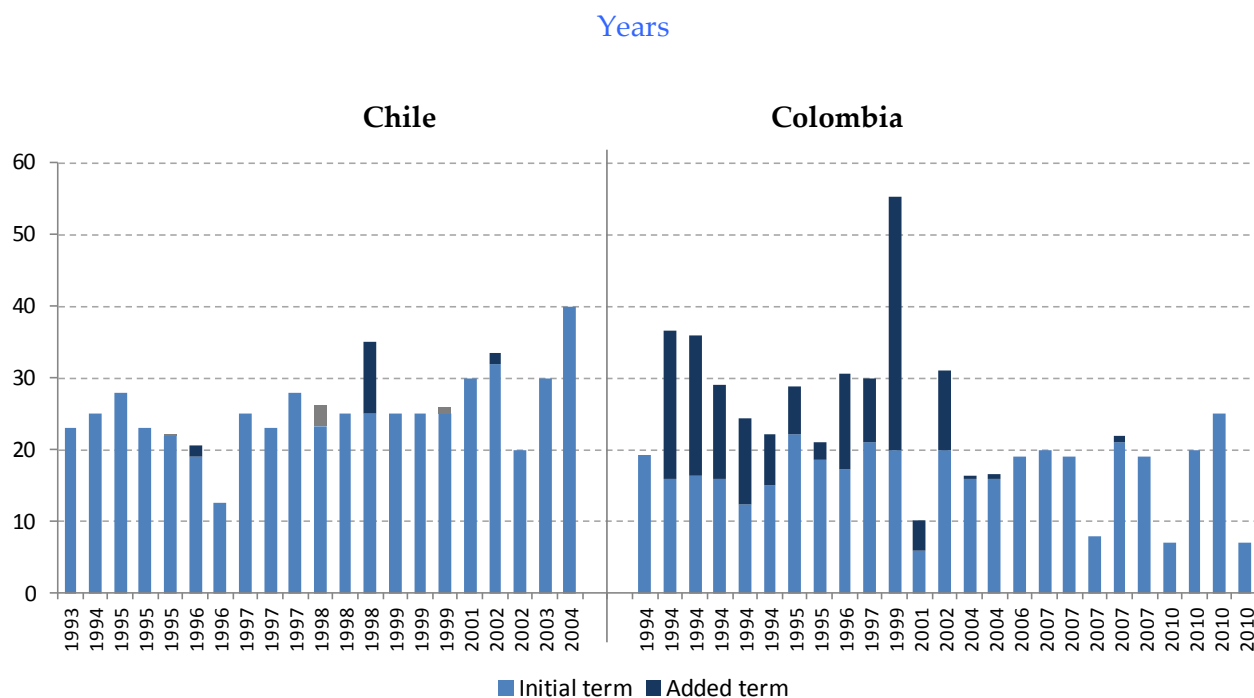


Source: Authors' calculations based on MOP (Chile) and INCO (Colombia).

Most of the increased concession terms occurred in Colombia at the nineties. In Chile, 6 concessions (out of 21 concessions studied) have been lengthened, three of them by a specific amount of years and the others by a variable amount.²⁷ In Colombia, 15 contracts (out of 25 concessions studied) have been lengthened, extending their initial term by an average of 70%. One concession (*Malla Vial del Valle y Valle del Cauca*) was extended by 35 years. Nevertheless, the more recent concessions have avoided significant increases in term (Figure 6). These more recent concessions are of variable term, as opposed to the 'fixed' term contracts used for the first two generations of concessions. In Peru, one concession has seen an increase in its term, from an initial term of 6 years to more than 13 years.

27. In these three last cases, based on the estimated value of the additional works included and the extra term needed for the concessionaires to recuperate such investment, it can be calculated that two of them will be at least 5 years while the other around 1 year.

Figure 6. Increases in concession terms in Chile and Colombia



Notes: The x-axis indicates the year in which the concession contract was initially signed. The exact added term of 3 concessions in Chile is dependent on future toll revenue and is thus not yet known. These variable term additions are shown in grey.

Source: Authors' calculations based on MOP (Chile) and INCO (Colombia).

Finally, in addition to the costs described above, a change in the terms of contracts initially awarded by a competitive auction has the negative consequences mentioned in the literature reviewed earlier. These include the perverse incentives that lead to adverse selection in future auctions. For instance, the failure of the *El Vino-Tobiagrande-Puerto Salgar* concession in Colombia is the direct result of a predatory bid winning in the tendering process. The concession was ultimately cancelled due to breach of contract by the winning firm and entailed costs to the government and to the public.

IV. EMPIRICAL ANALYSIS AND RESULTS

The objective of the empirical analysis is to test whether there is evidence that State opportunistic behaviour resulting from dynamic inconsistent incentives is associated with the renegotiation of road concessions in the three countries analysed. To do this, we test these two hypotheses:

Hypothesis 1: State-led renegotiations that add new stretches of roads and State-led renegotiations that include additional complementary works during governments' last year in office are costlier than other renegotiations, measured as a percentage of the contract's initial value.

Hypothesis 2: Governments defer a larger share of renegotiation's fiscal costs in State-led renegotiations that take place during their last year in office.

Hypothesis 1 identifies renegotiations in two situations in which there is a high probability that the government is behaving opportunistically. The first is when governments append additional works or stretches of road to concession contracts to build or rehabilitate extra stretches of road while avoiding standard public contracting processes and reducing its impact on its budget due to concessions' particular treatment in fiscal accounting. The second situation is when the State adds complementary works towards the end of its term, which allows them to accrue political capital in the face of upcoming elections. Hypothesis 1 states that renegotiations in these situations are costlier than renegotiations in other situations

Hypothesis 2 implies that governments defer a larger share of renegotiation costs during their last year in office to avoid paying them during their administration.

We test hypotheses 1 and 2 using a renegotiation-level model that covers Chile, Colombia and Peru for the period 1993-2010 and from 543 contract changes made on 61 of the 62 road concessions. In particular, to test hypothesis 1, we have 529 observations for renegotiations paid from fiscal costs, and to test hypothesis 2, we have 250 observations for renegotiations paid from deferred fiscal costs.

IV.1. The size of renegotiation cost

To test hypothesis 1, we use the following OLS model:

$$FC_i = \alpha + \beta_1 Extraroad_i + \beta_2 Preelection_i + \beta_3 Start_i + \beta_4 Private_i + \beta_5 Newgov_i + \gamma X_i + \theta C_i + \varepsilon_i \quad (1)$$

The dependent variable FC_i is the direct fiscal costs of each renegotiation as a percentage of the initial contract's value and the subscript i indexes renegotiations. $Extraroad_i$ is a dummy variable that takes the value of 1 if a government-led renegotiation includes in the concession contract additional stretches of road. $Preelection_i$ is a dummy variable indicating government-led renegotiations that add complementary works during the 12 months previous to the end of a presidential term. Under hypothesis 1, both β_1 and β_2 should be positive and statistically significant.

The model also accounts for renegotiations that derive from weaknesses in initial contract design. The dummy variable $Start_i$, identifies renegotiations taking place during the first three years after signing the contract that were led by the same administration that signed the initial contract. Since these changes are made just after signing the initial contract and construction has yet to end, the lack of a rigorous project design and planning can imply the need for most of these complementary works. This constitutes a first step to explore if opportunism by governments signing the initial contract led to renegotiations by hastily tendering projects with contract weaknesses to accrue short-term political gain. Nevertheless, it should be highlighted that even if initial contract's weaknesses are causing particularly costly renegotiations and consequently β_3 is positive, which we expect, the model is unable to determine if those weaknesses in contract design and project tendering were a result of opportunistic behaviour as opposed to low technical capacity or lack of experience by the State.

In addition, the model includes variables that might be associated with renegotiation, such as hold-up risk and the arrival of new governments attempting to correct previous shortcomings in concession contracts or change contractual terms motivated by a different political thought. $Private_i$ is a dummy that indicates firm-led renegotiation. The hold-up risk argument that private firms have been using renegotiation as a tool to take advantage of weak State institutions and secure larger rents suggests that private-led renegotiation is particularly costly (*i.e.* β_4 positive and statistically significant).²⁸ Similarly, $Newgov_i$ is a dummy variable that takes the value of 1 if a renegotiation takes place in the first year of a new presidential term of a contract signed under a previous administration.

The matrix X represents a set of dummy variables that identify changes in the regulatory and institutional frameworks of the three countries' concession programmes. In terms of regulatory changes, we control for introduction of a concession board in Chile in 2004 and the enactment of law 1150 of 2007 in Colombia and law 1012 of 2008 in Peru. In terms of changes in the institutional framework, we include a dummy variable that identifies the creation in Colombia of INCO in 2003. Nearly all renegotiations in Chile took place after the introduction of

28. This model cannot identify the different channels through which hold-up risk might take place, such as a weak tendering process that allows for predatory offers, State weakness or unforeseen delays in land expropriation and environmental mitigations.

law 19460 of 1996 and before the enacted of the most recent concessions law in 2010 and thus dummy variables for these policy changes are dropped. This is also the case for the creation of OSITRAN in Peru.

Finally, we control for size and complexity of the concession contracts and we introduce country fixed effects, all included in matrix C. To control for the size of contracts, we use the initial single-lane kilometres included in the concessions. To control for project complexity we use as proxy the initial contract value per single-lane kilometres of the contract being renegotiated. We include these control variables given that bigger and more complex projects might be more prone to modification during the concession. Note, however, that the initial contract value per single-lane kilometres can be a proxy of how well initial costs were estimated as much as initial complexity of the project. Hence, any statistical significance of this variable has to be interpreted cautiously.

Table 6 summarises the results of regression 1. In particular, regressions are exposed in columns 1-3. Column 1 excludes control variables for major changes in the legal framework. Column 2 includes control variables for major changes in the legal framework and column 3 controls for major changes in the legal framework and clustered errors by country.

Both variables associated with opportunistic State-led renegotiation are statistically significant. In particular, State-led renegotiations initiated by the leaving government are significantly at 1% (columns 1 and 2) and 10% (column 3) more costly than other types of renegotiation. Furthermore, State-led renegotiations to add new stretches of road are significantly at 1% (in all regressions) more costly than other types of renegotiation. These results provide strong evidence in favour of hypothesis 1. Although cautious should be paramount in interpreting coefficients given the size of the sample, the magnitude of how costlier these types of renegotiation are is large given that the average cost of a single renegotiation is USD 13 million. In contrast, other types of renegotiation, such as early renegotiations aimed to solve problems related to poor planning and contract design are not statistically significant and not particularly costly. Neither private-led renegotiations nor renegotiations led by new governments have a statistically significant relationship with the cost of renegotiation.

Results show that renegotiations in Colombia that took place after the enactment of law 1150 of 2007 were significantly bigger. Specifically, it shows that while the ceiling of renegotiation cost contained in Colombian law before 2007 may have not been fully respected, it did prevent renegotiation from being much costlier. Indeed, after the enactment of law 1150 of 2007 (*i.e.* ceiling to renegotiations adopted previously had been removed), renegotiations became costlier (the variable is positive and statistically significant at 1% in regressions included). Also, the introduction of the Concession Board in Chile in 2004 led to slightly smaller renegotiations (not statistically significant in regression 2 and significant at 10% in regression 3). In contrast, there is no evidence the creation of INCO affected the costs of renegotiations (not significant in regressions included). The evidence of the effects of the PPP law in Peru enacted in 2008 to reduce renegotiation costs is not clear. Despite the improvements that it brought into the regulatory framework, the positive coefficient in the regressions (not significant in regression 2 and statistically significant at 5% in regression 3) is unexpected since it suggests it lead to slightly costlier renegotiations.

Table 6. Fiscal cost of a renegotiation as a share of initial contract value

OLS and country fixed-effect

Dependent variable: Fiscal cost of renegotiation as a percentage share of the contract's initial value	(1)	(2)	(3)
State-led by leaving government ^a	61.206*** (11.819)	64.336*** (11.848)	64.336* (17.501)
State-led to add new stretches of road ^b	100.019*** (13.406)	88.152*** (13.638)	88.152*** (3.211)
State-led at the start of concession ^c	-8.534 (8.417)	-10.650 (8.490)	-10.650 (7.450)
Private-led	-3.776 (6.727)	-2.457 (6.741)	-2.457 (1.841)
State-led by a new government	-2.987 (7.549)	3.604 (7.673)	3.604 (1.978)
Km in initial contract	-0.0446** (0.023)	-0.039* (0.023)	-0.039 (0.032)
Value of initial contract per km	-7.037*** (2.603)	-6.737** (2.596)	-6.737** (2.879)
Colombia	-1.050 (7.987)	-9.723 (9.201)	-9.723 (4.377)
Peru	-0.431 (12.396)	-4.831 (15.549)	-4.831 (3.357)
After Chile's Concession Board		-8.160 (16.486)	-8.160* (2.757)
After law 1150 in Colombia		23.528*** (6.582)	23.528*** (0.869)
After creation of INCO in Colombia		0.086 (5.991)	0.086 (0.548)
After law 1012 in Peru		5.339 (16.796)	5.339** (1.003)
Constant	26.766** (11.186)	26.816** (11.931)	26.816** (12.440)
R ²	0.155	0.179	0.179
Observations	529	529	529

Notes: * Statistically significant at the 10% level; ** statistically significant at the 5% level; *** statistically significant at the 1% level.

Columns 1, 2 and 3 refer to the following regressions:

- (1) It excludes control variables for major changes in the legal framework.
- (2) It includes control variables for major changes in the legal framework.
- (3) It controls for major changes in the legal framework and clustered errors by country.
 - a. By administrations other than the one that signed the initial contract and after construction has finished.
 - b. By administrations other than the one that signed the initial contract.
 - c. By the same administration that signed the contract.

Source: Authors' calculations based on MOP (Chile), INCO (Colombia) and OSITRAN (Peru).

IV.2. The cost of the renegotiation deferred to future fiscal budgets

Hypothesis 2 refers to one salient feature of governments' opportunistic use of renegotiation of concessions: the deferral of costs to soften budgets. Governments incur in long-term costs paid by future administrations and users to obtain short-term political benefits.

There are different approaches to defer renegotiation costs. First, the commitment to use future funds to pay for changes in the contract (as it has been often done in Colombia). Second, the increase in the toll tariffs that concessionaires can charge or the increase in the maturity of concession contracts (as it has been the case in Chile). Depending on the approach used for the renegotiation, different agents are in charge to pay its cost. In the case of an increase in the toll tariffs, the users pay for the renegotiation in the form of more expensive tolls through the duration of the concession contract. In the case of longer contracts, the State pays the cost at the very end of the contract term in the form of forgone revenue from tolls it would have received had the concession not been extended. In addition, the longer the term the higher the transaction cost related to the incompleteness of contracts. However, neither of these last two costs mentioned above is included in the analyses below and can be explored in a future research. In the case of toll tariffs, it is doubtful that this is a result of government opportunism, since raising toll prices can entail a high political cost. In the case of extended term, the actual cost incurred in terms of forgone revenue in the future is difficult to calculate and depends on many assumptions.

The identification problem in testing opportunistic deferral of renegotiation costs is that limited resources can justify the cost of renegotiation to be deferred and this does not imply opportunistic behaviour by any party.²⁹

To overcome this identification problem, we focus on governments' last year in power. Governments would defer fiscal costs in the last year of the administration rather than in other years when renegotiations are motivated by opportunistic behaviour. We know the share of cost of a particular renegotiation paid in the future through deferred fiscal funds. In the case of renegotiations taking place during the last year of a presidential term, the entire cost deferred to the future will be paid by another administration. Thus, we can test if governments defer more of the renegotiation cost to the future during their last year in office by comparing the share of fiscal costs paid in the future for State-led renegotiations taking place during governments' last year in office. To do this, we construct the following model:

$$DFC_i = \alpha + \beta_1 Lastyear_i + \beta_2 FC_i + \beta_3 Private_i + \beta_3 Newgov_i + \gamma X + \theta C + \varepsilon_i \quad (2)$$

29. While in the three countries the cost of fiscal resources is lower than the Weighted Average Cost of Capital (WACC) for project finance, meaning that it is optimal to pay in the shortest time possible, the government's yearly budget for road transport investment might not be enough to pay for all renegotiation costs of that year. This could explain the need to defer some renegotiation costs to future fiscal years.

The dependent variable DFC_i is the percentage share of direct fiscal costs that is deferred to future fiscal years and the subscript i indexes renegotiations. The dummy variable $Lastyear_i$ takes the value of 1 if a renegotiation is State-led and takes place during the last year of a presidential term. Under Hypothesis 2, β_1 should be positive and statistically significant. We expect this to be the case since fiscal deficits are affected by the political cycle and governments attempt to spend more close to elections and consequently incentives are higher to shift the payment to future governments.³⁰

The model controls for the total fiscal costs of renegotiation, FC_i , because larger renegotiations tend to have a larger share of their cost paid in the future given that they require more financing. As in the previous regression, this model includes changes in regulatory and institutional framework for PPPs in the three countries. It also includes controls for project size and complexity, as well as country fixed effects. Table 7 summarises the results of regression 2. Column 1 excludes control variables for major changes in the legal framework. Column 2 includes control variables for major changes in the legal framework and column 3 controls for major changes in the legal framework and clustered errors by country.

Renegotiations to add complementary works led by governments during their last months in office are statistically significant at 5% when dummy variables for changes in regulatory and institutional frameworks are included. This empirical result supports hypothesis 2 and suggests that opportunistic behaviour by governments due to time-inconsistent incentives may be associated to the renegotiation cost of concession contracts. As expected, a higher proportion of renegotiation is paid in the future the bigger the renegotiation is (significant at 1% in regressions 1, 2 and 3). Furthermore, the cost renegotiations taking place after the enactment of law 1150 in Colombia are also deferred in a larger proportion (statistically significant at 1% in regressions 2 and 3). This is also the case for the creation of the Concession Board in Chile and law 1012 in Peru when regression errors are clustered by countries (both statistically significant at 1%). This might be due to the fact regulation and policy improvements have failed to end concessions' special treatment in public fiscal accounting.

30. See Nieto-Parra and Santiso (2012) for the impact of elections on public expenditures in Latin America in comparison to OECD economies.

Table 7. Percentage share of renegotiation cost deferred to the future

OLS and country fixed-effect

Dependent variable: Percentage share of renegotiation fiscal costs paid through deferred fiscal funds	(1)	(2)	(3)
State-led by leaving government	8.967 (5.453)	12.326** (5.233)	12.326** (5.233)
Total fiscal cost	0.175*** (0.028)	0.131*** (0.028)	0.131*** (0.028)
Km in initial contract	0.040 (0.025)	0.039 (0.024)	0.039 (0.012)
Value of initial contract per km	3.216 (2.555)	2.490 (2.490)	2.490 (2.452)
Colombia	-17.686*** (5.945)	-23.224*** (6.598)	-23.224*** (1.474)
Peru	41.537*** (12.136)	20.403 (20.668)	20.403* (4.757)
After Chile's Concession Board		13.777 (10.933)	13.777*** (0.158)
After law 1150 in Colombia		30.830*** (6.007)	30.830*** (0.955)
After creation of INCO in Colombia		-5.771 (5.457)	-5.771 (2.460)
After law 1012 in Peru		34.442 (21.990)	34.442*** (1.718)
Constant	11.914 (9.663)	13.666 (9.590)	13.666 (5.316)
R²	0.282	0.363	0.363
Observations	250	250	250

Notes: * Statistically significant at the 10% level; ** statistically significant at the 5% level; *** statistically significant at the 1% level.

Columns 1, 2 and 3 refer to the following regressions:

- (1) It excludes control variables for major changes in the legal framework.
- (2) It includes control variables for major changes in the legal framework.
- (3) It includes control variables for major changes in the legal framework and clustered errors by country.

Source: Authors' calculations based on MOP (Chile), INCO (Colombia) and OSITRAN (Peru).

V. CONCLUSIONS

This paper uses novel data to analyse the renegotiation of road concession contracts in Chile, Colombia and Peru. It uses a sample of 61 of the 62 road concession contracts signed between 1993 and 2010. These concessions had an initial value of nearly USD 14 billion, cover more than 12 000 kilometres and have an average initial term of 21 years.

Despite information limitations, key results are obtained from the analysis of these dataset. First, 50 out of 61 concession contracts have been modified, resulting in more than 540 renegotiations. In particular, the concession contracts in Colombia have been renegotiated 430 times.

Second, the renegotiations per concession differ considerably among economies but remain high in comparison to international standards. While in Colombia this number is more than 20, in Chile and Peru it does not exceed 5 renegotiations per concession. In general, renegotiated concessions in these three countries have been renegotiated on average 10 times.

Third, most of the contracts were first renegotiated less than three years after their initial signing. On average, contracts' first renegotiation occurred 1 year, 1.4 years and 2.7 years after their initial signing in Colombia, Peru and Chile, respectively. This suggests that contract renegotiations are motivated more by the lack of an adequate contract design or by opportunistic behaviour rather than the assumptions behind the incomplete contract theory.

Fourth, renegotiations of contracts have implied high fiscal costs and an increase in the terms of the contracts. Among contracts renegotiated, on average, the fiscal cost exceeded 25 million, 45 million and 265 million in Peru, Chile and Colombia, respectively (USD constant prices of 2009). This represents a fiscal cost over the initial value close to 15% in Chile and Peru, and more than 280% in Colombia. The added term is close to 1 year in Chile and Peru, and 6 years in Colombia. The use of renegotiations to add new stretches in Colombia (*i.e.* more than 50 km of added length on average in the renegotiated concessions) explains in part these considerable differences with respect to Chile and Peru. The new stretches of roads in Colombia accounted for more than a third of total fiscal costs of renegotiation.

Fifth, State-led renegotiations, which are more common than firm-led renegotiations, are often motivated by the opportunistic behaviour of governments. Concessionaires had the initiative on less than a fifth of renegotiations and more than 80% of the renegotiations resulted from a bilateral agreement. After controlling for a set variables, results suggest that State-led renegotiations that added new stretches of roads and State-led renegotiations that included additional complementary works during governments' last year in office were costlier than other renegotiations, measured as a percentage of the contract's initial value. Furthermore,

governments deferred a larger share of renegotiation's fiscal costs in State-led renegotiations that took place during their last year in office.

These results suggest that most of the renegotiations were not the unavoidable result of incomplete contracts, nor firms seeking larger rents or accounting for low traffic levels. The three countries analysed make for a diverse sample given the heterogeneity in concession and regulatory designs as well as the frequency and size of renegotiations. These countries differed in the initial set up of concession programmes and have all evolved differently to their respective experiences. Even Chile that is the country with the longest experience and with the lowest number of renegotiation per year elapsed (0.2), most of the renegotiations were government led (85%), with the largest proportion of renegotiations requiring additional works (69%) and the highest fraction paid in future fiscal years (55%), a presumption that time consistency problems were a major factor explaining the renegotiations.

Key policy lessons follow from this research. It calls for further improvement in the private sector involvement in transport infrastructure projects. First, there is a need to strengthen the prioritising and planning phase of infrastructure projects, which must be governed by cost-benefit analyses. These should include value-for-money analyses, comparative evaluations among contract frameworks.

Second, it is fundamental to modify fiscal accounting of concessions in order to reduce time consistency problems. Currently, most countries consider PPP projects off balance if there is availability risk or demand risk. The coherent approach is to follow IFRS 12 norm, as has been proposed by the IMF. This implies that any project regulated by the State and the residual asset return to the government should be included in the State's balance sheet. This would remove the political bias for PPPs (see Engel *et al.*, 2007 and Irwin, 2007 for research on the fiscal accounting of PPPs).

Third, it is necessary to improve the institutional and regulatory framework for transport infrastructure to ensure an unbiased and thorough assessment of PPPs and a better specification of projects before tendering. This should be encouraged in an environment that minimises perverse incentives for rent seeking, solves the problems of dynamic inconsistency, mitigates information problems and maximises efficiency and quality in the provision of services. An initial step in this direction can be to subordinate PPP agencies to the Ministry of Finance rather than the Ministries of Transport or Public Works.

Fourth, the institutional capacity to, ensure proper risk transfer and avoid concession contract renegotiations should be reinforced, possibly by increase human resources of these institutions.

Fifth, it is crucial to perform more rigorous environmental and social assessments before granting concession contracts, while ensuring that the whole process is completed more efficiently. Lastly, independent monitoring of service standards agreed in the contracts is essential for keeping the incentives to maintain the assets. Traditional public work or transport ministries do not have incentives to enforce the contracts for the same time inconsistency problems that lead them to under-invest in the maintenance in traditional public works.

ANNEX

Concession contracts in the sample (1993-2010)

	Concession	Initial value	Initial term	Initial length (km)	Years elapsed	Value/km
Chile	1 TEM	325	25	229	13	1.4
	2 CLM	334	23	218	13	1.5
	3 ANC	928	25	265	14	3.5
	4 ASSA	228	19	194	11	1.2
	5 NP	307	23	160	12	1.9
	6 TC	274	25	144	11	1.9
	7 AAMB	281	25	172	12	1.6
	8 SLV	295	25	136	13	2.2
	9 SCLA	226	40	22	6	10.5
	10 LVLS	284	28	90	15	3.2
	11 CC	12	13	5	14	2.3
	12 CRB	242	23	131	15	1.8
	13 CBPM	42	25	109	16	0.4
	14 CT	411	32	113	8	3.6
	15 SVV	182	28	128	13	1.4
	16 ST	16	22	27	15	0.6
	17 RVLC	510	25	141	11	3.6
	18 RITP	138	30	80	9	1.7
	19 CR60	26	20	14	8	1.8
	20 VM	66	23	5	17	12.8
	21 ANOS	37	30	8	7	4.4
Colombia	1 MVM	76	19	188	16	0.4
	2 BLPV	57	16	31	16	1.8
	3 SMRP	64	16	249	16	0.3
	4 BV	178	16	86	16	2.1
	5 CB	24	12	110	16	0.2
	6 DEVIBOG	146	15	51	16	2.9
	7 FFLA	135	22	38	16	3.5
	8 NEG	70	19	150	15	0.5
	9 DEVIMED	176	17	304	15	0.6
	10 APM	266	21	91	14	2.9
	11 MVVCC	473	20	335	12	1.4
	12 ZP	24	6	370	9	0.1
	13 BTS	210	20	189	8	1.1
	14 BGG	338	16	122	7	2.8
	15 PLV	48	16	54	6	0.9
	16 ZMB	75	20	59	4	1.3
	17 RPC	189	19	162	4	1.2
	18 CS	140	19	139	4	1.0
	19 AMC	108	8	80	3	1.3
	20 RC	159	21	224	3	0.7
	21 GIC	228	19	123	3	1.9
	22 RDS1	509	7	79	1	6.5
	23 RDS2	1 144	20	528	1	2.2
	24 RDS3	1 136	25	465	0	2.4
	25 TA	605	7	645	0	0.9
Peru	1 RV5	61	25	183	8	0.3
	2 IN	205	25	955	6	0.2
	3 IS2	221	25	300	5	0.7
	4 IS3	332	25	403	5	0.8
	5 IS4	205	25	306	5	0.7
	6 RV6	192	30	222	5	0.9
	7 BAC	31	15	78	4	0.4
	8 IS1	99	25	758	3	0.1
	9 IS5	183	25	827	3	0.2
	10 RV4	286	25	356	2	0.8
	11 CHA	34	15	81	2	0.4
	12 MCO	17	15	47	2	0.4
	13 ADS	360	25	475	1	0.8
	14 IC2	100	25	377	0	0.3
	15 MA		6		16	

Note: Values are in million constant USD from December 2009. Contract terms are shown in years and concession length in km.

Source: Authors' calculations based on MOP (Chile), INCO (Colombia) and OSITRAN (Peru).

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