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Abstract

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Keywords: Public–Private Partnerships, Concessions, Renegotiations, Bargaining, Procurement

JEL Classifications: G38, H54, L51

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ABSTRACT

There is a growing concern about the frequency of renegotiations in Public Private Partnerships (PPPs). We focus our research on the Portuguese experience and study 254 renegotiation events of 35 PPP contracts since 1995, and examine the triggers of renegotiations and who initiates them. We also investigate whether both the public and private sector learn from successive renegotiations in terms of the timing of renegotiations, contract design, regulatory change, and bargaining power extraction. We show that previous experience in renegotiations reduces the likelihood of renegotiations, and that electoral cycles and political connections lead to strategic behavior of both the public and the private sectors. The bargaining power seems to be mostly held by private firms who are often able to extract the rents what they set out to get at the beginning of negotiations by starting negotiations in the year prior to elections, and especially when they built out political connections. The learning from renegotiations on the public sector's side, in terms of contract design and execution of regulatory change seems modest.

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Abstract: There is a growing concern about the frequency of renegotiations in Public Private Partnerships (PPPs). We focus our research on the Portuguese experience and study 254 renegotiation events of 35 PPP contracts since 1995, and examine the triggers of renegotiations and who initiates them. We also investigate whether both the public and private sector learn from successive renegotiations in terms of the timing of renegotiations, contract design, regulatory change, and bargaining power extraction. We show that previous experience in renegotiations reduces the likelihood of renegotiations, and that electoral cycles and political connections lead to strategic behavior of both the public and the private sectors. The bargaining power seems to be mostly held by private firms who are often able to extract the rents what they set out to get at the beginning of negotiations by starting negotiations in the year prior to elections, and especially when they built out political connections. The learning from renegotiations on the public sector's side, in terms of contract design and execution of regulatory change seems modest.

1 – Introduction

Over the last few decades, Public Private Partnerships (PPPs) have been increasingly used by governments around the world to finance and manage complex (infrastructural) operations. In this sense, a PPP can be described as: "…an agreement between the government and one or more private partners […] whereby the latter deliver the service in such a manner that the service delivery objectives of the government are aligned with the profit objectives of the private partners and where the effectiveness of the alignment depends on a sufficient transfer of risk to the private partners" (OECD, 2008: 17). In this way, PPPs are long-term contracts (typically covering 30–40 years) whereby the private sector assures the construction of infrastructure or provides a service. There is an increased interest in the strategic aspects involving the delivery of public services and PPPs and the organizational choices made by public and private actors (Quelin et al., 2014).

In practice, PPP contracts have frequently been subject to renegotiations, which occur when specific events (often referred to as "compensation events") change the financial conditions of the concession. This is mainly the case when the public authority is asked or proposes to compensate the project company for a loss of revenue or unanticipated additional costs. When a renegotiation is initiated by the government, a change in compensation usually occurs in three situations: (i) the public sector requires a change in the contract (unilaterally), (ii) the public sector's actions create a liability to the project company, and (iii) a change in a law has occurred that affects the profitability of the project (Yescombe, 2011). Alternatively, renegotiations can be initiated by the private sector; this is mainly the case when the concession's financial conditions deteriorate in such a way that the private company may slip towards bankruptcy. The solution is additional financial compensation or a revision of the concession terms (e.g., increasing prices, reducing investments, or lowering operational costs by reducing service requirements).

One of criticisms of PPPs is that the high rate of renegotiations undermines the credibility of the initial bids by the private sector because bidding parties may anticipate renegotiations (that can subsequently tilt the balance in their favor), which affects the (ex ante) bidding competition and thus the (ex post) efficiency of PPPs. Furthermore, renegotiations impose an additional burden on the fiscal budget. PPPs also have particular characteristics that make them more prone to renegotiations, as they are long-term, complex, and incomplete contracts. In addition, they occur in heavily regulated sectors that are sensitive to political and circumstantial changes. These factors, combined with the high levels of investment, result in greater uncertainty. Therefore, understanding the renegotiation process is a key aspect of ex-ante PPP contracting. Only few (and geographically disperse) studies have touched on this subject.

Since 1993, Portugal has been a leader in Europe in terms of setting up large PPPs (as a percentage of GDP), with 35 PPPs to date. Despite their prevalence, there has been little discussion or investigation into its PPPs. Only two studies based on a small sample focus on the Portuguese experience: one at the state central level (Cruz & Marques, 2013a) and the other at the local government level (i.e., municipalities; Cruz & Marques, 2013b). The intensive use of PPPs over the last two decades makes the Portuguese experience an interesting study object, because there is now a sufficient number of observations (in contrast to earlier descriptive research) to quantify the renegotiation probability and motives (by means of probit and duration models).

We study 254 renegotiations events between 1995 and 2012, most of which were in the road sector. About 75% of all the PPPs were renegotiated at least once (and many even multiples times). On average, the first negotiation occurs 3.5 years after the construction/investment stage. The abnormally high frequency of renegotiations raises the question as to whether renegotiations should be regarded as a natural and typical aspect of PPPs, or whether they induce a substantial disadvantage in the PPP procedure relative to the traditional procurement processes, as renegotiations drive up the costs for the government.

In this study, we aim at addressing three questions by means of a unique, hand-collected (proprietary) dataset: (i) what triggers renegotiations and affects the duration of renegotiation events?, (ii) what determines who initiates renegotiations (the government or the private partner)?, and (iii) what are the consequences of frequent renegotiations for the private and public sector in terms of learning behavior by either party? We intend to look at the managerial implications of these results and how they can help to inform future management practices, and also intend to help governments improve their management of contracts with private partners.

In order to discuss the consequences of renegotiations for private and public management, we look at the strategic behavior of each party. We analyze the bidding process, and including how the private companies behave and can learn. We also consider the financial claims by the private sector in renegotiations in order to assess to what degree these demands are met by governments. This showed us how each party learned from previous experience. We also study whether litigation by the private sector is used after losing a PPP bid or when renegotiations are started. Regarding the public sector, we focus on how governments learn from the PPP experience by going over the Court of Audit's reports and their

follow up reports, and by assessing the degree to which their recommendations have been followed up by changes in the law and how this law was interpreted and executed in practice. Finally, we also examined the renegotiations clauses in the PPP contracts, and how they have changed over time.

The findings of this paper (and the answers to the above three questions) can be summarized as follows. First, although several projects experience multiple renegotiations, the probability of a renegotiation goes down with the number of earlier renegotiations, reflecting that those (temporarily) resolve the financial distress of PPPs, and that uncertainty diminishes over the remaining contract years. Larger and more complex PPPs (with higher Capex) are more prone to uncertainty and cost overruns. A very important trigger of renegotiations are electoral cycles: renegotiations are more likely to take place in electoral years, but even more so in the year prior to an election. This is in line with opportunistic behavior from both the public and the private parties, as the former may renegotiate in order to provide some benefits to the electorate (in the hope to be rewarded by the voters), while the private party may be enticed to take advantage of politically sensitive times. There is some evidence that right wing governments (assumed to be more company-friendly) are more prone to enter renegotiations. Political connections – e.g. the very well-connected Ascendi construction group – may induce more frequent renegotiations. Worsening fiscal deficits and higher public debt levels do not seem to lead to more renegotiations.

The average duration of a renegotiation is rather long, namely 655 days. Longer contracts take longer to renegotiate, but higher financial uncertainly (high leverage and the use of a demand-based payment) reduces the duration. Foreign private parties are more keen to strike a deal fast, as do majority governments who have more decision-making clout.

Second, in response to the question who initiates the renegotiation, we find that in PPP contracts with more ex ante uncertainty (longer contracts, high leverage, high investment), the government is more risk sensitive and more often takes the initiative to renegotiate. In relation to electoral cycles, it is the government that frequently initiates renegotiations in the year prior to election. After elections, when a change in government has taken place, the private sector tries to renegotiate. A reduction in perceived corruption causes the private sector to ask for renegotiations less frequently, as governments will be less willing to accept their demands.

Third, in terms of regulatory learning, the Court of Audits' reports have enhanced the learning experience on the PPP programs with varying success. Its analyses of the deficiencies of PPP contracting and renegotiating lead to clear suggestions for improvements and new PPP legislation, but the effectiveness of the legislation in terms of curbing renegotiations - one of its intentions - may be limited. Furthermore, there seems to be little learning on the public side in terms of PPP contracting: the clauses regulating renegotiations in the initial contracts did not change over the past 20 years, nor are the renegotiation clauses different between the initial contract and the renegotiated contracts. In this respect, the government just applies a copy-paste approach, which may reflect the lack of legal/technical ability and foresight on the part of the executive public entities (and possibly also the pressure to sign these contracts to please the electorate, or the political influence of these PPP companies' shareholders). In

terms of the bidding process and learning on the private sector's side, when a bidder has won concessions in the past, his final rank will be higher, but past wins are no guarantee to continue with a winning streak. The latter may be explained that if firms have won several concessions, they make higher bids (as they can bear to lose a bid). Interestingly, we find that the bargaining extraction rate in renegotiations (the difference between the requested and obtained amount) is very high in private party-initiated renegotiations and even amounts to 100% in three quarters of the renegotiations. It seems that the public sector easily caves in, as there is no evidence that the bargaining extraction rate depends on skillful renegotiations (induced by renegotiation experience). What does matter though is the timing of the renegotiations: at and around elections, the bargaining extraction rate is higher, reflecting the parties' relative bargaining power. Political connections seem to be related to higher bargaining power rates.

This paper is organized as follows: Section 2 provides a literature review. Section 3 presents the hypotheses, and section 4 summarizes the data and the methodological approach. Section 5 discusses the results while section 6 deals with the (lack of) learning from past PPP experience both from the public and the private sector. Section 7 concludes.

2. Literature review

2.1 – Management theory of contracts and renegotiations

The design of contracts and relationships between parties has been widely discussed in economic and management theory since the seminal work by Macaulay (1963) on contracts as a set of agreed-upon terms for a product or service with necessary safeguard mechanisms (Harrison, 2003). Within management theory, the focus has moved to efficiency and performance of contractual relations (Kern, Willcocks & van Heck, 2002) and less on how contracts are designed and how their structures have evolved (Argyres, Bercovitz & Mayer, 2007; Bercovitz, & Tyler, 2014). Weber & Mayer (2011) state that how a contract determines the ongoing relationship between parties is still a disputed issue.

The renegotiations literature has largely concentrated on the relationship between concessionaires and the public grantor agencies or governments from the perspective of contract theory and contract incompleteness (Dewatripont 1988; Hart, 1990; Lazzarini et al., 2008; Tirole 1986; Williamson 1975, 1979) and has mainly focused on transaction cost economics (TCE), incomplete contracts, and uncertainty. Studies have also shown that contracts are frequently renegotiated, but the impact and consequences of such renegotiations are rarely addressed (MacNeil, 1978). Contracts are by definition incomplete to the extent that it is not possible to anticipate all future events for any given contractual arrangement (Hart, 2003). Hence, incomplete contract theory argues that renegotiations are the result of the need to adapt contracts to a changing environment or new conditions unforeseen in the initial agreement and that are requiring compensation for investments that were not foreseen in the contract and only became verifiable ex post (Grossman & Hart, 1986; Hart, 1995). TCE argues that transactions can be facilitated if contracts are aligned with the parties' expectations regarding the other party´s obligations. At the same time, the contract must provide incentives to fulfill obligations and lay the basis

for dispute resolution in case one party reneges on its obligations (Argyres, Bercovitz & Mayers, 2007; Lumineau et al., 2012). On the topic of renegotiation of contracts, TCE argues that contracts represent a set of clauses and safeguards protecting each party from the opportunistic behavior of the other party (Williamson, 1975, 1985, 1996). However, many papers also point out that attempts to be contractually exhaustive in terms of including safeguards to prevent opportunistic behavior may end up potentiating such events (Aghion et al., 1994; Dyer & Singh, 1998; Ghoshal & Moran, 1996; Malhotra & Murnighan, 2002). The reason is, as argue Weber & Mayer (2011:53): "*Scholars in other research domains have argued that in attempting to mitigate threats from opportunistic behavior, formal contracts actually serve to foster distrust and bring about the very actions they are designed to prevent.*"

Uncertainty may lead to greater efforts at providing safeguards in contracts, or, failing this, could lead to less detailed contracts reflecting the lack of knowledge with which parties initiate their transaction (Argyres, Bercovitz & Mayers, 2007). Crockers & Reynolds (1993) and Holden (1999) show that transactions characterized by greater uncertainty, including additional contingencies in the contracts, are especially costly, and they tend to be more incomplete. Tirole (1999) states that renegotiations occur because the cost of previewing almost all possible events is prohibitively high, but on the other hand, an abnormal frequency of renegotiations may highlight a poor contract design and possible excessive opportunistic behavior by one of the parties (Guasch, Laffont & Straub, 2003).

2.2 - Renegotiations: failure or embedded in contract design?

Unlike contract renegotiation theory, the literature on PPPs (and particularly on their renegotiations) is not abundant; private firms rarely share information about their agreements, and even less so about renegotiation decisions and outcomes. The few empirical studies about renegotiations only address government procurement (De Brux, 2010; De Brux, Beuve, & Saussier, 2011). Latin-American PPP renegotiations have been studied by Guasch, Laffont & Straub (2003) and they capture both the contract clauses and the characteristics of the economic and institutional environments. They show that approximately 75% of the transportation PPPs have been renegotiated, as were 90% of the water and sanitation PPPs.

Many PPP agreements occur in regulated markets that are politically sensitive, and require that project risks be shared between the public and private sectors. During the contract period, the government or the users or both will pay for an asset or service and these payments are typically fixed at the beginning of the contract. However, anticipated renegotiations create uncertainty regarding future payments and government liabilities. There has been strong criticism on PPP as they tend to be so frequently renegotiated. A long concession period, risk sharing, political change, and the sensitivity of regulated markets all substantially increase uncertainty to all PPP stakeholders (Chan, Levitt & Garvin, 2010). PPP renegotiations can be defined as a revision of the concession contract, which affects and alters the financial balance of the project firm (Guasch, Laffont, & Straub, 2007). It should be noted that this definition includes only substantial departures from the original contract and not contractually

anticipated changes, such as tariff adjustments. PPPs have several characteristics that make them more prone to renegotiate: they are long-term, complex, and incomplete contracts occurring in heavily regulated sectors that are sensitive to political and circumstantial changes, require a high level of investment, and have a high level of uncertainty (Estache, Guasch, & Trujillo, 2003).

Whereas some authors consider a renegotiation event as a natural and typical process in PPPs (Engel, Fischer, & Galetovic, 2009), the majority of authors view the frequency of renegotiation events as PPP failure (e.g. Froud & Shaoul, 2001; Jamali, 2004). Frequent PPP renegotiations ought to be avoided (Schwartz, Corbacho & Funke, 2008), and if they occur it should only be a response to distress and lack of efficiency (Guasch & Straub, 2006).

2.3 - PPP renegotiations' triggers

In theory, contractual arrangements of a PPP project should be dynamic, corresponding to the evolution of risks as the future unfolds and new information dissipates uncertainty (Pellegrino et al., 2013). Although the renegotiation of contracts involves costs, revisions of the contractual terms of trade may also be viewed as a tool for adapting to changes in uncertainty. In practice, however, effective communication mechanisms between partners are seldom present; private and public sectors find themselves more often in adversarial rather than cooperative positions (Domingues & Zlatkovic, 2014). PPP contracts are by definition incomplete, but are usually inflexible when faced with unexpected circumstances and require formal renegotiation leading to a higher tendency to litigate (Spiller, 2008). In particular, PPP contracts are often highly prescriptive and excessively rigid (e.g., long-term traffic forecasts are set at as a basis for financial compensation for concession lasting 25 years or longer), which leads to situations in which the public grantor is bound by contingency clauses that could not have been foreseen (Domingues & Zlatkovic, 2014). This situation imposes various costs such as ex-ante transaction costs, information and bargaining costs, and also ex-post transaction costs of monitoring and contract enforcement (Soliño & Gago de Santos, 2010).

Potential triggers that can potentiate renegotiations are: (i) past experiences with renegotiations (not only of PPPs, but of partnerships in general, as the learning from previous experience can reduce the length of renegotiations (Arino et al., 2014) and (ii) (lack of) learning on contract design, the concession's duration, characteristics of the PPP project (size of the investments, the stability of the financial structure, the type of payment scheme), opportunistic behavior by both parties (induced by political cycles and elections, or political connections of the private firms), the country's legal and institutional environment and its fiscal position – each of which we discuss in some more detail:

Regarding learning and contract design, Mayer & Argyres (2004) and De Brux (2008) argue that, although renegotiations can be regarded as undesirable due to high transaction costs, a successful renegotiation can reduce the probability of future (repetitive) renegotiations in the decades to follow since this first renegotiation is to realign the contract terms with the long-term expectations about the viability of the project by the parties involved. Argyres, et al. (2007, 2012) provide evidence that contract

structures do evolve over time in ways consistent with learning behavior. In contrast, when the private party expects to be or is simultaneously engaged in several PPPs, renegotiation may induce reputational costs (Cruz & Marques, 2013a; Curhan, Elfenbein & Xu, 2006).

Specific PPP characteristics that can induce more frequent renegotiations are, for instance: the *contract length* of concessions. A long contract duration induces higher uncertainty regarding economic, technological, social or political evolutions and is more prone to instability and forecast failure (Cruz & Marques, 2013a; Guasch, 2004). Not just contract length but also the *age* of concessions with large infrastructural investments may affect the renegotiation probability because uncertainty may decrease fast over time for concessions that have left behind the construction stage in which the largest costs were incurred. Reduced uncertainty in combination with a favorable macro-economic evolution affecting credit may lead to project refinancing with better debt conditions, such as higher leverage, lower interest rates, or longer debt maturity (or a combination of all three) (Toms, Casanova & Beck, 2008). High initial project financial *leverage* increases the probability of financial distress and hence renegotiations on the recapitalization of the PPP company or on incoming cash flows (Engel, Fischer & Galetovic, 2010; Klein, 2012; Moore, Straub & Dieter, 2014; Yescombe, 2011). *Project size* is also related to negotiations as large projects are more likely to experience cost overruns considering that they are more complex, less standardized, and more prone to contingencies (Cruz & Marques, 2013a,b; Moore, Straub & Dethier, 2014).

Renegotiations may also stem from *opportunistic (ex ante) behavior* from bidding private parties since bidders for a contract who assume that renegotiations are likely to occur may bid more aggressively (Williamson, 1989). Subsequently, when the concession has been won, renegotiations can occur without further competition from the other bidders. This way, an opportunistic bidder can seek renegotiation to compensate for his initial under-bidding (Guasch, 2004). Likewise, overly optimistic traffic forecasts in transportation projects are often explained by an optimism bias, which is in fact a deliberate deception by project promoters who are interested in getting projects started (Flyvbjerg, Holm & Buhl, 2002, 2005; Skamris & Flyvberg, 1997).[3] At any point in time over the contracts' duration, an (opportunistic) bidder is in a strong position because the interruption of a public service is often unacceptable, as it would trigger high social and political costs, which induces to a compromised negotiation position for the government.[4] The inverse case where the public sector holds a lot of bargaining power also occurs; this happens mainly when the private company is in a difficult financial condition, and bankruptcy would have a significant impact on shareholders (either financially or in terms of reputation).

Contractual clauses that regulate the risk allocation matrix, financial guarantees, contract termination, and key performance indicators or investment requirements, can influence the likelihood of renegotiation (Domingues & Zlatkovic, 2014). The *type of payment scheme* in the exploitation phase

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[3] Baeza & Vassalos (2010) report that optimist bias in traffic projections was the main source of renegotiations of PPPs in Spain.

[4] The opposite situation could also occur when governments try to interfere in contract clauses, such as in the Portuguese Lusoponte case study in which the government decided to abolish the increase in tariffs that had been stipulated in the PPP contract (Miranda Sarmento & Renneboog, 2014a).

can be a source of uncertainty - especially when the revenues of the private party depend on demand of the service offered - which augments the probability of renegotiation. In contrast, an availability payment (a fixed annual rent, as long as the asset is in condition to be used according to the contractual requirements) granted by the government generates less uncertainty. Guasch et al. (2007) also found evidence that projects with solely private financing have a positive impact on the probability of renegotiations initiated by the private sector. Furthermore, *sector and project specificities* that influence how risks are allocated between the partners (e.g., construction delays, demand and revenue risks during operational stage, and the arbitration process) affect the probability to rewrite contracts.

Political cycles may also have a bearing on renegotiations. First, tight public budgets typically encourage the public sector to pass on large investment obligations to the private sector possibly with governmental guarantees. These guarantees could induce opportunistic behavior as it provides incentives for the private party to be less efficient, which could subsequently lead to seeking additional rents from the public sector (Guasch et al., 2003, 2008). Less meticulous and possibly overgenerous behavior from public sector could be reinforced when new elections are approaching, which incites governments to invest more in infrastructure. Second, politicians often consider PPPs as the perfect tool for delivering infrastructure while avoiding up-front payments and making off-balance sheet investments. Third, the renegotiations of PPPs also seem to depend on electoral cycles: incumbent governments invest or renegotiate in order to guarantee re-election and newly-elected officials may renegotiate from a political ideological perspective in order to meet social demands in a way different from the past (Engel et al., 2006, 2009; Guasch & Straub, 2009). A change in government is also likely to affect renegotiations since it represents a breach in the past dialog and of implicit contracts between public and private sectors (Breuve, De Brux & Saussier, 2014). In this context, what may matter for renegotiations of PPPs are: an incumbent government's expectations that it may lose power, the likelihood that a left- or right-wing government is in power (whereby right-wing government often have stronger ties with the private sector), and the probability that a political party gains an absolute majority in a coalition government. For instance, a majority government may be less transparent in PPPs renegotiations since it does not have to promote consensus or seek support from the opposition.[5]

Another key issue in PPP renegotiations is the (lack of) stability in the *regulatory and institutional quality*, which induces (or not) trust between the PPP partners. The likelihood of a renegotiation increases with the degree of inadequacy of the regulatory framework and deficiency of the institutional environment (Guasch et al., 2003, 2006). When faced with changing circumstances, flexible contracts address uncertainty through renegotiation clauses, which make it possible to revise the terms of trade under the same contract instead of changing the contract itself. This aspect stresses the importance of designing long-term contracts that have an economic and political rationale (Athias & Saussier, 2007, 2010; Saussier, 2000). There is evidence that the absence of an efficient regulator affects the likelihood

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[5] A good example is the Lisbon port concession, which was renegotiated by the government in 2010 in order to extend the concession period. As the government did not have a majority, this concession was reversed by Parliament.

of renegotiation (Cruz & Marques, 2013b). However, there seem to be few feedback loops that lead to learning at the level of the regulator because Moore, Straub and Dethier (2014) show that renegotiations do not fundamentally alter the regulatory regime. Not only regulation may matter but also the rule of law since renegotiations can be resolved in court if the legal system is fast, reliable, and fair (Cruz & Marques, 2013a). So, even the mere threat to take renegotiation cases to court may affect renegotiations and their duration.

Institutional reliability and governance is typically captured by indices (e.g., bureaucratic quality, government effectiveness, etc.) defined by either supranational organizations or non-profit think tanks (e.g., The World Bank, Transparency International, PRS group). In these indicators, corruption is often highlighted for two reasons. First, better governance reflects a lower level of corruption. Second, the influence of country-level corruption affects who initiates the renegotiation: a more corrupt environment leads to more firm-led renegotiations and significantly reduces the incidence of government-led renegotiations (Guasch and Straub, 2009).

Finally, a country's *fiscal constraints* can induce a government's opportunistic behavior. Governments opt for PPPs to avoid that public expenditures weigh on the budget (see Miranda Sarmento & Renneboog (2014) for an explanation of this "budget temptation"). The budget temptation shifts the negotiation power to the private parties as the public party is more interested in avoiding short-term costs by postponing payments and easing the present fiscal burden while ignoring the total discounted costs over the whole contract duration.

3. –Hypotheses

3.1 – Triggers of a renegotiation events and their duration

The probability of a renegotiation can be affected by characteristics of the project and contract (e.g. its complexity determined by size and contract duration, and its financial structure), past renegotiation experience, the political environment (election periods, right- or left-wing government, majority or minority government, coalition government, firms' political connections), the country's economic situation (budget surplus/deficit, national debt level), and legal/institutional environment (rule of law, corporate governance regulation, low political risk, low corruption). Below, we formulate our hypotheses on the determinants of the probability and duration of a renegotiation, and who initiates the renegotiation (the government of the private party) and for what reason (Table 1 provides an overview). We know that the average PPP contract is renegotiated multiple times, but we expect that *past renegotiation experience reduce the probability of subsequent renegotiations and their duration (Hypothesis 1)*. A successful renegotiation reduces the emergence of further such events if the concession conditions are adjusted and yield a more stable financial structure. Furthermore, while the initial contract (spanning e.g. 30 years) is necessarily incomplete, the remaining contract duration subsequent to renegotiations is lower and hence the predictability of remaining cash flows is enhanced. We include in our models *first renegotiation* as the explanatory variable (1 if the renegotiation event is

the first PPP renegotiation, as opposed to 0 for subsequent renegotiations) and expect a positive parameter estimate. We also control for *years since previous renegotiation* and the *concession age*.

PPP complexity is also expected to affect renegotiations: *More sizeable projects and longer contracts increase the probability of renegotiations and their duration (Hypothesis 2)*. The reason is that project complexity reflects uncertainty in terms of cost overruns and revenue forecasting. We use the *capex* (log of the total investment required for each PPP) and the *contract duration* (the length of each PPP contract) as independent variables and expect a positive impact for both. Especially during the construction period, large infrastructure projects are prone to cost overruns (Bruzelius, Flyvbjerg, & Rothengatter, 2002; Flyvbjerg, Holm, & Buhl, 2002) and more complex projects may also have a slower learning curve in terms of contract design and management. We used the *operational stage* (0 when the renegotiation occurs during the construction stage, and 1 during the operational stage) as control variable, which we expect to lead to more renegotiations as this is the longer period of the concession— typically, the construction takes 4-5 years and operation last for at least 20 years (often even up to 30 years). Renegotiations during the construction stage may be shorter because politicians may be eager to inaugurate the infrastructure in order to capture votes at upcoming elections. The opposite view – shorter renegotiations in the operational phase – could be rationalized in that the cost of service interruption may be too high in this stage, and that by that point both parties have more experience and knowledge about the project.

We expect that *higher leverage positively affects the likelihood and duration of renegotiation but that leverage attracted from the European Investment Bank is negatively related to renegotiations and their duration (Hypothesis 3)*. We use the *debt/capex* (the percentage of the investment financed by debt, i.e., the project's leverage) and *EIB* (a dummy variable indicating whether the European Investment Bank has financed part of the debt) as independent variables. High debt financing increases the risk that the net operational cash flows are at certain points in time not sufficient, lead to a liquidity problem of the PPP, and consequently trigger renegotiation. In addition, a high level of debt—despite being common in project finance—can expose the project to shocks and crises in the financial markets with consequences for the cost of debt and financial sustainability of the project (Miranda Sarmento & Renneboog, 2015). The loans awarded by the EIB are usually large, have very long maturities, are granted at low interest rates (which could be considered as mild subsidization of major European infrastructural projects), and could enhance the credibility of the project and trust for other (international) financial banks to also grant loans at favorable terms. Hence, EIB loans are expected to have a positive impact on the project's financial structure, borrowing rate, and sustainability; and hence reduce the probability of renegotiations.

In this financial context, it is also important to control for the operational cash flow variance, or in other words, for the way the government will pay for the maintenance and service in the operational phase. The contractual payment can be based a *demand-related or an availability payment*. A PPP availability payment consists of a fixed annual rent as long as the asset is in condition to be used according to the contractual requirements. This type of payment is expected to decrease the probability of renegotiation

because the demand risk has been allocated to the public sector. Therefore, there is a lower uncertainty regarding the long-term projections on revenues for the private party, which reduces the cost of capital, and hence induces a lower probability that renegotiations are initiated by the private party. The variable availability payment is zero if a payment to the PPP is based on service (demand) and one if the payment is based on availability).

Electoral cycles can affect probability of a renegotiation. We expect *a higher probability of renegotiations and shorter renegotiations prior to elections (in elections years and the year prior to election years) (Hypothesis 4)*. Opportunistic renegotiations may arise from the side of the government because it may be interested in pleasing voters, which could affect election results. The (also opportunistic) initiative to renegotiate may also come from the private firm that wants to bank on its increased negotiation power. This may occur when the private party wants to take advantage of the fact that the government may be more prone to give in to its demands because the government cannot afford problems with a public service, especially in election times. Therefore, we expect to see positive coefficients on the variables *election* year at t or *election year at t-1*. It is possible that also election lead years affect renegotiations, especially if this goes hand in hand with a change in government (*Change in government* is an indicator variable equal to 0 if after an election the political party remains in office, and 1 if there was a change in government).[6] A new government can reconsider the previous government's decisions due to either new priorities or political motives, and thus commence renegotiations, or respond to a private sector initiative. We also use *right-wing government* as a control variable because such a government may be more prone to renegotiate, considering that it is expected to have better ties with the private sector than a left-wing government.

The political connections of the private party can affect renegotiations. *We expect that when foreign firms are the main shareholders in a PPP consortium, the lack of political ties is negatively related to the probability of renegotiations, and if renegotiations occur, we expect them to last longer (Hypothesis 5)*. Political connections are supposed to increase renegotiations and reduce the duration of each event because connected firms will create "additional pressure" on the government to make a fast (and favorable) decision. We use *foreign shareholders* as an explanatory variable representing few political connections (0 if the majority of the equity capital is owned by domestic companies and 1 if the majority is owned by foreign companies). The largest construction group actively involved in Portuguese PPPs and with strong political ties is *Ascendi,* whose board comprises current and former politicians, from both the centre left and centre right political parties (for several years Mota-Engil, the main shareholder of Ascendi, has had as CEO a former top politician, several times a former minister, at one time even a former minister of transport). We hence expect that the Ascendi variable (which is 1 when the PPP belongs to the Ascendi Group and 0 if not) is related to more frequent and shorter renegotiations,

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[6] Years with a change in government are 1995, 2002, 2005 and 2011.

reflecting Ascendi's negotiating power in road sector PPPs.[7] We also study the effect of *Right-wing governments* (or center-right coalition governments whose indicator variable takes a value of 1, and 0 in case of a left-wing government or a center-left coalition) on renegotiations as they are expected to be more oriented towards economic efficiency and less towards social equality. Hence, right-wing governments, which have better ties with the private sector (an argument made by Cabo (2012) when examining political appointments in Portuguese listed companies), are more prone to enter renegotiations and to clinch a deal faster. Political connections are indeed perceived as influencing investment decisions; Fisman (2001) and Hong & Kostovetsky (2012) present the case of 'red' and 'blue' US firms - firms with Democratic or Republican ties. Finally, we also include the variable *Majority Government* (1 if the government at the time of a renegotiation has a parliamentary majority, and 0 if not) because a majority government has more decision clout when conducting negotiations, which induces a positive correlation with the probability of renegotiation and a negative one with the negotiation duration (Cruz & Marques, 2013b).

We expect that *a more shareholder-oriented legal environment reduces the likelihood of renegotiations, and shortens the negotiation time (Hypothesis 6)* because an efficient legal environment can affect the design of long-term contracts such that contract revisions are less needed and, if they take place, last less long. We capture this legal context by the 2006 PPP Law, but in this context, it is also important to control for political risk, and corruption. In 2003, the first PPP law was accepted in the Portuguese parliament and established a general framework regarding the concept, preparation, bid, adjudication, and monitoring of PPPs. Still, given that the 2003 law did not include much guidance on renegotiations, this law was amended in 2006. The aim was to increase cooperation among public sector entities that dealt with PPPs, and to improve the mechanism of controlling PPPs in order to enhance transparency and hence reduce the number of renegotiations. In addition, the negotiation procedures and mechanisms to share the benefits between the public and private sector following renegotiations were lined out. This way, the *2006 PPP law* (in our models a variable equal to 0 if the renegotiation has occurred before the approval of the 2006 PPP law, and 1 subsequently) was expected to strengthen the legal ground for PPPs and their contracts such that the probability that renegotiations are initiated by either party is weakened. *Low Corruption* is a dynamic variable – a high index score points at low *perceived* corruption - that captures whether agents believe that the governmental decision-making is subject to influence. Hence, high corruption would relate to higher odds for renegotiations as a way to capture additional rents, and a shorter renegotiation duration (Kaufman, Kraay & Zoido-Lobatón, 1999). The *low political risk rating* (the higher the index, the lower the risk) is a composite of political, financial, and economic risks and measures the relative position of a country.

We also hypothesize that an *efficient judicial system will lead to more renegotiations and shorter renegotiation durations (Hypothesis 7)* because, if the renegotiations come to a stalemate, one of the

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[7]The Ascendi Group plays an important role in the road sector and belongs to two of the largest economic groups in Portugal: Mota-Engil, a large construction company, and BES, one of Portugal's leading banks. Of the 254 renegotiations events, Ascendi accounts for 89.

parties can take the case to court to force a solution. High scores on the (dynamic variables) *Rule of law* and *Contract viability* indicate that the quality of contract enforcement is high. The rule of law represents how easy it is to enforce contractual claims in a court of law, and also captures the judicial limits of government to realize its policy program through the legislative arm of government. Contract viability represents the risk of unilateral contract modification or cancellation and, at worst, is an outright expropriation of privately owned assets. As such, this index captures a country's political stability (the higher the index, the lower the risk). A more stable political situation is expected to reduce the probability of renegotiations because there is less room for opportunistic behavior from either the public or the private party.

Finally, we argue that the macro-economic context in terms of budget (deficit) and national debt level can effect renegotiations of PPP contracts. *Both less fiscal space (binding budget constraints) and mounting national debt levels may increase renegotiation frequency with governments seeking to postpone expenditures (in short renegotiations) (Hypothesis 8).* Both the fiscal deficit and public debt level are standardized by GDP. Table 2 summarizes the variables described above.

[Insert Tables 1 and 2 here]

3.2 – Government- versus private sector-initiated renegotiations

In case of a reason why in a specific context either the government or the private section initiates a renegotiation, we relate it to the above respective hypotheses and add a label 'b', e.g. hypothesis 3b). If either party is equally likely to initiate a negotiation in the above contexts, we do not formulate an explicit hypothesis.

As high leverage may threaten in some circumstances the financial stability of the PPP, we expect the private sector, which is more exposed to financial risk, to sound the alarm bell and start up renegotiations (*Hypothesis 3b*).

Electoral cycles can induce opportunistic behavior: governments may be tempted to start renegotiations prior to elections in order to pass on some benefits to voters; after elections, a new government may be keen on renegotiating PPPs because as it may be driven by different objectives and priorities (*Hypothesis 4b*). The alternative hypothesis is that the private sector starts up renegotiations prior to elections as the government may succumb more easily to pressure in those years, afraid that disturbance in sensitive public services such as urban transport could negative influence the election's outcome (for an example, Miranda Sarmento & Renneboog (2015) describe the Lusoponte case where nearby elections triggered opportunistic behavior by the private sector). Also, a change in government towards a government more friendly to corporations (most likely, a right-wing government) could lead to private-sector initiated renegotiations after elections. When the private party in a PPP has strong political connections, we expect it to make use of these ties and renegotiate more frequently (*Hypothesis 5b*).

We expect that in times of more corruption, the private sector renegotiates more frequently (*Hypothesis 6b*). In times with strong rule of law (enforcement of the law by the judicial system), the private sector

also takes the initiative to renegotiate as stalemate renegotiations would end in court (*Hypothesis 7b*). Finally, we expect that binding fiscal constraints and mounting national debt entice the government to renegotiate in order to postpone expenditures to ease the fiscal burden *(Hypothesis 8b)*.

4. Data and Methodology

4.1 Data

The analysis of the Portuguese experience with PPPs renegotiations hinges on a unique panel dataset of 254 renegotiation events over the period 1995 to 2012 (related to 35 PPPs, 26 of which were renegotiated at least once). The data were hand-collected from each of the 35 reports from "Direcção Geral do Tesouro e Finanças" (DGTF), the department of the Ministry of Finance responsible for managing and monitoring PPPs in Portugal. The 35 reports that contain most of this data are property of the Ministry of Finance. Although they are not publicly available, the previous Portuguese government granted us access (with a confidentiality agreement for individual cases). We were also able to collect information from the initial and renegotiated PPP contracts and their annexes, which are also not publicly available. Furthermore, we also gathered data on the initial bidding process: who participated, who won and lost in the first and second rounds from the reports of the commissions that conduct the bidding and renegotiation processes. Last, we were able to use information from the Court of Audits, particularly their reports and information on the audits of several PPPs.

From each PPP report, we gathered the year of the renegotiation request, the request's motive, which party initiated the PPP, and the time to complete the renegotiation. This information then enabled us to construct these variables: first or subsequent renegotiation; years since previous renegotiation; electoral variables (renegotiation occurs in an election year or the previous or subsequent year, a year with a change in government, a year with a right wing government in power. a year with a majority government); a renegotiation of an Ascendi group PPP (most important and well-connected PPP group in Portugal); and if the renegotiation occurred after the implementation of the 2006 PPP law.

For each PPP, we created these variables: sector; concession age at the time of renegotiation; construction/operational stage at the time of the request; payment is made by availability; investment (log of capex); contract duration; leverage (debt/capex); EIB finance; and majority of capital being from foreign shareholders. We also collected legal, political and public finance variables, including: the rule of law; the degree of corruption; a contract viability index; a low political risk rating; the fiscal deficit as a percentage of GDP; and the public debt as a percentage of GDP. Table 3 exhibits the descriptive statistics of these variables.[8]

[Insert Table 3 about here]

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[8] The Breusch–Pagan test for heteroskedasticity rejects the null hypothesis. The Jarque-Bera test on the variables' normality is statistically significant meaning that we can safely consider the data to be normally distributed

4.2. **Methodology**

To determine what drives the probability of a renegotiation and the probability that a renegotiation is initiated by the government (as opposed to the private sector), we estimate probit (and logit) models with panel data whereby each year (our dependent variable) is labelled as either a renegotiation or no-renegotiation event-year. Specifically, we assume that the model takes the form: $\Pr(Y = 1 \mid X) = \phi(X'\beta)$ (1), where Pr denotes the probability, and Φ is the cumulative distribution function of the standard normal distribution. The parameters β can be estimated by maximum likelihood. It is possible to motivate the probit model as a latent variable model. Suppose there exists an auxiliary random variable: $Y* = X'\beta + \varepsilon$ (2) where $\varepsilon \sim N(0, 1)$. Thus, Y can be viewed as an indicator for whether this latent variable is positive:

$$Y = \begin{matrix} 1 \; if \; Y* > 0 \; i.e - \; \varepsilon < X'\beta \\ 0 \; otherwise \end{matrix} \quad (3)$$

In this model, the 254 renegotiation events take the value of one. Non-renegotiation years of renegotiated PPPs and the years in which a renegotiation was going on are zero, as are all the concession years of the nine PPPs that were never renegotiated. We used a random-effects and population-averaged probit models and cluster standard errors at the PPP (project) level. To assess the determinants of government-versus private sector-initiated renegotiations, we only consider the 254 renegotiation events, and also run random-effects and population-averaged probit models for government-led renegotiations (dummy equals 1) and private firm-initiated renegotiations (dummy equals 0) as the dependent variable. To respond to question as to what determines the length of a renegotiation, we estimate a duration model (Cox Proportional-Hazards semi-parametric model) with the length of time of each renegotiation as the dependent variable (Gujarati, 2011

5. Results

5.1 – Descriptives of PPP Renegotiations

Portugal´s first PPP concerned the construction of the "Vasco da Gama" bridge (1999-2002 and 2008-2010), which was followed by another 34 PPPs. The majority of these projects have been in the road sector (22 projects), with others were in the health (10), railway (2), and security (1) sectors. A total of €20 billion was invested by the private sector overthe past two decades. The large number of projects and investments implies that large payments will have to be made to the private sector over the decades to come. For instance, between 2014 and 2020, the annual payments represent 1% of GDP; from 2020 to 2035, annual payments are expected to decline to - a still sizeable - 0.5% of GDP. Using the discount rate used by the public sector (6%), the annual payments for the next 30 years represent a net present value, which approximately amounts to 10% of current GDP (2014). The high concentration of PPPs entails that Portugal is a world leader in PPPs (Sarmento & Reis, 2012), which can be seen when comparing the data on the amount invested in PPPs by GDP for each European country (Figure 1).

[Insert Figure 1 here]

For the road sector PPPs, a high degree of skepticism regarding their value for money (VfM) has arisen. The profitability of the concessions, the conditions of renegotiation and financial rescues, and the high level of public payments have laid the basis for such doubts.

Along with the burden that the PPP contracts place on the public sector, one also needs to consider the rapid pace at which these contracts were created. They were often established without ensuring that the public administration would be capable of managing them. The novelty of the PPP model added to the fact that the Portuguese government was not prepared for the level of complexity of these contracts, and has led to a number of questionable decisions. In addition, until 2003, there was no proper legal framework for PPPs and, until 2006, there was no legal PPP renegotiation framework. All this made the Ministry of Finance behave passively in terms of PPP follow-up. Given that Portugal was financially rescued by the "Troika" (the EU, ECB, and the IMF) in 2008, the adjustment program has included specific measures regulating PPPs (Sarmento & Reis, 2012). Out of the 254 renegotiation events, the road sector accounted for 233, the railway sector for 17, the security sector for three, and the health sector for only one (Table 4, Panel A). A significant number of renegotiations took place during the operational stage (171 events, 155 of which were in roads) and a large number of renegotiations were requested in an election year (117 events, of which 112 were from the road sector). As most renegotiations end with a financial compensation to the private company, the future liabilities for the Portuguese government have even surged further. Forty-three per cent of PPPs were renegotiated in the first three years (15 concessions out of a total of 35), and 57% in the first four years. On average, the first renegotiation in a PPP takes place after 3.5 years since the signing of the contract (see Table 4, Panel B).

[Insert Table 4 here]

Table 5 (panel A) categorizes the renegotiations by motive and sector. We observe that a substantial part of the renegotiations are initiated by the public sector, and follow legal changes, increases in taxes, or administrative issues. Unforeseen events, such as archaeological findings and major cause events, which create delays in the construction phase, are an important reason to renegotiate. The 14 renegotiations triggered by low demand in the railway sector result mainly from the MST project (the South Lisbon light railway) and Fertagus (the rail project on the Lisbon bridge) (Sarmento & Renneboog, 2014). The average time between the PPP contract and the first renegotiation event is seven years. When we only consider the 155 renegotiation events that occurred during the operational stage, the average time for renegotiation is six years with a standard deviation of 3.3 (see Table 5, Panel B)

[Insert **Table 5** here]

5.2 – Determinants of PPP renegotiations

In order to answer our first research question as to what affects renegotiations, we estimated a probit model, the results of which are presented in Table 6. The models confirm that, relative to the health

section (which is our benchmark and is hence left out), road sector PPPs are most frequently renegotiated (in fact, all of them were renegotiated at least once over the last 15 years); and also more frequently than PPPs in the security and railroad sectors.

The *First Renegotiation* variable indicates that there is a high probability that a PPP that has never been renegotiated before will be renegotiated at one point and that the probability of subsequent renegotiations decreases (which supports hypothesis 1). There does not seem to be pattern in the number of years in between renegotiations (as the likelihood of a renegotiation does not go up with the number of years since the previous renegotiation). While the odds to renegotiate are expected to decrease with the concession age as the remaining time span of the concession becomes smaller which reduces the remaining uncertainty, this is not upheld by the data. Out of the PPP project's characteristics, we find that the renegotiation likelihood is highest in the operational stage, which makes sense because the operational stage starts several years after the initial phase and is the lasts much longer (than the construction phase). In the operational stage, more uncertainty about the viability of the PPP's long-term financial performance is present. Larger PPPs (higher Capex) and projects with longer contract duration are more likely to be renegotiated, because such projects are more prone to uncertainty and cost overruns (which supports hypothesis 2). In relation to the financial structure of the PPP, we expect that high project leverage makes the project's financial stability weaker such that renegotiations are more likely. As we observe a negative sign for leverage in Table 6, we fail to find support for hypothesis 3. Neither (advantageous) borrowing from the European Investment Bank nor an availability payment (in contrast to a demand-driven payment) affect renegotiations.

As expected, electoral cycles do affect the likelihood of renegotiations: they are more likely to take place in electoral years and in the year prior to an election (which supports hypothesis 4). This could reflect opportunistic behavior from both parties involved, as incumbent governments may be enticed to renegotiate in order to provide some benefits to the electorate (in the hope to be rewarded in the elections to come), while the private party may see a window of opportunity as governments in election mode cannot afford a disruption in the provision of a public service. After the elections, the momentum for renegotiations seems to have passed (see Table 6). There is some evidence that right wing governments are more prone to enter renegotiations (or that companies may be more willing to do so when facing a right wing government), but the evidence is weak (only significant at the 10% level in models (3) and (4)). While we find some (but not consistent) evidence that foreign firms negotiate more frequently (models (2) and (6)), we also document that the Ascendi group renegotiates more frequently than other private parties, and this could be explained by the fact that Ascendi has by far the best political ties (to all political parties), which supports hypothesis 5. In untabulated results, we re-estimate these regressions for the sample of road PPPs only (as Ascendi focuses only on road PPPs and does not participate in other sectors) and find a much stronger relation between renegotiations and the presence of this firm. Somewhat counterintuitively, majority governments seem to renegotiate less, while we would expect that minority governments (whose actions also have to be supported by the opposition in parliament) would renegotiate more frequently.

Whereas one of the aims of the 2006 PPP law was to reduce the renegotiation frequency in PPPs, Table 6 shows that it appears to be rather ineffective in this respect, as a consequence of weak design and/or weak implementation (which fails to support hypothesis 6). As we will discuss later, there is strong evidence that the public sector is ineffective in executing the law (see section 6.). On the opposite, as expected, a better judicial system, captured by the rule of law, leads to more renegotiations because the efficiency with which claims are settled in court can encourage both PPP parties to engage in negotiation in the knowledge that a (mere) threat to go to court may encourage reaching a negotiated result out of court (hypothesis 7). Neither the contract viability index nor the political risk relate to the renegotiation odds. Finally, we do not find support for hypothesis 8 as neither the Fiscal deficit nor the level of Public debt level are correlated with renegotiations.

[Insert **Table 6** here]

5.3 – Government- versus private sector-initiated renegotiations

In order to examine which of the two PPP parties starts renegotiations, we estimate probit models with government-led renegotiations (dummy variable equals 1) as the dependent variable in Table 7. We find that for the longer PPP contracts (Contract duration) and contracts that were started long ago (Concession age), the government more often takes the initiative to renegotiate. This seems to imply that higher uncertainty affects the public sector more. This is corroborated by the fact that PPPs with a demand payment (as opposed to an availability payment) tend to have more renegotiations initiated by the government. Highly levered PPPs (high Debt/Capex) are more often renegotiated by the government, unless the European Investment Bank has been an important lender (which implies that the PPP project could be financed at favorable terms and is less sensitive to uncertainty).

While we have documented in Table 6 that electoral cycles induce more renegotiations, we now show in Table 7 that it is the private sector that initiates the renegotiations in the year before and of the election. Also after elections, the private sector tries to renegotiate, especially when an election brings a new government from another political party (Change in government) to power.

When the private party is a foreign firm (Foreign shareholders) and the need to renegotiate arises, the government commences the renegotiation. It seems that the politically-connected Ascendi prefers the government to take the initiative. This could reflect strategic behavior by Ascendi (which is a group that renegotiates more than the others, as Ascendi accounts for 89 of the total 254 renegotiations) that who uses its political connections - its board members are (former) politicians - to influence governments to ask for renegotiations which tilts the bargaining power to its side. Table 7 also shows that majority governments are less inclined to renegotiate.

As expected, a less corrupt environment causes the private sector to ask for renegotiations less frequently, as governments will be less willing to accept their demands. Low political risk increases private sector intention to renegotiate because the private sector will be more willing to ask for additional compensation if it perceives the odds as low that an adverse political decision (such as expropriation) is

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taken or a negative reaction from public sector will follow. A better judicial system should make the private sector more comfortable with asking for renegotiations. In the event of a negative decision from government, renegotiations can be resolved in court if the legal system is fast, reliable, and fair. Finally, fiscal constraints induced by budget deficits or mounting public debt increase government-led renegotiations, as the government may be tempted to postpone expenditures, which would in turn ease the fiscal burden.

[Insert **Table 7** here]

5.4 – Renegotiation duration

The average duration of a renegotiation is 655 days (approximately 1.8 years), shown in the histogram of Figure 2. To assess what determines the renegotiation duration period, we estimate a semi-parametric duration model (Cox hazard model), the results of which are shown in Table 8 (a re-estimation with only the road sector's subsample shows similar results).

We find that longer contracts (for road PPPs) take longer to renegotiate (Model (5)) and that the duration is negatively correlated with leverage and the use of an availability payment. A high debt burden generates sufficient pressure not to let renegotiations linger. High project leverage is related to more condensed renegotiations because high leverage reflects higher bank risk which encourages banks to exert greater pressure to assure a fast resolution of the conflict, particularly if the resolution can affect the PPP's financial sustainability and consequently its debt service. PPPs with availability payment also renegotiate faster, which can be explained by the lower uncertainty (one does not have to estimate demand) and risk to the private sector that is provided by this type of payment mechanism.

In the year after an election, renegotiations take less time. This contradicts our assumption that the duration of renegotiation would increase after elections, because the pressure of approaching elections is absent for a number of years. Right wing parties in government seem to stall renegotiations. Foreign private parties are keener to strike a deal fast, as do majority governments who have more decision-making clout. There is some evidence that since the introduction of the 2006 PPP law, renegotiations take longer and that an improvement in the legal environment (high Contract viability; Low Corruption) also tends to make renegotiations last longer.

A survival duration (Kaplan-Meyer) analysis examined the isolated impact of specific variables. We observed that renegotiations in the road sector tended to last longer than in other sectors and that PPPs in the operational stage had shorter renegotiations than those at the construction stage. Domestic shareholders and the Ascendi Group also had an advantage in terms of renegotiation periods. There is also some evidence that left wing governments renegotiate faster, and that the 2006 PPP law did not reduce the duration of renegotiations.

[Insert **Table 8** and Figure 2 here]

6. Discussion

6.1 – Companies/ learning from the bidding process

Before making a decision to develop a public investment through traditional procurement or PPP, the Portuguese government is obliged to create a task force to study and analyze the project, especially the technical, legal, and financial issues. Miranda Sarmento & Renneboog (2015) document that in spite of the various changes in the PPP legal framework (see above), the procurement process has not been subject to significant change over the past two decades. The process starts with the opening of a tender procedure which contains the following information and conditions: the PPP contracting procedure and specifications, analysis of the options that determine the configuration of the project, project description and financing, demonstration of the public interest in order to justify the use of a PPP, demonstration of affordability of costs and consideration of the risks, and an environmental impact statement (Verhoest et al., 2013). Given that the PPP usually involves a substantial investment, an international announcement and publication of the tender in the Official Journal of the European Community is mandatory. After receiving the bidders' proposals, the government makes a first evaluation based on both financial and technical criteria, such as (i) minimizing the public financial input (that accounts for about 30% of the final award classification), (ii) the technical quality of the proposal (that, in terms of conception, project, construction and exploration, accounts for around 50% of the classification) and (iii) the service quality and security. The best-qualified bidders are shortlisted (usually about 4 to 7 parties) and a first round of negotiations starts. At the end of the negotiation process, two bidders are invited to present their best and final offer. After a final evaluation of these proposals, the Finance Minister and the Minister under whose authority the project falls (e.g. could be transport and mobility, health, or education) make a joint decision on which proposal wins the bid. The final stage comprises the signing of the PPP contract between the government and the private party.

When we examine the bidding process of 21 PPP highways, we note that several consortiums repeatedly bid on each project. The most frequent bidders are Portuguese and Spanish companies (only one French company participated several times in the bidding, and a UK company bid for the first PPP, the "Vasco da Gama Bridge"). With regard to the Portuguese bidders, the most important group, Ascendi, was the winner in eight PPPs (the consortium won 38% of their bids), and came twice second in the bidding (10% of their bids). Another important national consortium was created by two large Portuguese construction companies (Soares da Costa and Teixeira Duarte) and the Spanish company Dragados. This consortium won two PPPs (only 10% of the bids they participated in). Similarly, another two large Portuguese construction companies (Somague and Edifer) joined forces (along with several mid-sized companies) and won two PPPs. Interestingly, the highway operator Brisa, a former state-owned enterprise that was privatized in the 1990s owns four PPP concession (winning four out of eleven bids) (in consortium with some mid-sized construction companies).

The Spanish Cintra and Ferrovial groups are the private party in two PPPs, but its Spanish counterparts FCC and ACS never won a concession. It seems that Spanish firms were no longer actively participating

in the 2007-2010 tenders, possibly as a consequence of the financial and real estate crisis that severely hit the Spanish construction sector in in that period. Several French companies bid for Portuguese PPPs, but they were rather unsuccessful – either they won none or only one concession (e.g. Eifagge along with a mid-sized Portuguese company).

In the bidding process for 21 PPP highways, we identified 25 companies that made at least one bid, and together made 282 bids, alone or as part of a consortium. To examine if companies are learning from their previous bidding experience, we estimate an ordered probit model with as dependent variable the bidder's final rank (after two bidding rounds) and as explanatory variables the bidder's experience in PPP bidding and the number of times he won the concession (Table 9). Subsequently, we estimate a probit model with as dependent variable a dummy variable capturing winning versus losing the bid for the two firms that survived the first bidding round and ended up in round two. The variable Previous experience, which consists of the number of times that a firm did participate in a PPP bidding process in Portugal, is statistically significant and indicates that multiple participations to the bidding process does not lead to a higher final rank (model (1) of Table 9), but conditional on passing to the second bidding round, experience matters to be the final winner (model (2)). When a bidder has won concessions in the past, his final rank will be higher, but past wins are no guarantee to continue a winning streak. The latter may be explained by the fact that, if firms have won several concessions, they can afford to make higher offers (as they can bear to lose a bid). We control for consortium size and see that larger consortia do not necessarily increase their changes to win the PPP contract. It should be noted that we control for firm and year fixed effects, which controls for time-invariant firm specificities and timing of the PPPs (such as electoral years). When we abandon firm fixed effects and include as explanatory variables the bidder's nationality, we find that Portuguese firms are ranked higher than foreign firms, but this does not translate in a higher probability to win. Ascendi, the Portuguese firm with the best political connections (see above) does indeed have a higher probability to win.

[Insert **Table 9** here]

6.2 – Companies learning from renegotiations

For instance, in some road PPPs, despite the allocation of demand risk to the private sector, there is a minimum traffic guarantee. Usually a traffic band system is setup, whereby the concessioner has the right to ask for a renegotiation if traffic is below the lower band. Some changes in conditions are foreseen in the contract (for instance, tariff adjustments to inflation), and are hence not reasons for renegotiations. Only when substantial departures occur from the situation on which the original contract is based, then the contract can be amended legally following renegotiations. When one of the parties presents a claim for a renegotiation, the Ministry of Finance has to be notified, and a commission is appointed that represents the government and is usually composed of members of the sectorial ministry and the finance ministry. After the renegotiation, this commission is required to present a report to the government, and if it agrees with the terms of the negotiation, an amendment to the contract is signed by the public and

private parties. If an agreement cannot be reached, the following step is usually a court case or the establishment of an arbitral court, with three members (one appointed by the government, one appointed by the private, and a third one, impartial, appointed, in agreement, by both parties).

In order to analyze if companies are learning from renegotiations events, we collected for a subsample of 65 cases, the financial compensation requested by the private firm and the final amount offered by the government. This way, we calculate the "bargaining power rate" of private sector in each renegotiation, which is the difference between the requested and obtained financial compensation. Interestingly, in 50 cases out of 65, the bargaining power rate is close to 100%, which means that the private sector received everything it had asked for. We run a pooled OLS model with the bargaining power rate as dependent variable and the experience, electoral years, and political connections measures as explanatory variables (see Table 10). Models (1) and (2) show that the bargaining power rate does not depend on renegotiation experience (neither the first renegotiation indicator variable nor the years since previous renegotiation are statistically significant). What does seem to matter is the timing of the renegotiations: at and around the elections, the acceptance rate is higher which indicates that the private parties have more bargaining power or that the government is more likely to give in when they feel the pressure of the electorate. Surprisingly, negotiations with right-wing governments, which are expected to be more company-friendly, do not lead to higher extraction rates. Foreign shareholders extract lower rents in renegotiations possibly because of a lack of political connections, which contrasts with the strongly politically connected Ascendi, which does have a high bargaining power rate (of 100%). Another interesting aspect of the learning process is depicted in Figure 3: whereas the duration of the renegotiations shows an upward trend from 2000 to 2005, this trend is reversed in the subsequent decade.

[Insert **Table 10** and **Figure 3** here]

6.3 – Renegotiations and litigation

There is some evidence that PPP tendering triggers litigation, initiated by bidders who did not win the concession and disagree with the final classification (Lino, 2010). A recent example related to the high speed rail project that was contested by the losing bidder, based on the argument that the winning private party offered to construct a technically inferior project.[9] When the PPP conditions are at a later stage renegotiated by the winning firm, companies that lose the initial bidding are expected to sue the government (or the private partner of the PPP). The argument from the losing companies is that this new (ex post) context would have distorted the ex ante level-playing field at the initial bid, because the losing firms, if they had anticipated renegotiations, would have made different bids. A renegotiation with substantial changes in the contract de facto consists in a new bidding procedure, but without enabling competitive bids to be made. However, we have found no evidence that these litigations have arisen

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[9] http://www.publico.pt/economia/noticia/motaengil-pede-indemnizacao-pela-anulacao-de-troco-do-tgv-1489870

over the past two decades. Still, the European Court of Justice believes that renegotiations can induce contract distortions and had made two verdicts on this matter (in the Presstext (2008) and Wall AG (2010) cases): substantial changes in contracts are not legal when they (i) introduce new conditions that would have induced the initial bidders to make different proposals; (ii) significantly change the contractually described services; and (iii) modifies the financial balance in favor of the private partner in a manner not foreseen in the original contract. The above case have changed the way governments look upon renegotiations of public contracts and imposes limits on renegotiations.

6.4 – Public sector learning: Evidence from the Court of Audits

Over the last decade, the Court of Audits ("Tribunal de Contas" – TC, in Portuguese) has produced several reports on PPPs, which comprised highly critical remarks on the entire PPP process.[10] Most of this strong criticism was focused on the fact that governments resorted to PPPs, mainly because they were considered "off-budget" while a detailed analysis of whether or not these projects yielded 'value for money' (VfM) in relation to traditional procurement was largely ignored. Furthermore, the Court versed strong doubts about the quality of the PPP management (from the government's side) and the microeconomic efficiency of these contracts and projects. The Court has stressed several times the need to clearly define the objectives and results of PPPs, on which basis the efficiency, effectiveness, and sustainability of PPPs could be assessed (in budgetary terms) (TC, 2003; 2012).

Despite some improvements induced by the 2006 PPP law, the PPP experience still casts doubt on the effectiveness of this legislation. The 2006 PPP law amended the 2003 law, in that it tried to correct for the deficiencies and pitfalls identified in the first few years of the PPPs experience. For instance, it required to use a Public Sector Comparator (PSC),[11] a point reiterated by the Court (TC, 2003; 2005a; 2005b; 2007; 2012). Although, the use of PSC was made mandatory in the 2006 PPP law, it was only used in the hospital PPPs but not in the road sector PPPs.

The 2006 PPP law made the following changes in the PPP legal framework:

- Introduction of the PSC to test VfM in each project.
- Each new contract should have safeguard clauses for early repayment of loans (cheaper refinancing) and benefit-sharing mechanisms, in the case of upper side revenues or lower costs when compared with the financial case base. However, practice shows that even for new contracts after 2006 these clauses were mainly benefiting the private sector.
- Centralization of the PPP process in the Ministry of Finance, reducing the autonomy of the line ministries. This centralization was also to reinforce the financial and budget control of PPPs.
- New rules for renegotiations and financial rebalances, setting shared benefits clauses in case of better financial conditions for the PPPs as a result of a renegotiation. Reinforcement of the

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[10] See also Monteiro (2005), Sarmento (2010), Cruz & Marques (2011, 2013a, 2013b) and Miranda Sarmento & Renneboog (2015a).

[11] According to Sarmento (2010), using the PSC prior to the bid is an effective measure for evaluating VfM because it enables the public sector to base its decisions on a financial evaluation of alternatives to the current PPP project. The PSC is the difference between the costs for the public sector of a PPP payment and the cost of building the asset or providing it through traditional procurement (based on full cost, revenue, and risk estimates in cash flow terms). These costs are discounted at the public sector rate to determine the net present value, and then compared with the discounted value of public payments to the private supplier, considering the risks and costs retained by the public sector (Grimsey & Lewis, 2005b).

Ministry of Finance role in renegotiations, particularly when they represent an increase in public payments or a public financial compensation.

Over the last years, there were some, yet incipient, changes: the Court of Audits suggested the need for creation of budget-control mechanisms and for more transparency in relation to multi-annual forecasted charges in terms of budgeting (TC, 2003; 2007; 2009). Future payments should be disclosed in the budget, with detail on each individual PPP along with the assumptions made for each forecast. Regarding renegotiations (that in recent years has been a major source of concern due to the additional payments made by the government to the private parties), the Court formulated an advice to:

- focus on the quality of management and contract monitoring capabilities of the public sector (TC, 2003, 2005b).

- provide transparency on the contract and payment changes ('rebalancing conditions') brought about by the renegotiations, more specifically on quantifying the charges paid by the state and changes in the contract proposed by the government, resulting in renegotiations and almost automatic public compensation to private sector (TC, 2005a; 2007). A comparison of the base case and the adjusted contract ought to be implemented (TC, 2012)

- to document the risk profile and profitability of each concession, in particular those that have an IRR above 10%, in order to reduce public expenditures (TC, 2012).[12]

In sum, the Court of Audits reports have enhanced the learning experience on the PPP programs in Portugal with varying success. First, in some aspects, there was a clear and practical improvement in the adoption of PPPs, as in the case of the budget and cost control, along with better monitoring by the Ministry of Finance. Second, the Court's suggestions were embedded in new legislation, but the effectiveness of the legislation in terms of practical application may be limited. Specifically, the PSC which was not used in the first PPPs, was a major concern to the Court in the 2003 and 2005 reports, and was then introduced in the 2006 PPP law. Still, this important tool was not applied to the road sector PPPs, even for all the projects started after 2006, but only to the health sector (between 2008 and 2012, 4 hospital construction projects with medical and clinical services were undertaken). Third, in some cases, the recommendations were not followed, such as the ones on bidding process and the reduction the complexity and bureaucracy of the PPP process.

6.5 – Public sector learning: Evidence from contracts

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[12] The PPP law was revised again in 2012, because Portugal asked for a "bail-out" from the "troika" (the IMF, ECB, and EC). One of the reforms in the PPP renegotiation process focused on centralizing the PPP process in the Ministry of Finance in order to increase the transparency and control over PPPs, and at the same time expand the central government's powers over regional and local PPPs.

As PPP renegotiations can induce opportunistic bidding, one would expect PPP contracts to more clearly delineate the conditions of renegotiations. For this reason, we have compared (i) the renegotiation clauses of contracts signed at different moments in time e.g. those from the beginning of our sample period (2000) and those signed a decade later, and (ii) within PPP projects, the renegotiation clauses in the original contract and in the renegotiated contract in order to examine whether learning in contract design takes place. For instance, we examine whether the clauses between the PPP "Norte" (signed in 2000) and renegotiated contract in 2010 are different, as are the clauses between Norte in 2000 and the PPP project "Baixo Alentejo" from 2008. The "Norte" 2000 contract allows for renegotiations under four different conditions: (a) 'Unilateral change imposed by the Grantor, of the conditions for the development of activities included in the Concession, provided that as a result of the same, it can be established that the Concessionaire, has a significant increase in costs or a significant loss of revenue'; (b) The 'occurrence of situations of force majeure'; (c) 'Legal changes of a specific nature, which may have a significant and/or direct impact on the income and expenditure relating to the exploitation of Motorways'; (d) In cases 'where the right to restore the financial balance is expressly provided for under the Concession Agreement'. These renegotiation clauses are rather general and in the 2010 renegotiation contract none of these conditions were changed. Relative to the Norte 2000 PPP contract, the 2008 contract of "Baixo Alentejo" includes a new condition that is more favorable for the private sector: the private party will be compensated if the government were to decide to introduce tolls, as the base case in the contract is availability payment and tolls would not be levied. All three contracts included the following key triggers for renegotiations, namely the Annual Ratios on Senior Debt Service Coverage, Annual Ratios on Loan Life Coverage, and the annual IRR (to shareholders). Renegotiations were allowed, based on the previous conditions, if these ratios would be reduced by 0.01 percentage points relative to the case base. Again, the criteria that could trigger renegotiations are exactly the same in both above PPP contracts and in the renegotiated contract. Finally, the clause on payments to the private party following a renegotiation states that the payment could take the form of a lump-sum, annual increased compensation, or stable payments over an extended concession period, and is identical in the three contracts.

When we study the clauses on renegotiations, their key-criteria and payment firms for 35 randomly selected PPP primary and renegotiated contracts, we always find (nearly) identical clauses. We conclude that the above clauses regulating renegotiations did not change over the last 15 years. Apparently, no learning process was established on the public side that has just applied a copy-paste approach in this respect. The reason may be due to the lack of legal/technical ability and foresight on the part of the public entities, the pressure to sign these contracts to please the electorate, or the political influence of these companies' shareholders.

7. Conclusions and policy implications

In this paper, we have documented that PPP contracts are very frequently renegotiated: we counted 254 renegotiation events over the past two decades for 35 large PPP projects in Portugal, which is the European country with by far the highest number and highest value of PPPs (per capita) in Europe. The discounted value of all the annual PPP payments over the next three decades represent amounts to 10% of current GDP.

We examined factors trigger renegotiations and what affects the renegotiation duration. We also studied which party – be it the government or the private party – initiates the renegotiation process. A problematic issue of the use of PPPs is that renegotiations may undermine the efficiency of the initial bidding process because an expected revision of the payments at subsequent renegotiations affects the (ex ante) bidding competition and thus the (ex post) efficiency of PPPs. For this reason, we studied whether the bidding parties learn over time: we examined the private sector's bidding rank, bargaining extraction rate (percentage of the claim realized in renegotiations), political connections, and, for the public sector, whether contract design and regulation affects renegotiation intensity.

We find that larger and more complex PPPs (with higher capital expenditures) are more prone to uncertainty and cost overruns, which augments the probability of renegotiations. Highly leveraged PPPs are renegotiated faster as banks fearing financial distress may apply more pressure to reach a faster resolution for financial imbalances. While PPPs experience multiple renegotiations, the probability that subsequent renegotiations arise goes down with the number of earlier renegotiations. This indicates that renegotiations address – at least for some time – expected financial difficulties, and that uncertainty diminishes as the remaining number of concession years decreases. Electoral cycles significantly influence the likelihood of renegotiations, which are most likely to start in the year prior to an election. This may reflect that the government expects to be rewarded by its voters for benefits arising from the renegotiation (e.g. lower tolls), but also that the private party may time its renegotiations opportunistically and chooses politically sensitive times in which the government cannot afford a service breakdown of public services. Political connections induce more frequent renegotiations (as we observe for the well-connected Ascendi construction group). Right wing governments (assumed to be more company-friendly) are more prone to enter renegotiations. Foreign private parties are keener to strike a deal fast, as do majority governments, who have more decision-making clout. Worsening fiscal deficits and higher public debt levels do not seem to lead to more renegotiations.

We also demonstrate that the party initiating more risky renegotiations, proxied by a longer concession period, a high leverage, and a high investment, is the government. In relation to electoral cycles, we find that it is also the government initiates renegotiations in the year prior to election (and that it is hence not the private partner taking advantage of its augmented bargaining power). After elections, when a change in government has taken place, the private sector tries to renegotiate to capitalize on the fact that a new government may take different perspective on the PPP, possibly inspired by a different political ideology. A reduction in perceived corruption causes the private sector to ask for renegotiations less frequently, as governments will be less willing to accept their demands.

From this analysis, what can be learnt by either party participating in the PPP?

A *private firm* participating in the bidding process can learn that it pays to behave 'strategically' in the initial bidding process which is organized by the public sector and is inherently flawed. It pays for a firm to put in low bids for the contract because, in case of a win, an unviable situation with very low anticipated profitability (or even financial losses) can be turned around by (multiple) renegotiations of the initial contract at the subsequent construction and operational phase of the project. At the time of the renegotiations, the competing firms (from the initial bidding phase) are no longer around such that the private partner only negotiates with the public sector. While a strategically astute firm can exploit the flawed bidding-renegotiation process, it is clear that this situation is not optimal from a social cost perspective and distorts fair competition. The argument from the losing companies is that this new (ex post) context would have distorted the ex ante level-playing field at the initial bid as realizing the possibility of renegotiations, the losing firms may have made different bids. Still, we did not find evidence that firms that lost in the initial bidding process litigate at the renegotiation times and bring the government or the winning firm to court at that point. The reason may be that the renegotiations take place several years after the contract allocation, that litigation is costly and a lengthy process, and that it is unlikely to change the concession or yield sufficient compensation. Some recent judgments by the European Court of Justice (the Presstext and Wall AG cases) recognize that renegotiations can induce contract distortions and that substantial changes in contracts are not legal when they introduce new conditions that would have induced the initial bidders to make different proposals.

Hiring non-executive directors with strong political ties (e.g. former politicians) may help a private firm in renegotiations. Furthermore, we observe that a private partner's request for an upward revision of the public sector's compensation is almost always met in full by the public sector (the bargaining extraction rate of the private sector is very high).

In terms of the bidding process, we find that past bidding experience is correlated with a higher probability to win the bid, but the number of past wins are negatively correlated to future wins of the bid. The latter may be explained that if firms have won several concessions, they can afford to make higher offers and bear to lose a bid.

For the *public sector*, we have shown that the stream of reports from the Court of Audits over the past two decades has provided a clear insight in the strengths, but especially in the disadvantages and pitfalls of the use of PPPs. The Court emphasized the need for a careful value-for-money financial analysis of the PPP (by implementing a public sector comparator), refinancing clauses of the PPP, the creation of one body responsible for overlooking PPPs to avoid fragmentation of planning and monitoring, enhancing the technical and financial knowledge of the governmental body responsible for PPPs. The identification of the weak points in the PPP process has led to new PPP regulation such as the 2006 PPP law. While the 2006 law may have imposed more discipline on the public sector, the number of renegotiations (initiated both by the public and the private sector) has not decreased. So, the effectiveness of the 2006 PPP law – which also aimed at reducing the number of renegotiations - is

doubtful. Furthermore, no real learning was uncovered in the contract design (in relation to renegotiations): the relevant clauses in the initial contracts did not materially change over the past 20 years, nor are there changes in renegotiation clauses between the initial contract and the renegotiated contracts of a given PPP. It is somewhat surprising that the change in riskiness of the project (given that the time horizon of the concession become shorter as time passes and that the financing of the PPP changes subsequent to renegotiations) does not lead to a more clear delineation of the conditions under which future renegotiations can take place. In this respect, the government's inactivity may reflect the lack of legal/technical ability and foresight on the part of the executive public entities.

Considering that in the year prior to an election year, the government frequently takes the initiative to start renegotiations, one could wonder whether the renegotiations should not be done by an independent authority in which political influence is banned as much as possible. We have observed that the government is not a good negotiator, in that in the vast majority of cases, it fully meets the compensation demands by the private partner. We also noted that political connections – board members of construction firms are former politicians or even ministers – enhance renegotiations. A ban on such conflicts of interests by former politicians (and by extension, people with experience in the relevant ministries) ought to be introduced even if the political ties were established in the past.

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Table 1 – Hypotheses on the probability of renegotiation

This table presents an overview of out hypotheses, along with the explanatory and related control variables (CV), with the expected sign and justification.

Hypotheses	Explanatory variable	Related control variables	Expected sign and justification
H1: The experience of previous renegotiations reduces the probability of renegotiations and their duration.	▪ First renegotiation (Dummy: 0- no; 1 – yes)	▪ Years since previous renegotiation ▪ Concession age	▪ Main effect: Among the multiple renegotiations of the PPPs, first renegotiations are expected to have a higher probability of occurrence relative to subsequent ones as the likelihood of yet another serious problem that urges for a second or third renegotiation is smaller. Furthermore, an effective first renegotiation reduces the probability of subsequent renegotiations. ▪ Controls: the more time has evolved since a renegotiation, the higher the probability of a renegotiation.
H2: More sizeable projects with longer duration increase the probability of renegotiations and their duration.	▪ Investment (Log of capex) ▪ Contract duration (Number of years of contract)	▪ Operational stage (Dummy: 0- if renegotiation occurs during construction stage; 1- if renegotiation occurs during operational stage)	▪ Main effect: A higher investment increases private sector risk and thus also the probability of renegotiation. ▪ Main effect: The length of contracts increases uncertainty, which augments the probability of renegotiation ▪ Control: A higher probability of renegotiations occur in the operational stage, due to higher uncertainty.
H3: Low leverage and the presence of financing from international institutions reduce the probability of renegotiations and shortens their duration.	▪ Debt/Capex ▪ EIB (Dummy: 0 if the project was not financed by EIB, 1 – otherwise)	▪ Availability payment (Dummy: 0 – if revenues are based on users' payments, 1 – if payment is made by government, based on availability of infrastructure, regardless of demand)	▪ Main effect: Higher leverage increase the risk of financial distress, which increases the probability of renegotiation ▪ Main effect: Long-term debt financing from the EIB (European Investment Bank) increases the PPP's financial stability because of a reduced need to contract commercial bank debt, The EIB's loans extend over the whole PPP duration at below market rates. Thus, EIB funding is expected to reduce the likelihood of renegotiation. ▪ Control: PPPs with availability payment have lower risk (they do not assume demand risk), which reduces the probability of renegotiations.

Hypotheses	Explanatory variable	Control variables	Expected sign and justification
H4: Electoral cycles increase the likelihood of renegotiations and reduce their durations.	▪ Election years at t, t-1, and t+1	▪ Change in government ▪ Right Wing government	▪ Main effect: Electoral years increase probability of renegotiations, due to possible opportunistic behavior by governing parties. The year before an election increases the likelihood of renegotiation, due to governments fearing being voted out of office; The year after an election positively affect renegotiations because newly elected officials may be more willing to negotiate. ▪ Control: A change in government may lead to opportunistic behavior from private sector, leading to more renegotiations. ▪ Control: Right wing governments positively affect renegotiations, as they usually have stronger ties with the private sector.
H5: Political connections of shareholders increase the probability of renegotiations and reduce their duration.	▪ Foreign shareholders Dummy (0 – if national shareholders; 1 – if foreign)	▪ Ascendi Dummy (0 – if the PPP does not belong to Ascendi group; 1 – otherwise) ▪ Majority government (0 if renegotiation occurs during government without a majority in parliament; 1- otherwise)	▪ Main effect: Equity stakes held by foreign shareholders reduce renegotiations, as these shareholders are less politically connected, and are less likely to be able to influence government decisions in renegotiations. ▪ Control: The presence of the powerful Ascendi group positively correlates with renegotiations, as it is the largest PPP group owned by two politically connected shareholders (Mota-Engil and BES) ▪ Control: Majority governments should favor renegotiations, as they are more powerful in decision making
H6: A better legal environment reduces the probability of renegotiations and shortens their duration.	▪ 2006 PPP Law (Dummy, 0 if the renegotiation is prior to the 2006 PPP Law; 1- otherwise)	▪ Low Corruption (scale 1-10, 10 is lowest corruption level) ▪ Low Political risk rating (scale 1-100, 100 is lowest risk)	▪ Main effect: In subperiods with a better legal environment (stricter legislation, lower corruption), the probability of renegotiations is lower.

Hypotheses	Explanatory variable	Control variables	Expected sign and justification
H7: A better rule of law increases the probability of renegotiations.	▪ Rule of Law (scale 1-10, 10 is strongest rule of law)	▪ Contract viability (scale 1-10; 10 is best viability)	▪ A more effective judicial system increases the likelihood of private sector to ask for renegotiations and shortens the likelihood, as a stalemate in renegotiations will be resolved in court.
H8: Budget constraints increase the probability of renegotiations.	▪ Fiscal Deficit as % of GDP	▪ Public Debt as a % of GDP	▪ Main effect: Less fiscal space increases the odds of (government induced) renegotiations, as government may seek to postpone expenditures.

Table 2 – Explanatory Variables

This table presents the definition of the main explanatory variables, their source, and units of each variable. Source: own data from the Ministry's of Finance concession contracts, the Portuguese government's website, PSR group, Eurostat.

Variable	Type/Unit	Source	Description
First renegotiation	Dummy	Own variable	1 if renegotiation is the first renegotiation of the PPP; 0 otherwise.
Years since previous renegotiation	Discrete	Own variable	Number of years since the previous renegotiation was started.
Concession age	Discrete	Own variable	The number of years since the signing of the PPP contract, at the moment of the renegotiation
Investment	Log of capex	Ministry of Finance PPP report	The log of the project investment value.
Contract duration	Discrete	Ministry of Finance PPP report	The total number of years of the PPP contract
Operational stage	Dummy	Own variable	1 if the renegotiation occurred at the operational stage, 0 otherwise (in the construction phase)
Debt/Capex	Discrete/ percentage	Ministry of Finance PPP report	Debt as a percentage of the total PPP investment
EIB	Dummy	Ministry of Finance PPP report	1 if the project is partially funded with European Investment Bank loans; 0 - otherwise
Availability Payment	Dummy	Ministry of Finance PPP report	1 if project is pay by availability and 0 if it is pay by demand
Election years (at t)	Dummy	Portuguese gov. site	1 if the renegotiation occurred in an election year, 0 otherwise
Election year lag (at t-1)	Dummy	Portuguese gov. site	1 if the renegotiation occurred in a year previous to the election year, 0 otherwise
Election year lead (at t+1)	Dummy	Portuguese gov. site	1 if the renegotiation occurred in a year after the election year, 0 otherwise
Change in government	Dummy	Portuguese gov. site	1 if the renegotiation occurred in an election year with a change in government, 0 otherwise
Right-wing government	Dummy	Portuguese gov. site	1 if the renegotiation occurred in a year with a right-wing government in power, 0 otherwise
Foreign shareholders	Dummy	Ministry of Finance PPP report	1 if the PPP company is mainly owned by foreign companies, 0 if owned by national companies
Ascendi	Dummy	Ministry of Finance PPP report	1 if the PPP belongs to the Portuguese group "Ascendi", 0 otherwise
Majority government	Dummy	Portuguese gov. site	1 if the renegotiation occurred in a year with a majority government in power, 0 otherwise
2006 PPP law	Dummy	Own variable	1 if the renegotiation occurred since the 2006 PPP law, 0 otherwise
Low Corruption	Discrete	PSR group	Rating from 1 to 10, 10 representing the lowest corruption.
Low Political risk rating	Discrete	PSR group	Rating from 1 to 100, 100 representing the lowest risk.
Rule of Law	Discrete	PSR group	Rating from 1 to 10, 10 representing the best rule of law.
Contract viability	Discrete	PSR group	Rating from 1 to 10, 10 representing the highest contract viability.
Fiscal deficit	Discrete	Eurostat	Public deficit as a percentage of GDP
Public debt	Discrete	Eurostat	Public debt as a percentage of GDP

Table 2 continued

Variable	Type/Unit	Source	Description
First bidding	Dummy	Own variable	1 if the company is bidding for a PPP for the first time, 0 - otherwise
Previous experience	Discrete	Own variable	Number of times each company has bid before
Previous winner	Discrete	Own variable	Number of times each company has won before
Consortium size	Discrete	Ministry of Finance PPP report	Number of companies in the consortium

Table 3 – Descriptive statistics

This table presents the descriptive statistics of the explanatory variables. Source: see Table 2.

Variable	Obs.	Mean	St. Dev.	Min.	Max
Renegotiated	428	0.59	0.49	0	1
Road sector	428	0.80	0.40	0	1
Railway sector	428	0.08	0.28	0	1
Security sector	428	0.02	0.13	0	1
First renegotiation	428	0.06	0.24	0	1
Years since previous renegotiation (years)	428	1.13	1.57	0	11
Concession age (years)	428	6.15	3.94	1	18
Investment (log of M€)	428	6.06	1.35	1.1	7.93
Contract duration (years)	428	28.41	6.21	4	36
Operational stage	428	0.69	0.46	0	1
Debt/Capex (%)	428	69%	21%	14%	97%
EIB	428	0.68	0.47	0	1
Availability payment	428	0.39	0.49	0	1
Election years (at t)	428	0.42	0.49	0	1
Election year lag (at t-1)	428	0.32	0.47	0	1
Election year lead (at t+1)	428	0.35	0.48	0	1
Change in government	428	0.33	0.47	0	1
Right-wing government	428	0.47	0.50	0	1
Foreign shareholders	428	0.23	0.42	0	1
Ascendi	428	0.30	0.46	0	1
Majority government	428	0.77	0.42	0	1
2006 PPP law	428	0.77	0.42	0	1
Low Corruption (scale 1-10)	428	6.17	0.23	5.56	6.97
Low Political risk rating (scale 1-100)	428	79.16	5.62	71	91
Rule of Law (scale 1-10)	428	2.31	0.27	1.5	2.5
Contract viability (scale 1-10)	428	3.07	0.95	2	4
Fiscal deficit (%)	428	-6.8%	2.5%	-2.7%	-9.6%
Public debt (%)	428	82.2%	22.7%	48.7%	120%

Table 4 - PPP renegotiations

Panel A shows the main data collected on renegotiations events. Panel B exhibits the percentage of PPPs that renegotiate under a range of specific conditions. Source: See Table 2.

PANEL A					
Data	Roads	Railway	Health	Security	Total
Number of PPP companies	22	2	10	1	35
Capex (M€)	18.801	502	650	126	20.079
Renegotiations events	233	17	1	3	254
Number of companies renegotiated	22	1	1	1	25
Renegotiations asked during construction stage	78	3	0	2	83
Renegotiations asked during operational stage	155	14	1	1	171
Renegotiations with traffic/demand payment	103	17	1	0	121
Renegotiations with availability payment	130	0	0	3	133
Renegotiations asked in election years	112	4	1	0	117
Renegotiations accepted	70	12	0	0	82
Renegotiations rejected	5	0	0	0	5
Renegotiations undergoing (at 31-12-2012)	158	5	1	3	167
PANEL B					
Average years between contract and the first renegotiation	3.4	7.0	4.0	2.0	3.5
% PPP renegotiated	100%	50%	10%	100%	71%
% PPP renegotiated in the first 3 years	64%	0%	0%	100%	43%
% PPP renegotiated in the first 4 years	82%	0%	10%	100%	57%
% PPP renegotiated in the construction period	82%	50%	0%	100%	57%
% PPP renegotiated in the operational period	77%	50%	10%	100%	57%
% PPP renegotiated in the electoral year	44%	2%	0%	0%	46%
% PPP renegotiated by left government	42%	4%	0%	1%	47%
% PPP renegotiated with national shareholders	64%	6%	0%	1%	72%

Table 5 - Renegotiation motives and timing

Panel A presents the main motives behind the renegotiation events. Panel B gives the average time between the award of the concession and the first renegotiation event, and the time between the beginning of the operations and the first renegotiation event. Source: See Table 2.

PANEL A					
PPP events	Roads	Railway	Health	Security	Total
Public sector motives					
Specific legal changes	79	0	0	0	79
Corporate tax increase relative to case base	11	0	0	0	11
Administrative delays	5	0	0	3	8
Contract changes	6	0	0	0	6
Changes in environmental requirements	1	0	0	0	1
Sub-total	102	0	0	3	105
Construction motives					
Archaeological findings	35	0	0	0	35
Additional work	23	3	0	0	26
Delay in expropriations	8	0	0	3	8
Construction overruns	7	0	0	0	7
Sub-total	73	3	0	0	76
Operational and major causes motives					
Low demand	0	14	0	0	14
Global agreement	11	0	0	0	11
Major causes events	4	0	1	0	5
Additional financial compensations	1	0	0	0	1
Other events	42	0	0	0	42
Sub-total	58	14	1	0	73
TOTAL	233	17	1	3	254
PANEL B					
Time in years					
Time between contract and renegotiation	Mean	Median	Min.	Max.	St. Dev
Roads	7	7	1	18	4
Railway	9	9	7	11	1
Health	4	4	4	4	0
Security	3	3	2	5	2
Total	7	7	1	18	4
Time between 1st year of operation and renegotiation	Mean	Median	Min.	Max.	St. Dev
Roads	6	5	1	15	3
Railway	6	6	6	8	1
Health	3	3	3	3	0
Security	1	1	1	1	0
Total	6	5	1	15	3

Table 6 – The probability of PPPs renegotiations

This table shows the marginal effects of a random effects probit model with as dependent variable the renegotiation/no-renegotiation event. Test 1, 3 and 5 include sector variables. We use alternative variables in some models if we cannot include these variables in the same model due to multicollinearity. Robust standard errors in parentheses. *** stands for $p<0.01$, ** stands for $p<0.05$, and * for $p<0.1$. Source: own calculations based on sources presented in Table 2.

VARIABLES	(1) Renegotiated	(2) Renegotiated	(3) Renegotiated	(4) Renegotiated	(5) Renegotiated	(6) Renegotiated
Road sector	0.860***		0.908***		0.860***	
	(0.04)		(0.04)		(0.05)	
Railway sector	0.480***		0.532***		0.482***	
	(0.06)		(0.07)		(0.06)	
Security sector	0.417***		0.433***		0.418***	
	(0.04)		(0.05)		(0.04)	
Renegotiation experience						
First renegotiation	0.468***	0.437***	0.483***	0.434***	0.468***	0.437***
	(0.04)	(0.03)	(0.04)	(0.03)	(0.04)	(0.03)
Years since previous renegotiation	0.004	0.011	-0.005	0.008	0.003	0.011
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Concession age	-0.021	-0.011**	-0.02	-0.001	-0.021	-0.015**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Project characteristics						
Capex	-0.021	0.202***			-0.021	0.202***
	(0.01)	(0.04)			(0.06)	(0.04)
Contract duration			-0.02	0.025***		
			(0.01)	(0.01)		
Operational stage	0.322***	0.230***	0.328***	0.243***	0.321***	0.230***
	(0.09)	(0.09)	(0.09)	(0.08)	(0.09)	(0.09)
Financial structure						
Debt/Capex	-0.007***	-0.001	-0.008***	-0.003*	-0.007***	-0.001
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)
EIB		0.063		0.19*		0.063
		(0.10)		(0.09)		(0.10)
Availability payment	-0.146	-0.037	-0.147	-0.014	-0.151	-0.037
	(0.121)	(0.10)	(0.12)	(0.10)	(0.12)	(0.10)

Table 6 continued

VARIABLES	(1) Renegotiated	(2) Renegotiated	(3) Renegotiated	(4) Renegotiated	(5) Renegotiated	(6) Renegotiated
Electoral cycles						
Electoral year	0.242	0.244	0.449**	0.378*		0.244
	(0.21)	(0.20)	(0.19)	(0.18)		(0.20)
Electoral year (t-1)	0.261*	0.261**	0.375***	0.320***	0.157	0.261**
	(0.14)	(0.13)	(0.10)	(0.09)	(0.12)	(0.13)
Electoral year (t+1)	0.088	0.09	0.170	0.110	-0.013	0.091
	(0.14)	(0.13)	(0.15)	(0.14)	(0.10)	(0.13)
Right wing government	0.257	0.246	0.311*	0.292*	0.258	0.246
	(0.26)	(0.25)	(0.17)	(0.16)	(0.28)	(0.25)
Change in government					0.041	
					(0.23)	
Political connections						
Foreign shareholders	0.033	0.255**	0.018	0.187***	0.027	0.255**
	(0.10)	(0.06)	(0.09)	(0.07)	(0.10)	(0.06)
Ascendi	0.116	0.025**	0.115	0.158*	0.113	0.225**
	(0.08)	(0.08)	(0.08)	(0.07)	(0.08)	(0.07)
Majority government	-0.305	-0.30	-0.434***	-0.417***	-0.268	-0.300
	(0.20)	(0.19)	(0.10)	(0.08)	(0.27)	(0.19)
Legal environment						
2006 PPP Law	0.538**	0.534**	0.591***	0.554***	0.490**	0.534**
	(0.17)	(0.17)	(0.12)	(0.14)	(0.20)	(0.17)
Low Corruption	-0.441	0.435			-0.554	-0.435
	(0.35)	(0.34)			(0.36)	(0.34)
Low Political risk			-0.046	-0.028		
			(0.04)	(0.03)		
Rule of Law						
Rule of Law	0.443*	0.439*	0.531***	0.464***	0.499**	0.439*
	(0.24)	(0.23)	(0.192)	(0.18)	(0.24)	(0.23)
Contract viability	-0.248	-0.166			-0.285	-0.166
	(0.31)	(0.30)			(0.40)	(0.29)
Fiscal constraints						
Fiscal Deficit	0.045	0.049	0.056	0.056	0.019	0.04
	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)

VARIABLES	(1) Renegotiated	(2) Renegotiated	(3) Renegotiated	(4) Renegotiated	(5) Renegotiated	(6) Renegotiated
Public debt	-0.003	-0.001	-0.001	0.001	-0.005	-0.001
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
Constant	4.41	2.42	3.98	-1.77	6.94	2.42
	(10.63)	(10.65)	(9.95)	(9.71)	(11.70)	(10.65)
Wald test	0.000	0.000	0.000	0.000	0.000	0.000
Observations	428	428	428	428	428	428

Table 7 – Probability of government-led renegotiations

This table shows the marginal effects of a random effects probit model with the dependent variable being if the government initiate the renegotiation. We found multicollinearity between right wing government and election year t-1, between contract viability with low political risk and public debt and between low political risk and public debt, and for that we present 7 tests. *** stands for p<0.01, ** stands for p<0.05, and * for p<0.1. Source: own table.

VARIABLES	(1) Gov Led	(2) Gov Led	(3) Gov Led	(4) Gov Led	(5) Gov Led	(6) Gov Led	(7) Gov Led
Renegotiation experience							
First renegotiation	0.205	0.200	0.043	0.277*	0.190	0.078	0.180
	(0.13)	(0.13)	(0.12)	(0.128)	(0.13)	(0.12)	(0.13)
Years since previous renegotiation	0.071	0.068	0.016	0.075	0.071	0.067	0.069
	(0.04)	(0.04)	(0.04)	((0.05)	(0.05)	(0.05)	(0.05)
Concession age	0.042**	0.042**	0.041**	0.042**	0.041**	0.037**	0.040**
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.03)	(0.02)
Project characteristics							
Capex	-0.045	-0.045	-0.009	-0.050	-0.035	-0.012	-0.029
	(0.10)	(0.10)	(0.10)	(0.10)	(0.11)	(0.10)	(0.11)
Contract duration	0.084**	0.084**	0.062**	0.085**	0.081**	0.045**	0.084**
	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)	(0.02)	(0.03)
Operational stage	-0.025	-0.018	0.029	-0.023	-0.025	0.076	0.004
	(0.15)	(0.15)	(0.15)	(0.15)	(0-15)	(0.14)	(0.15)
Financial structure							
Debt/Capex	0.014***	0.014***	0.014***	0.015***	0.014***	0.014***	0.014***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
EIB	-0.564***	-0.558***	-0.526***	-0.577***	-0.576***	-0.526***	-0.555***
	(0.09)	(0.09)	(0.10)	(0.10)	(0.09)	(0.09)	(0.09)
Availability payment	-0.324*	-0.320*	-0.366**	-0.340**	-0.333*	-0.357**	-0.310*
	(0.17)	(0.17)	(0.15)	(0.17)	(0.17)	(0.15)	(0.17)
Electoral cycles							
Electoral year	0.103	0.474		0.587	-0.296***		-0.039***
	(0.56)	(0.54)		(0.762)	(0.402)		(0.432)
Electoral year (t-1)	-0.761***	-0.583**		-0.609**	-0.731***		-0.550***
	(0.18)	(0.256)		(0.248)	(0.14)		(0.18)

Table 7 continued

VARIABLES	(1) Gov Led	(2) Gov Led	(3) Gov Led	(4) Gov Led	(5) Gov Led	(6) Gov Led	(7) Gov Led
Electoral year (t+1)	-0.519*	-0.496*	-0.367***	-0.532*	-0.68***	-0.168***	-0.659***
	(0.27)	(0.28)	(0.14)	(0.28)	(0.16)	(0.15)	(0.19)
Right wing government			0.097			0.098	
			(0.33)			(0.48)	
Change in government	-0.595***	-0.565**		-0.842***	-0.978***		-0.954***
	(0.23)	(0.23)		(0.18)	(0.04)		(0.07)
Political connections							
Foreign shareholders	0.372***	0.370**	0.388***	0.383***	0.386***	0.382***	0.376***
	(0.13)	(0.13)	(0.14)	(0.13)	(0.14)	(0.12)	(0.12)
Ascendi	0.604***	0.601***	0.609***	0.611***	0.619***	0.622***	0.605***
	(0.10)	(0.10)	(0.11)	(0.11)	(0.10)	(0.09)	(0.11)
Majority government	-0.912***	-0.922***	-0.740***	-0.944***	-0.805***	-0.464	-0.828***
	(0.05)	(0.03)	(0.10)	(0.05)	(0.07)	(0.32)	(0.06)
Legal environment							
2006 PPP Law	0.194	0.033	-0.391	0.191	-0.317	-0.326	-0.529***
	(0.44)	(0.52)	(0.28)	(0.64)	(0.32)	(0.40)	(0.18)
Low Corruption	-3.293***	-2.476***	-1.511***	-2.784***	-2.917***	-0.920**	-2.026***
	(1.06)	(0.92)	(0.50)	(0.88)	(0.71)	(0.39)	(0.54)
Low Political risk		-0.0939***	-0.073**				-0.140***
		(0.03)	(0.04)				(0.05)
Rule of Law							
Rule of Law	1.488**	1.243*	0.983***	2.416***	3.728***	0.949***	3.571***
	(0.71)	(0.64)	(0.35)	(0.91)	(1.17)	(0.32)	(1.09)
Contract viability	-0.443***				-0.763***	-0.176	
	(0.15)				(0.25)	(0.25)	
Fiscal constraints							
Fiscal deficit	0.273***	0.292***	0.137***	0.269*			
	(0.08)	(0.08)	(0.04)	(0.14)			
Public debt				0.031***			
				(0.01)			
Constant	46.96***	50.94***	30.45***	13.80***	8.77***	9.95***	
	(15.10)	(13.30)	(11.19)	(26.53)	(12.29)	(15.94)	
Observations	245	245	245	245	245	245	

Table 8 – Duration models

This table estimates a duration model by means of a Cox-hazard test. The dependent variable is the time between the start of a negotiation and its conclusion (in case of a successful completion) or the end of 2012 (when our data end, in case of uncompleted renegotiations). Variable definitions are in Table 2. Nine observations were dropped due to a lack of data. Robust standard errors are in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Source: own table.

	All sample			Road sector		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	_t	_t	_t	_t	_t	_t
Renegotiation experience						
First renegotiation	0.66	0.39	0.66	0.22	-0.49	0.22
	(0.54)	(0.59)	(0.54)	(0.57)	(0.73)	(0.57)
years since previous renegotiation	0.03	-0.00	0.03	0.21	0.01	0.21
	(0.15)	(0.16)	(0.15)	(0.17)	(0.19)	(0.17)
Concession age	-0.07	-0.08	-0.07	0.06	-0.05	0.06
	(0.11)	(0.10)	(0.11)	(0.11)	(0.10)	(0.11)
Project characteristics						
Capex	0.35		0.35	-0.07		-0.07
	(0.25)		(0.25)	(0.56)		(0.56)
Contract duration		0.02			-0.29**	
		(0.05)			(0.13)	
Operational stage	0.88	0.56	0.88	1.08	0.65	1.08
	(0.56)	(0.66)	(0.56)	(0.66)	(0.72)	(0.66)
Financial structure						
Debt/Capex	-0.04***	-0.05***	-0.04***	-0.02	-0.06***	-0.02
	(0.01)	(0.01)	(0.01)	(0.03)	(0.02)	(0.03)
EIB	-0.56	0.14	-0.56	0.13	1.55	0.13
	(0.95)	(0.92)	(0.95)	(1.05)	(0.95)	(1.05)
Availability payment	-1.79*	-1.71*	-1.79*	1.24	-0.06	1.24
	(1.03)	(0.92)	(1.03)	(0.96)	(1.17)	(0.96)
Electoral cycles						
Electoral year	0.79	-0.89	0.79	0.90	-0.59	0.90
	(0.77)	(1.39)	(0.77)	(0.92)	(1.53)	(0.92)

Table 8 continued

VARIABLES	All sample			Road sector		
	(1)	(2)	(3)	(4)	(5)	(6)
	_t	_t	_t	_t	_t	_t
Electoral year t-1	0.17	-1.02	0.17	-0.62	-1.70	-0.62
	(0.60)	(0.75)	(0.60)	(0.83)	(1.06)	(0.83)
Electoral year t+1	-1.71***	-1.78*	-1.71***	-3.51***	-2.84**	-3.51***
	(0.51)	(1.02)	(0.51)	(0.71)	(1.45)	(0.71)
Right wing government	2.59**	0.80	2.59**	4.41**	0.48	4.41**
	(1.29)	(2.17)	(1.29)	(1.76)	(1.39)	(1.76)
Political connections						
Foreign shareholders	-1.30**	-1.40**	-1.30**	-0.54	-1.07	-0.54
	(0.63)	(0.58)	(0.63)	(0.83)	(0.88)	(0.83)
Ascendi	0.07	-0.20	0.07	0.93	0.57	0.93
	(0.50)	(0.47)	(0.50)	(0.67)	(0.71)	(0.67)
Majority government	-5.08***	-2.32	-5.08***	-7.21***	-0.22	-7.21***
	(1.47)	(1.50)	(1.47)	(1.83)	(1.25)	(1.83)
Legal environment						
2006 PPP Law	2.97**	1.71	2.97**	2.03	0.23	2.03
	(1.32)	(2.38)	(1.32)	(1.64)	(1.25)	(1.64)
Low Corruption	4.41***		4.41***	6.02***		6.02***
	(1.24)		(1.24)	(1.59)		(1.59)
Low Political risk		0.07			-0.05	
		(0.27)			(0.30)	
Rule of law						
Rule of Law	-0.49	-0.80	-0.49	1.45*	0.86	1.45*
	(0.77)	(1.53)	(0.77)	(0.82)	(1.47)	(0.82)
Contract viability	3.63***		3.63***	6.79***		6.79***
	(1.32)		(1.32)	(2.03)		(2.03)
Fiscal constraints						
Fiscal deficit	-0.08	-0.15	-0.08	-0.11	-0.25	-0.11
	(0.14)	(0.23)	(0.14)	(0.19)	(0.23)	(0.19)
Public debt	0.05	-0.07	0.05	0.14*	-0.13	0.14*
	(0.05)	(0.05)	(0.05)	(0.07)	(0.08)	(0.07)
Observations	245	245	245	224	224	224

Table 9 – Experience in bidding

This table relates the bidder's rank or win to his experience in the bidding process. Model (1) is estimated by means of an ordered probit whereby the bidder's rank (after two rounds of bidding) is the dependent variable. In Model (2), the dependent variable is an indicator variable that captures whether a firm won or lost the 2nd stage bid. The independent variables are First bidding (whether or not the firm participated to the bidding process for the first time), Previous experience (number of times a firm has bid for a PPP), Previous win (number of times the firm won a PPP concession), and consortium size (number of firms in the consortium). The models include firm and year fixed effects. Robust standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

VARIABLES	(1) Bidder Rank (ordered probit)	(2) Win (/Lose) (probit)
Previous experience	-0.29***	0.29***
	(0.06)	(0.08)
Previous winner	0.53***	-1.24***
	(0.11)	(0.31)
Consortium size	0.09	-0.63**
	(0.07)	(0.27)
Constant	0.01	1.07
	(0.51)	(1.31)
Firm effects	Yes	Yes
Year effects	Yes	Yes
Observations	279	89

Table 10 – PPP renegotiations and the bargaining power rate

This table presents the results of a pooled OLS regression with as dependent variable the bargaining power rate (the percentage between the funds demanded in the renegotiation by the private firm and the funds actually paid by the government to the private party). To avoid multicollinearity, we did not include concession age and years since previous renegotiation into one model; idem for electoral year and change in government. Robust standard errors are in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: own table.

VARIABLES	(1) "bargaining power rate"	(2) "bargaining power rate"
First renegotiation	-0.00	-6.12
	(10.52)	(13.98)
Concession age	-0.49	
	(1.75)	
years since previous renegotiation		-3.16
		(2.74)
Electoral year	18.26*	
	(9.70)	
Electoral year t-1	16.22	16.38*
	(12.17)	(8.86)
Electoral year t+1	16.44	15.90**
	(10.41)	(7.92)
Right-wing government	-40.39**	-43.20***
	(17.45)	(14.14)
Change in government		22.62
		(16.24)
Foreign shareholders	-34.96***	-35.90**
	(13.00)	(14.54)
Ascendi	22.11**	25.37***
	(10.63)	(8.87)
Majority government	-8.27	-8.05
	(14.04)	(9.56)
2006 PPP Law	5.44	9.83
	(11.05)	(10.87)
Constant	69.04***	71.10***
	(13.34)	(10.82)
Observations	65	65
R-squared	0.66	0.67

Figure 1- PPP Investments (1995–2011) as a percentage of GDP

This figure shows the relative weight of PPP investments according to the size of each economy (level of accumulated PPP investment, over the period 1995 to 2011, as a percentage of GDP). Source: figure based on data collected from EIB (for investment in PPPs) and Ameco (for GDP).
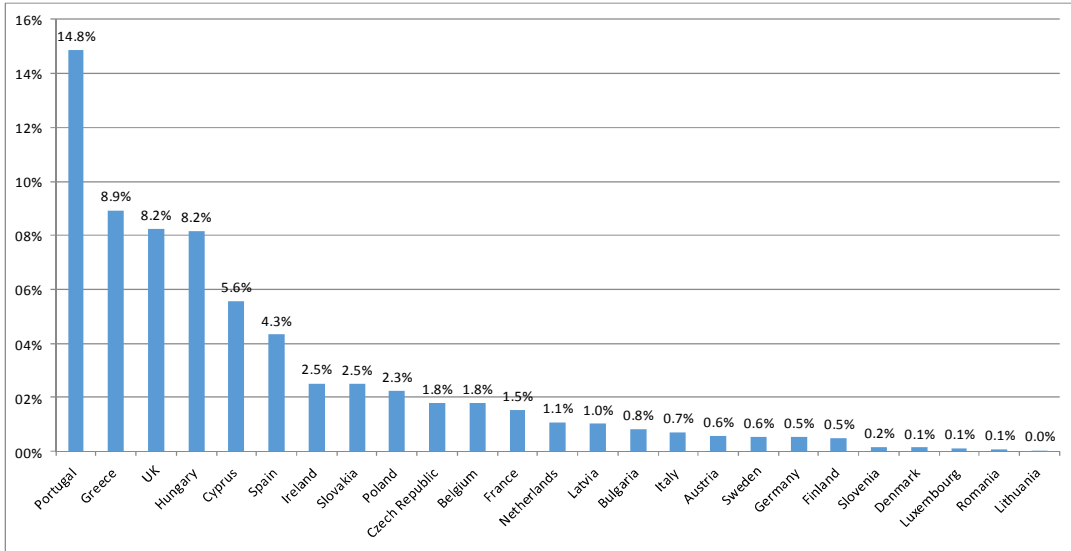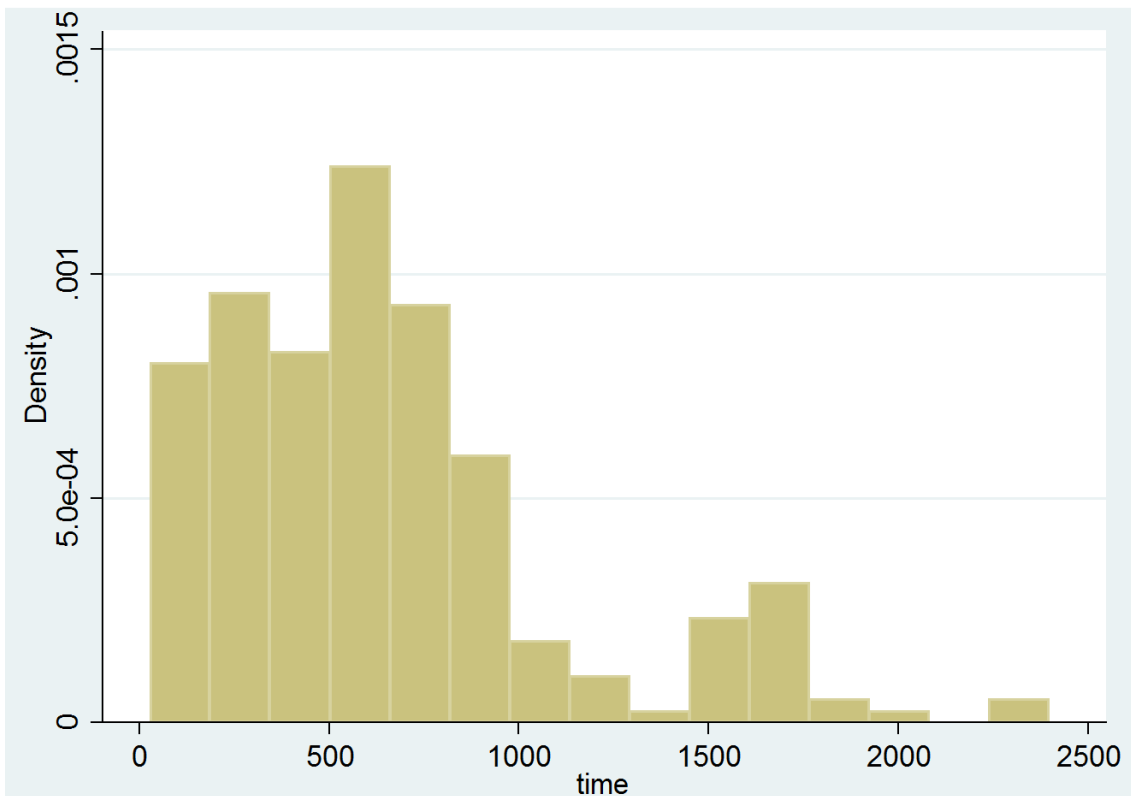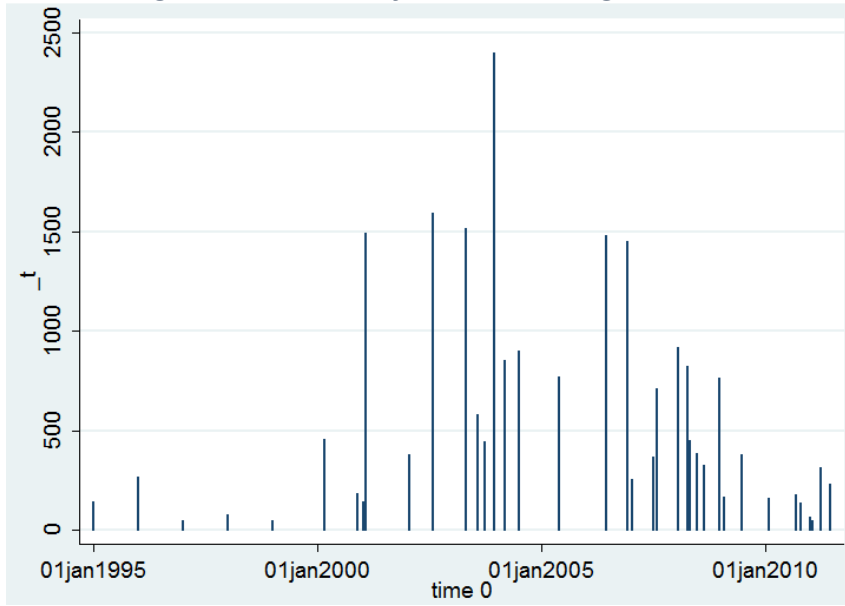

Figure 2 – Histogram of the duration of renegotiations

Source: own data.

Figure 3 – Duration of concluded renegotiations

Source: own data.

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