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The Cost of Public-Private Partnerships for the Public Partner: The Road Sector in Portugal

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Abstract

Nowadays, the high costs that the Portuguese State is bearing with Public-Private Partnerships (PPPs) are often in the headlines of the Portuguese newspapers. In this context, the purpose of this dissertation is to analyse the predicted costs with PPPs projects for the public partner in the road sector. Since, over the last years, the National State Budgets has presented different predictions regarding the cost that the State will bear during 2014-2031.

Therefore, I had as objective to assess if there are reasons that explain those differences. To accomplish this objective, I investigated each project and each State Budget. Through this data analysis, I verified that during the period that was studied (from the State Budget of 2005 to 2014), new projects with expected costs for the public partner were launched, and there were renegotiations of the contracts. Thus, these are some of the reasons for the differences observed. Then, I identified factors that affect the predicted costs through econometric analysis. The model has as dependent variable the Present Value of the predicted costs for each project in each State Budget, and I concluded that they are affected by the changes on the model of payment, by the economic context and by the fact that Portugal was in the last years under a Financial Assistance Programme. Moreover, with this dissertation, I identified some challenges for the public partner with the PPP model. One of the main aspects that has to be improved is the transparency. The State Budgets should disclose more information and mainly explain significant deviations from the previous ones.

Resumo

Nos dias de hoje, os elevados custos suportados pelo Estado com Parcerias Público-Privadas (PPPs) são muitas vezes manchetes dos jornais portugueses. Neste contexto, o objetivo desta dissertação é analisar os custos previstos com PPPs do sector rodoviário para o parceiro público. Uma vez que, ao longo dos últimos anos, os Orçamentos de Estado apresentaram diferentes previsões em relação aos custos que o Estado terá que suportar durante 2014-2031.

Assim sendo, pretendi encontrar explicações para essas diferenças. De forma a concretizar esse objetivo, analisei cada projecto e cada Orçamento de Estado (OE). Com esta análise de dados, verifiquei que durante o período analisado (do OE de 2005 ao de 2014), novos projectos com custos esperados para o parceiro público foram lançados, e que houve renegociações de contractos. Assim, estas são algumas das razões para as diferenças observadas. Depois identifiquei fatores que afetam os custos previstos via análise econométrica. O modelo tem como variável dependente o Valor Actualizado dos custos previstos para cada projecto em cada OE, e concluí que são afectadas pelas mudanças do modelo de pagamento, pelo contexto económico e pelo facto de Portugal ter estado nos últimos anos ao abrigo de um Programa de Assistência Financeira. Com esta dissertação identifiquei alguns desafios para o parceiro público com o modelo de PPP. Um dos principais aspectos a melhorar é a transparência. Os Orçamentos de Estado devem divulgar mais informação e, principalmente, explicar os desvios mais significativos relativamente a estimativas anteriores.

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Acronyms

CASNS- Centro de Atendimento do Serviço Nacional de Saúde

CMFRS- Centro de Medicina Física e Reabilitação do Sul

CPI - Consumer Price Index

DBFOT – Design-Build-Finance-Operate-Transfer

DGO- Direção-Geral do Orçamento

DGTF- Direção-Geral do Tesouro e Finanças

DSCR- Debt-Service Coverage Ratio

ECB- European Central Bank

EP- Estradas de Portugal, S.A.

EU- European Union

E&Y- Ernst & Young

FRAs- Financial Re-equilibrium Agreements

GDP- Gross Domestic Product

InIR- Instituto de Infra-Estruturas Rodoviárias I.P

IRR- Internal rate of return

M€- Million Euros

MST- Metro Sul do Tejo (the subway of the south of the river Tagus)

NAO- National Audit Office (Tribunal de Contas- TdC)

NHS- National Health System

NMGFSR- Novo Modelo de Gestão e Financiamento do Sector Rodoviário

NPV- Net Present Value

OECD- Organisation for Economic Co-operation and Development

O&M- Operation & Maintenance

PPP- Public-Private Partnership

PSC- Public Sector Comparator

PV- Present Value

SB- State Budget

SCUT- Sem Cobrança aos Utilizadores (roads with shadow tolls)

TIP- Traditional infrastructure procurement

UK- United Kingdom

USA- United States of America

UTAP- Unidade Técnica de Acompanhamento de Projetos

VAT- Value Added Tax

VFM- Value for Money

1. Introduction

Over the last years, in Portugal, there has been a considerable debate in the media and at a political level regarding Public-Private Partnerships (PPPs). The costs supported by the State¹ are considered too high and unaffordable. Therefore, it is important to understand if they were expected in the State Budgets (SBs). By observing the predicted costs presented in different State Budgets for the same period of time and for the road sector, I verified that those predictions vary from one SB to another. For example, the figure 1 presents the predicted costs for the State with PPPs in the road sector from 2014 to 2031 in two different State Budgets, the SB 2006 and 2009. Thus, if I am analysing the costs for the same period of time, I would expect that those lines overlap, in other words, the predictions should be equal. In fact, the evolution of the costs is similar, but the values are higher in the SB 2009.

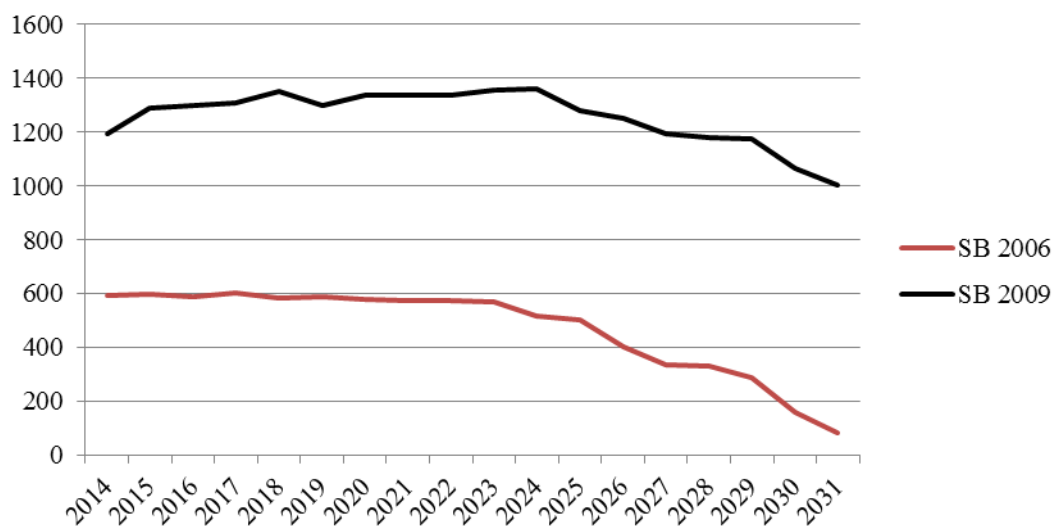


Figure 1: Predicted costs during 2014-2031

X-axis: Years

Y-axis: Predicted costs for the State (M€)

¹ In this dissertation State is a synonym of public sector or public partner, as per Moreno (2010)

Other approach in observing these differences is by summing the discounted predicted costs per SB, and in this way I obtained the PV of the predicted costs for each SB, as observable in the graph below:

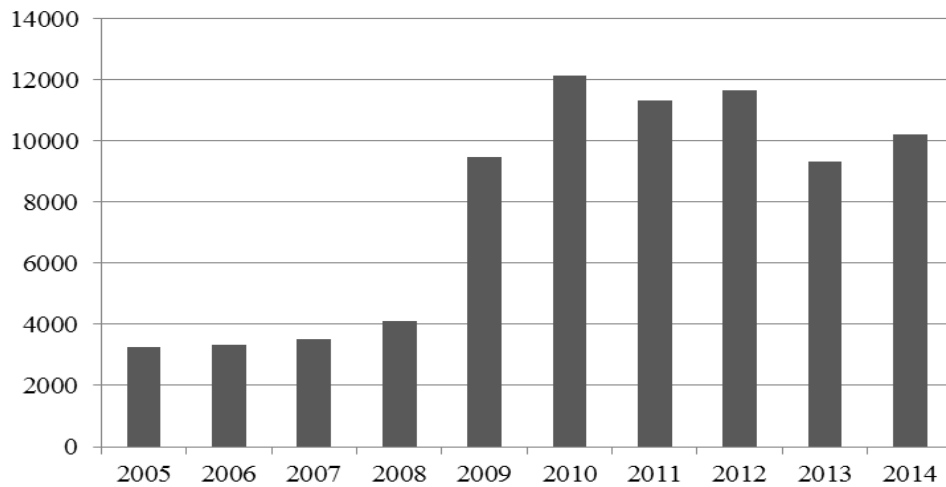


Figure 2: Predicted costs per State Budget

X-axis: SBs

Y-axis: PV of predicted costs for the State (M€)

Observing this graph I could also verify the differences from one SB to another. For example, comparing the present value (PV) of the predicted costs presented in the SB of 2006 and of 2009, there is a difference of 6 170 M€². Why are they different?

In this context the main objective of this dissertation is to find the explanations behind the predictions presented in the Portuguese State Budgets regarding the cost that the State will bear during 2014-2031. Thus, I will aim at answering the questions: *How can one explain different predictions regarding how much the State will spend during the same period of time? Which factors can affect the predictions?*

One of the explanations may be related to the launch of new projects. If there is a new project, this may increase costs. Other reason would be renegotiations. There are examples of PPPs that were renegotiated, and this had a significant impact on the financial responsibilities of the State. Moreover, the economic and political situation during the preparation of each SB may also affect the predictions. These possible reasons are further on analysed in this dissertation.

In order to answer the main question of this dissertation, I will firstly analyse each PPP in the road sector (24 projects) and each State Budgets (10 SBs, from the SB 2005 to 2014). This way, I will be able to recognize the main events regarding PPPs in the road sector. Then, I will compute an econometric model based on panel data, on which I will identify the variables that affect the predictions. Since State Budgets only present the total predicted costs for the road sector, this analysis will be based on data on costs per project, provided by Estradas de Portugal.

² The PV of the predicted costs in the State Budget of 2009 is 9 487 M€, and of 2006 is 3 317 M€. (In the section Methodology and Data Collection it is explained how these values were computed).

2. Literature Review

2.1. Overall overview of concepts

PPPs refer to a model applied by governments to finance public investment. Actually, there is not a single definition for this type of model. As defined by the OECD, they are “an agreement between the government and one or more private partners (which may include the operators and the financiers) according to which the private partners deliver the service in such 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). Since Portugal is the case study of this dissertation, the definition of PPP by the Portuguese Law is the following: “a contract by which private entities undertake, for a long period, the responsibility of ensuring the development of an activity aimed at satisfying a collective need. The financing, the investment and the operation of the project are responsibilities, in whole or in part, of the private partner” (Decree-Law n. 86/2003 of 26th of April³). Summarizing, all definitions of PPPs refer to them as a public-private relationship, based on a contract and on risk sharing in a more complex way than traditional infrastructure public procurement (TIP)⁴.

Actually, a PPP is a model of delivering public services that is being increasingly used in several countries in order to face current main challenges. For instance, in developing countries, needs regarding infrastructure and services have not been satisfied, and this has compromised the achievement of the Millennium Development Goals. On the other hand, developed countries have to face the growing demand for more infrastructures, the need to improve public services and the need to upgrade public infrastructure due to the ageing of assets (OECD, 2007). So, what is the solution? Governments could invest heavily in infrastructure and service delivery. However, there are budget constraints to bear in mind which cannot be ignored. To recap the first lesson in economics, there are limited resources and unlimited needs: all governments must still find the financial means to supply public infrastructure. Furthermore, some countries deal with fiscal pressures concerning the reduction of public debt and fiscal deficits (OECD, 2007

³ A few remarks on this Decree-Law:

- Translated by the author from the original Portuguese version:
“Contracto ou a união de contractos, por via dos quais entidades privadas, designadas por parceiros privados, se obrigam, de forma duradoura, perante um parceiro público, a assegurar o desenvolvimento de uma actividade tendente à satisfação de uma necessidade colectiva, e em que o financiamento e a responsabilidade pelo investimento e pela exploração incumbem, no todo ou em parte, ao parceiro privado”
- This Decree-Law was the first legal regulation regarding PPPs in Portugal, and established the characteristics and rules concerning the launch of PPPs. It is worth to mention that the majority of the contracts were signed before the publication of it. Therefore, the PPP’s boom in Portugal was without a specific legal framework (Moreno, 2010).

⁴ Traditional Infrastructure Procurement: governments pay to private companies for the construction of certain infrastructures. In the end of the construction’s period, the asset belongs to the government, and it is responsible for its operation (OECD, 2013). In Appendix 1, the differences between the contracting and financing structure of a TIP and a PPP concession, are presented. PPPs: “arrangements where the private sector supplies infrastructures assets and infrastructure-based services that traditionally have been provided by the government” (Corbacho, Funke et Schwartz, 2008).

and 2008; Posner, Ryu et Tkachenko, 2009). PPPs, as an alternative to TIP, have *proven*⁵ to be a good choice when governments deal with a strict financial constraint and the service delivery role⁶. In these situations, the financing from the private sector, sometimes, seems the cheapest or even the only way to finance a project. In extreme situations, governments only have two options: apply the PPP model or “no infrastructure” (OECD, 2007). In fact, “when national budgets are on bread-and-water diets, PPPs are like a parcel of cheese and sausage under the floorboards”⁷. Some governments only apply the PPP model when they have neither revenues nor the credit to finance investments in public goods and services⁸. On one hand, this is a reason for the increasing use of PPPs. But, on the other hand, it is one of the biggest problems. Summarily, the reason for applying PPPs should not be the demand for *financial miracle solutions* or *financial engineering* to launch projects. Contrarily, it should be a feasible solution among other alternatives, and should only be applied when its advantages for the public sector are proven by a cost-benefit analysis (Cardoso, 2011; Arroja, 2012).

Apart from that, there are other reasons for using PPPs, which provide potential⁹ benefits for the economy. For instance, the share of know-how and resources between the private and public sector, which may lead to a more effective, efficient¹⁰, flexible and faster way of maximizing collective satisfaction. The differences between these two types of partners may lead to a *healthy marriage* (Dochia et Parker, 2009; Posner, Ryu et Tkachenko, 2009; Cardoso, 2011; OPPP, 2011). Actually, the benefits obtained from the technical and specialized capacities in construction and management of services of private partners comes as one of the main potential advantages. These benefits encompass the improvement of supplied goods and services and/or the possibility of creating savings of public resources, which provides greater fiscal margin¹¹ (Grimsey et Lewis, 2004; OECD, 2007 and 2008; Posner, Ryu et Tkachenko, 2009; Cardoso, 2011). In addition to this, in comparison to a TIP, a PPP may provide more incentives for the private sector to deliver a better job. With the TIP model, the private sector is involved only in the construction, and afterwards, the public sector is solely responsible for the maintenance.

⁵ At least, according to some members of governments, and at idealistic terms. However, as it will be explained in this dissertation, this model of financing was not always a good idea. In some cases, they have proven not to be a good idea, or, a good idea that was not well implemented.

⁶ According to the information in the SB 2006, the Portuguese Government was interested in increasing the number of projects with high levels of investment using the PPP model, in order to deal with the public financial situation at the time (SB, 2006).

⁷ Source: OECD Observer No 278 (2010)

⁸ Public good: there are some goods and services that do not create profits, so they will never be offered by the private sector. In fact, the objective of this sector is the maximization of profits. However, these good and services create positive externalities for the economy as a whole. These are two reasons why they have to be offered by the State (Arroja, 2012; Sarmiento, 2013).

⁹ Some assumptions must be verified for a PPP to prove its real advantages (Cardoso, 2011).

¹⁰ A few remarks on Effectiveness and Efficiency:

- Effectiveness: the intended quantity is delivered (OECD, 2008).
- Efficiency: It is delivered at least cost (OECD, 2008).
- “The involvement of private operators has its main advantage over publicly run projects when there is a potential to take advantage of the private operators’ operational and administrative efficiencies (such as the technical expertise and the managerial competences of commercial operators), increased competition and enhanced services to end-consumers” (OECD, 2007). For example, efficiency can be improved because of the ability of the private partner to impose user charges, which may be not easy for the government. Moreover, the private partner may easier align the price with costs. In this way, inefficient demands are reduced (Schwartz, Corbacho et Funke, 2008 and Posner, Ryu et Tkachenko 2009).

¹¹ “The purpose of this collaboration is to bring added value to infrastructure through innovation, enabling the government to deliver either a qualitatively better end product for the same outlay or the same quality at a cost saving” (Grimsey et Lewis 2004).

Therefore, the private sector partner may purposely fail to perform in accordance with the desirable quality and without delays, because this may imply more profits. By not delivering a good job, the infrastructure may need an improvement in the future, which can lead to an additional contract with the same private entity. The other possible situation is if the State decides to cut in maintenance costs. In fact, this is usually the case in periods of austerity. Therefore, the operation of the infrastructure is not improved. Contrarily, with a PPP, the private sector starts receiving payments only when the operational stage starts, so it is not interested in delays during the construction period. Additionally, it would want to avoid high lifecycle costs (future O&M cost), which justifies a focus on higher quality¹². In conclusion, to pursue this objective, the private partner “boosts both the coverage and efficiency of infrastructure services” (OECD, 2007) and it may invest in cost-saving technology. Thus, it may have incentives to incur in higher costs initially, in order to reduce future costs¹³ (Posner, Ryu et Tkachenko, 2009; Burger et Hawkesworth, 2011; Cardoso, 2011). Other advantage of the PPP model is that it reduces the domain of the governmental action. In other words, with these projects, the State is not responsible for all the proceedings, such as planning, financing, construction, management and maintenance. Thus, the risks associated with all these stages are not fully borne by the State. In other words, there is risk sharing. Summarily, the main advantages for the public partner would be the risk sharing, the possible high value for money, if the private partner has more skills, and consequently, if it can face the additional financing costs of private interest rates (Schwartz, Corbacho et Funke, 2008; Posner, Ryu et Tkachenko, 2009; Cardoso, 2011). For the private partner, an advantage of the PPP model is the opportunity of new businesses. It is the possibility of working in areas that previously were only of the governments’ responsibility; and, at the same time, obtaining high remunerations (Schwartz, Corbacho et Funke, 2008; Moreno, 2010).

However, aligning public and private interests is not always possible, since sometimes there are goal conflicts. It is easier to deal with this, if the infrastructure leads to more productivity for the private partner. Contrarily, “the more a service takes on the character of a public good, the less private incentives will be congruent with public interest, leading to greater public disappointment with the results” (Posner, Ryu et Tkachenko, 2009). Generally, their different interests lead to uncertain relations, “characterized as bargaining relationships in which both partners have independent sources of leverage over the other”, which therefore, may affect the

¹² Examples: “PPPs, in fact, have shown some early gains in construction timeliness and costs. The United Kingdom National Audit Office reports that PPPs are delivered on time and on budget more often than traditional arrangements. Traditional infrastructure is on time and on budget 30% of the time, while PPP projects are on time and on budget over 75% of the time (Hodge and Greve, 2007, p. 549). Michael Pollitt also concluded that PPPs deliver on time and on budget a higher percentage of the time. While public agencies could do this too, they needed PPPs to stimulate and innovate (Pollitt, 2005). Beyond this, some studies have shown that PPPs were less costly in the United Kingdom for prisons and roads. The National Audit Office predicted that a sample of projects studied in the 1990s experienced cost savings of 10%, attributable to risk transfers from public to private firms (Hodge and Greve, 2007)” (Posner, Ryu et Tkachenko, 2009).

¹³ This only happens if the NPV of the future savings is higher or equal than the NPV of the additional initial costs (Burger et Hawkesworth, 2011).

achievement of public goals (Posner, Ryu et Tkachenko, 2009). In fact, PPPs, unfortunately, are not regarded as a *bed of roses*. Most of the problems that arise are related with the costs with PPPs for the State: they may encumber more SBs. In fact, there are different problematic situations in different countries. That is why some international institutions have already published recommendations¹⁴ regarding transparency, affordability, accountability, risk sharing, etc. of PPP's projects. These are core areas to which some of those problems are related to. In section 2.2, the problems related to these areas, which directly or indirectly affect the costs for the State, are deeply analysed.

2.2. Challenges regarding PPPs

2.2.1. The Role of the State

As aforementioned, a PPP has an inherent complex relation, which involves two distinct entities in a contract during a long period. These entities have different objectives and interests, and historically, they are not compatible (for example, maximization of profits vs social interest) (Bult-Spiering et Dewulf, 2006; OECD, 2008; Cardoso, 2011; OPPP, 2011). Therefore, cooperation is crucial. In this context, the word *partnership* does not mean that the involved parties share the same objectives. It means that, although their objectives are different, they are able to align them in order to achieve the objectives of both partners (OECD, 2008). In addition to this, the State cannot forget its responsibilities. Although some work is transferred to the private partner, the Government is still responsible for the performance of the project (Posner, Ryu et Tkachenko, 2009).

In order to deal with the problem of goal conflict and accomplish with its main responsibility of acting in favour of the public interest, the public partner should have “a competent, equitable and diligent attention to contracts, regulation and legal frameworks” (OECD, 2007). In fact, regarding competence, there are examples of situations that prove that the public partner is not prepared to deal with PPPs (OECD, 2007). In Portugal, for instance, it is mentioned that the State has a deficit of capacity to monitor, supervise, control and follow the contract of PPPs' projects (Tribunal de Contas, 2003; Assembleia da República, 2013). Therefore, the Government needs to develop and/ or improve its skills to be able to deal/negotiate with the private partner, who is considered to have better competencies (OECD, 2007)¹⁵. That is why the National Audit Office (NAO) in 2013 emphasized the need to have specialized personnel and sufficient number of people to monitor *a pari passu* all projects in all its aspects (cited by

¹⁴ One example is the book “Recommendation of the Council on Principles for Public Governance of Public-Private Partnerships” (OECD, 2012)

¹⁵ Although, “a PPP is a better option if the government does not itself possess the requisite skills to construct and operate the project”, when it chooses the PPP model, “it will nevertheless need skilled staff to monitor the private partner and to manage its own responsibilities and risk” (Burger et Hawkesworth, 2011). Therefore, “authorities need to build the necessary competencies to act as an equal partner to the private sector participants” (OECD, 2007). As Sarmento said, it is important to improve the capacities of the public sector to negotiate, since he thinks that they are really weak (Diário Económico, 2012).

Assembleia da República, 2013). The costs associated with the development of competencies should be included in the design of the project (OECD, 2007).

2.2.2. Risk

Risk is “any factor, event or influence that threatens the successful completion of a project in terms of time, cost or quality” (European Commission, 2003). In the TIP model, risks are fully allocated to the public sector. Whereas, one of the characteristics of the PPP model is that some risks can be transferred to the private sector. When a certain event occurs, the entity, to whom the risk related to that event was allocated, has to bear the cost. In other words, if a certain risk is allocated to the public partner, it has a higher responsibility over that risk. On one hand, the public partner would want to transfer risks to the private partner, since its responsibility is reduced. On the other hand, the private partner charges a price for dealing with risks, and the price increases with the exposure to more risk. In addition to this, the price is also linked to the risk-aversion profile of the private partner. The higher the risk aversion of the private partner, or the lower its capability to deal with the risk, the higher the cost will be (Cardoso, 2011). Actually, risk has a direct impact on the financial cost of a PPP (European Commission, 2003). Therefore, the allocation of risks should be *balanced*. Actually, a good allocation may contribute to a better Value for Money (VfM), since the private partner has higher ability to deal with certain risks (European Commission, 2003; OECD, 2008; Cardoso, 2011). VfM is the difference between the costs for the State using TIP and using PPP, via the calculus of the Public Sector Comparator (PSC). Thus, it is linked to savings for the public partner that can be achieved by applying the PPP model (Cardoso, 2011). However, VfM does not only include quantitative, but also, qualitative aspects, such as, the government’s judgment regarding what the best combination of quality, features and price is. Summarily, it refers to the highest quality at the best price (OECD, 2008 and 2013). Therefore, it is an important element in verifying if a certain project should be financed by a PPP or not.

However, as aforementioned, transferring a risk from the public to the private partner has a price premium, thus, it affects the cost for the public partner. In this context, it is important to allocate risk in a cost effective way. In conclusion, the best balance is to allocate each risk to the partner who has better capacity, more knowledge and experience to deal with it. For example, risks that concern operational efficiency usually should be assigned to the private partner, and risks related to the pursuing of non-commercial objectives should be allocated to the public partner¹⁶ (European Commission, 2003; Bult-Spiering et Dewulf, 2006; OECD, 2007).

Moreover, risk-allocation is linked to renegotiations of PPP contracts and Financial Re-equilibrium Agreements (FRAs) (characteristics of these contracts that are explained in a further

¹⁶ “The objectives of risk transfer include: to reduce long term cost of a project by allocating risk to the party best able to manage it in the most cost effective manner; to provide incentives to the contractor to deliver projects on time, to required standard and within the budget; to improve the quality of service and increase revenue through more efficient operations; and to provide a more consistent and predictable profile of expenditure” (European Commission, 2003).

section). The way that a risk is evaluated and therefore allocated has an impact regarding if there will be or not renegotiations (Cardoso, 2011). In fact, risk sharing is an important topic for this dissertation, since if the allocation is done correctly, it may reduce potential FRAs, and therefore avoid some extra costs for the State. Actually, when the public partner is selecting the best project during the tendering process, it should not choose based only on the financial costs. In fact, there are projects called optimistic/aggressive proposals. Initially, a project can present a lower cost, and thus win the tendering process. However, if risks are not well allocated, this can lead to FRAs, which consequently, will make the project more expensive for the public partner (Posner, Ryu et Tkachenko, 2009; Cardoso, 2011). This was one of the NAO's critics, since in Portugal, the main criteria to evaluate proposals is based on assessing the NPVs of State's costs. As a consequence, some private entities present projects with lower costs, simply in order to make it to the next stage. It is argued that this is an example of lack of equality, competition¹⁷ and transparency (Tribunal de Contas, 2003; Assembleia da República, 2013).

Moreover, the risk-allocation in Portugal is considered to be inefficient, due to a weak identification and allocation of risks. In fact, this was the cause of the failure of some PPP contracts. This weakness had as a consequence several FRAs that increased the costs of the State (Tribunal de Contas, 2008). Curiously, the public partner guaranteed some *exotic risks*, such as compensations to the private partner if the corporate tax increases (Arroja, 2012).

Furthermore, as already mentioned, the private partner may have more ability to face more risks. This may be due to the fact that, in a PPP contract, the private partner is usually comprised of more than one entity and each of them usually has different capacities and knowledge regarding different fields. This may contribute for the success of the PPP. However, this capacity of the private partner can have a negative impact. The private partner can use its knowledge and information to gain a privileged position (if the public sector does not protect itself), and act in a way that can be prejudicial for the public partner during the negotiation process. This reinforces the idea put forward in the previous section regarding the role of the State (Cardoso, 2011).

In Appendix 2, there is a list of risks and their explanations.

2.2.3. Transparency

As defined by the OECD, transparency is the “openness about policy intentions, formulation and implementation – is a key element of good governance”. This is correlated with better

¹⁷ It is important to have enough competition in order to have an effective risk-allocation. The OECD distinguishes two different processes of competition:

- Competition in the bidding process: This “improves the bargaining position of the government and prevents opportunistic (monopolistic) behaviour on the part of the private bidders. Thus, it helps a government to attain better VfM” (OECD, 2008). Therefore, if the number of competitors is limited, the PPP model should not be applied, since it can compromise the achievement of the best VfM (Burger et Hawkesworth, 2011).
- Competition in the provision of the service: This is after the contract signing. It “ensures that the private partner delivers the agreed VfM because competition prevents moral hazard and limits the capacity of the private partner to force the government to renegotiate the terms of the contract. In the absence of competition, the government may, in effect, continue to carry the risk, even when has been transferred according to the PPP contract.” (OECD, 2008).

outcomes, economically and socially (OECD, 2002). In Portugal, there are some examples that illustrate that this aspect must be improved. For example, the NAO, the entity responsible for evaluating projects and that can decide on their impracticability, realized that some contracts were not fully disclosed. In 2009, the NAO refused to sign the prior approval regarding five projects, and one of the reasons was the financial conditions for the State. After the NAO received a new version of those contracts, which presented lower costs for the State, they were approved. Nevertheless, in May 2012, the NAO said that the planned contingent liabilities were not presented. In reality, the NPV of the costs in the new version of the contracts plus the cost with contingent liabilities is equal to the NPV of the cost in the initial version of the contracts. Thus, the financial responsibility for the State remained the same (Arroja, 2012; Ernst & Young, 2012; Assembleia da República, 2013). This situation is common in other countries too. Governments make agreements with private partners that have potentially high, yet hidden, costs (Schwartz, Corbacho et Funke, 2008). This is a problem that arises with contingent liabilities associated with the PPP model. This is a potential liability, which is only converted as an actual liability if a certain event occurs (OECD, 2002; PPIAF, 2012) (See more information about contingent liabilities in Appendix 3). Specifically, in this dissertation, it is relevant to write about budget transparency, if in the State Budget (“the single most important policy document of governments” (OECD, 2002)) all information regarding fiscal issues (all direct costs and contingent liabilities) is fully and systematically disclosed (OECD, 2002).

2.2.4. Accountability, Affordability and Budgeting

The *accounting methodology* regarding PPPs has, in recent years, been a theme of regular discussion both at a national and international level. “PPPs are not only challenging managerially but also give rise to problems of budget control and accountability. Budget formulation and accounting processes play critical roles in determining the impact that PPPs will in fact have on fiscal policy, resource allocation and public management” (Posner, Ryu et Tkachenko, 2009).

There are different accounting methodologies, but some can create more incentives to apply the PPP model when a State wants to invest in public procurement. Actually, in some countries, the accounting has been one of the main reasons for choosing a PPP instead of a TIP, which has been creating false incentives. Usually, when choosing to invest through a PPP, the investment can be off budget. The assets and the debt incurred to buy the assets do not appear in the State’s books, only in the books of the involved private entities. In the TIP case, they are registered on the State’s books. In the TIP model, the government records expenditures (and debt, if it borrows) during the construction phase. In the PPP model, expenditures are usually only registered after the construction is complete and are spread out over several years. Thus, in the fiscal year when the asset is purchased, the expenditures of the public partner using the first

model are higher than when the second model is applied¹⁸. Therefore, a PPP may create the false impression that it is always a cheaper and more affordable model¹⁹. Governments can undertake a new project and do not report an increase on their expenditures. Initially, in the investment stage, undertaking a PPP project usually does not affect the deficit and the public debt. In this situation, governments are pushing expenditures to the future²⁰. This can seem at a first glance more tempting for governments that pretend to invest, and even more, in countries that face deficit or debt problems (OECD, 2008; Schwartz, Corbacho et Funke, 2008; Posner, Ryu et Tkachenko, 2009; Burger et Hawkesworth, 2011; Funke, Irwin et Rial, 2013; Sarmento, 2013).

In this context, it is relevant to understand the concept of *affordability*. In fact, it is not linked to the off-balance sheet nature. It is only related to the intertemporal budget constraint of the government. This concept means that the expenditure of the government can be accommodated within the aforementioned constraint²¹. Thus, this is related to the concept of sustainability. Choosing between a TIP and a PPP should not depend on the accounting methodology, but on the affordability and VfM²². To conclude, using the PPP model may lead to greater affordability, only if it increases the VfM, and consequently, if the project fits the intertemporal budget constraint²³. In fact, the question of affordability is not due to the *off the books* characteristic. However, the analysis of whether a project is affordable or not is sometimes neglected because of this characteristic of PPPs (OECD, 2008 and 2012; Funke, Irwin et Rial, 2013). Furthermore, it should be taken into account that, even if the country is investing in an effective project with VfM, this may crowd out other potential spending (Posner, Ryu et Tkachenko, 2009).

At this stage, it is possible to identify two challenges regarding PPP. Firstly, policy-makers cannot think, fallaciously, that if a project is *off budget* it is more affordable. Secondly, to assess affordability, they have to budget for a longer-time horizon. Actually, this does not always happen, governments usually only budget for the upcoming year. However, this is not always an easy task. In fact, usually there is uncertainty regarding costs and contingencies. Costs are

¹⁸ See more information regarding expenditures and revenues in each model in the Appendix 1.

¹⁹ It is a false impression, because the future payment commitments from the government to the private partner may be forgotten.

²⁰ In the short run, a PPP always reduces the government capital expenditure. However, analysing the present value, this may not be a cheaper option. This depends on the interest expenditure (“the interest rate paid by the private sector usually exceeds that of the public sector”) and on the efficiency (OECD, 2008). “In the absence of efficiency gains, PPPs and publicly financed projects have a similar long-run effect on public finances” (Funke, Irwin et Rial, 2013). Moreover, transferring mandatory costs to the future, it reduces the capacity of governments to “use spending cuts or shifts as instruments of countercyclical economic policy” (Posner, Ryu et Tkachenko, 2009).

²¹ “The future revenue stream of the government equals or exceeds the present value of the sum of expected future interest payments and the present value of the government’s expected non-interest expenditure” (OECD, 2008).

²² They are the two “benchmarks for PPP viability” (OECD, 2008).

²³ “If the use of a PPP instead of public financing does not change the net present value of the government’s cash flows, the PPP does not make investment more affordable. If the government cannot afford to finance the project using traditional public finance, it probably cannot afford to undertake it as a PPP. Conversely, if the government can afford to undertake the project as a PPP, it can probably also afford to finance it traditionally” (Funke, Irwin et Rial, 2013).

uncertain and difficult to predict, even direct fiscal commitments²⁴, because they are long term and sometimes depend on variables for which predictions change over time (example: demand and exchange rate²⁵). Moreover, there are other commitments, like contingent liabilities, which are difficult to quantify. This increases the difficulty concerning the assessment of affordability (OECD, 2008; Duarte, 2011; PPIAF, 2012). However, there are some recommendations that governments should follow to eliminate false incentives. They should provide more information regarding the future burden with PPPs. This information should include not only existing contracts but also planned contracts. Then, these predictions should be integrated in long-term fiscal projections. In fact, the budgeting can be reformulated to reduce the bias. For instance, the treatment of PPPs on budgets can be equal to the treatment of publicly financed projects, requiring the same type of approval and planning. Other example is the two-stage budgeting process. Firstly, all projects must be approved, assuming that they are publicly financed, and only thereafter, the method of financing is decided (Funke, Irwin et Rial, 2013).

The question of affordability is a constraint regarding public investment. In addition to this, some countries face other constraint: *fiscal rules*²⁶. This may also create incentives in favour of PPPs. Governments may only be able to pursue the objective of investing on a certain project by using a PPP²⁷. As previously said, this is decided based on the *off the books* PPPs' characteristic, instead of assessing if the project represents better VfM.

Moreover, as initially mentioned, different accounting methodologies applied in national budgets regarding PPPs may have different impacts on the bias in their favour. In the majority of countries cash accounting is applied, while in others accrual accounting or a mix of the two²⁸. These methods record expenditures and revenues differently. The cash-based method records them when cash is exchanged (when it is received or paid out). Contrarily, the accrual-based method records when they are incurred, when there is a decision, independently of the moment of payment. In the first method, a government would have less incentive for capital spending, because it would have to record it up front (during the design and construction phases). In the accrual regime, it is paid over time. Thus, this “can smooth out capital funding and overcome the spikes associated with cash-based budgets” (Posner, Ryu et Tkachenko, 2009). Countries with cash-based regimes that wish to intensify public infrastructures have few options to do so, such as, raise taxes, levy user fees, cut spending in other areas, etc. However, these are *painful* options. Therefore, a PPP seems to be the way to achieve their objective and, at the same time,

²⁴ Direct commitments: upfront payments and ongoing payments (example: shadow tolls and availability payments) (PPIAF, 2012). See more information in Appendix 3.

²⁵ When payments are made in a foreign currency.

²⁶ “Budgetary limits imposed either legally or as political commitments” (OECD, 2008). For example, Portugal is under the Stability Growth Pact, which requires countries not to have deficits above 3% of GDP (OECD, 2008).

²⁷ Actually, “fiscal pressures were a prime consideration for using PPPs in some of the eight countries studied. Budget officials in Hungary, for instance, said that bringing the deficit under the 3% target has been critical since its entry into the EU in 2003. When compared to traditional government capital investment, PPPs are a strategy to undertake capital projects with minimal impact on the deficit” (Posner, Ryu et Tkachenko, 2009).

²⁸ “Accruals and cash are often portrayed as opposing end-points on a spectrum of possible bases for accounting and budgeting” Source: OECD’s website

to overcome the spiking problem, since it does not encumber budgets in the short-run. This also explains the increased preference for this model (OECD, 2008; Posner, Ryu et Tkachenko, 2009). Adding to the aforementioned information that governments should disclose, they should also apply the accrual method. This is “more challenging, but potentially more influential” in reducing the bias in favour of PPPs. In addition to this, the most important indicators of the debt and deficit, such as indicators that are applied to set fiscal rules, should change (Funke, Irwin et Rial, 2013)²⁹.

Portugal has been improving the way to deal with PPPs (Posner, Ryu et Tkachenko, 2009). The National Budget has appended a memo with predicted net costs for each sector in a long-run perspective. This is considered an excellent example of transparency (Posner, Ryu et Tkachenko, 2009; Moreno, 2010; OECD, 2013). However, there are still some flaws. Firstly, they usually include neither costs regarding projects to be launched nor additional burdens related to potential FRAs. Secondly, in the SBs there is no information about the accounting methodology. Thirdly, the costs with each specific project are not known. These were some of the ingredients that led to sustainability problems; it is a burden that both the present and future generations have to pay with painful sacrifices (Moreno, 2010). Moreover, the main problem was that the State wanted to invest in infrastructures without³⁰ initially using its *own*³¹ money to face the high prices of this type of investments. Thus, the State took advantage of the accounting system (Moreno, 2010; Arroja, 2012). PPPs were the way to invest even in periods with strict budget constraints and external fiscal rules. They were associated to a budgetary relief regarding the initial investment (Schwartz, Corbacho et Funke, 2008; Arroja, 2012). This problem is linked to the lack of fiscal clarity related to PPPs. If there are no rules to address and manage the fiscal consequences of PPPs, they “can be used to bypass budget or borrowing limits” (PPIAF, 2012). In Portugal, this example of *financial engineering* apparently brought benefits to some economic agents. The State managed to provide goods and services without increasing the public debt. Therefore, governments increased their probability of winning the following elections. On the other hand, private partners made good businesses, with almost no risks and high profitability. Moreover, it was also fruitful for the banks that financed these projects. However, these contracts did not bring many advantages for the tax payers, actually, the costs are mainly covered by taxes that are launched annually in the SB (Moreno, 2010; Arroja, 2012).

In this context, and as conclusion, the OECD recommends that these projects “should not be used as a vehicle for escaping budgetary discipline by hiving financial commitments off public sector balance sheets” (OECD, 2007). All projects should be included in the State Budget,

²⁹ This “requires ensuring that these treat investment in PPPs as public investment that creates both public assets and public liabilities” (Funke, Irwin et Rial, 2013).

³⁰ Or with low commitments

³¹ In fact, it is the money of all Portuguese taxpayers.

except if all risks are transferred to the private partner. Actually, “guarantees (implicit or explicit) need to be accounted for and should be subject to a similar degree of scrutiny during public budget processes as other spending”, in order for the public sector not to forget their potentially high fiscal implications (OECD, 2007).

2.2.5. Renegotiations and FRAs

A renegotiation is the consequence of a process between the two involved entities, which is related to changes in the base-case³². This occurs when initial assumptions of the contract are revised. FRAs are requested when one of the partners does not comply with the contract. It is usually written in the contracts in which scenarios they can be requested (Cardoso, 2011; Sarmiento, 2013)³³.

Theoretically, a renegotiation brings advantages for this type of contracts. They are long-term contracts (the average, in Portugal, is 30 years), so it is difficult to design complete contracts with all details. Contrarily, short-term contracts can be easily reviewed and modified. Therefore, renegotiations in PPP contracts may become occasionally inevitable (OECD, 2007; Posner, Ryu et Tkachenko, 2009; Cardoso, 2011)³⁴. Circumstances change during the contractual period, so the contract should accommodate these alterations. In fact, “no contract is flexible enough to cover every eventuality” (OECD, 2007). Moreover, an excessively detailed contract may encourage partners to “look for loopholes” instead of making this relation work. Therefore, there should be a balance between flexibility and strictness. A certain degree of strictness is a source of confidence for all entities involved in the project. This balance is related to risk-allocation, since with rigid contracts, more risks are allocated to the public partner. And, with flexible contracts, more risks are allocated to the private partner, but the price premium may be higher (OECD, 2007; Schwartz, Corbacho et Funke, 2008; Burger et Hawkesworth, 2011).

According to the OECD, the best option is to “include contractual stipulations specifying under what circumstances revisions to the original agreement shall be considered. Permanent and active review panels, dispute committees and arbitrational instances should be established as part of the contractual structure and operated to strengthen the parties’ relationships” (OECD, 2007).

In Portugal, each contract specifies when a FRA may be requested. Some examples of those specifications are: when there is an unilateral imposition by the public partner, in other words when it changes what was initially defined, and this implies an increase in costs or a decrease in revenues for the private partner. Other examples are when there is a case of *force majeure* or a modification in a specific law (Cardoso, 2011). A FRA is usually established by using as

³² The base-case is the principal instrument of reference for the partners, which has all the economic-financial assumptions and projections (Cardoso, 2011).

³³ The Appendix 4 presents the process of renegotiation in Portugal.

³⁴ “Principle 18: Occasional renegotiations are inevitable in long-term partnerships, but they should be conducted in good faith, in a transparent and non-discriminatory manner” (OECD, 2007).

reference the base-case, and it has the objective of achieving the minimum values of some financial ratios³⁵. To accomplish this objective, the public partner, for example, may have to pay a direct compensation, and/or change the deadline of the contract and/or change its financial obligations (Cardoso, 2011). On the other hand, the public partner may want to renegotiate a contract, for example, to deal with changes in technology or fiscal constraints. However, sometimes this cannot happen, because the private partner has to approve it (Posner, Ryu et Tkachenko, 2009).

As aforementioned, there are potential advantages regarding renegotiations of PPP contracts. However, there are some examples of problematic situations. In Portugal, some projects were renegotiated several times, and in most cases, this significantly increased the costs for the State³⁶. Another example lies on the conclusions of Chilean officials, in which payments ended up being 35% higher than what was initially decided due to renegotiations. Therefore, they became an extra problem linked to PPP contracts for the public partner, bringing only partial benefits, in other words, only benefiting private partners (Posner, Ryu et Tkachenko, 2009; Cardoso, 2011; Arroja, 2012). This is the result of some of the aforementioned challenges, such as asymmetry of information, better negotiation skills of private partners and optimistic proposals during the tendering process (Tribunal de Contas, 2008; Posner, Ryu et Tkachenko, 2009; Cardoso, 2011).

According to Ernst & Young, the burden of the State should consider not only the costs regarding regular activity, but also the processes of FRAs that are contractually defined, and which could be the reason for a cost increase and a source of uncertainty (Ernst & Young, 2012).

2.3. PPPs in Portugal

In this dissertation, the case study is the situation in Portugal. Before analysing the predicted costs for the Portuguese State, an overview of the PPP projects is presented.

Since the 90's, several countries have been increasingly applying the PPP model (OECD, 2008; Burger et Hawkesworth, 2011)³⁷. Portugal is not an exception and since 1992 it has been developing projects by PPPs. The first project was the *Vasco da Gama bridge*. Since then, Portugal has become one of the leaders in Europe (Moreno, 2010)³⁸. Nowadays, there are PPPs in several sectors, such as road, railway, health and security³⁹. The road sector is the one with

³⁵ Source: Decree-Law n. 141/2006, Article 14th- C

Examples: Internal rate of return to shareholders (IRR) and Debt-Service Coverage Ratio (DSCR) (Cardoso, 2011).

³⁶ According to Abrantes de Sousa (2011), there were very good contracts at the beginning, but, over the years, they have become unrecognizable (cited by Arroja 2012). Moreover, according to Moreno, since 1992 in Portugal, it is not easy to identify a contract that was not renegotiated, and consequently, without higher costs for the public partner (Moreno, 2010).

³⁷ See the History of PPPs in Appendix 5.

³⁸ "With a ratio of between 1.2% and 1.3% of GDP, Portugal has the highest PPP-to-GDP ratio in Europe (nearly double the United Kingdom ratio of between 0.6% and 0.7%)" (OECD, 2008).

³⁹ These are the areas that the respective costs for the State are presented in SBs. Others public concessions, such as of the environment sector, are not included, since they do not imply costs for the State.

more projects and with a higher burden for the State. It represents 80% of future costs (Bult-Spiering et Dewulf, 2006; Arroja, 2012). This is the reason why it is analysed the road sector in this dissertation. Furthermore, the most used type of PPP is the concession contract (see more information in Appendix 6), in which the private partner is responsible for the conception, the financing, the construction, the maintenance, and the operation of infrastructures. In the following section, the financial linkages between the two partners are presented. In order to understand some of what will be said, it is worthwhile to mention that, in Portugal, it is also considered a PPP when the equivalent to a private partner is a public company, a cooperative, or a non-profit private institution. One example is Estradas de Portugal, S.A. (EP). Although the EP's concessions are not directly held by the State, the SBs include the costs supported by the concession EP. (See more information about the EP in Appendix 7).

2.3.1. Financing of projects and Costs for the State

This type of model is characterized by the way of financing. Private partners are responsible for part or total financing of projects. They have to mobilize the necessary financial resources in order to invest and operate the assets of the partnership, so there is a bigger financial effort by the private partner during the construction stage. The financing typically has two components, one is equity and another is debt capital. It may use bank financing and/or take advantage of EU funds⁴⁰. This is usually compensated by payments along the contract's period from the public to the private partner. In several projects, the payments during the lifespan of the projects are contractually defined (OECD, 2008; DGTF, 2009; Cardoso, 2011; Ernst & Young, 2012). However, the cost and the revenue for each partner can be different, depending on each contract. The private partner, typically, has two sources of revenue to overcome the cost of the investment on the infrastructure: the aforementioned payments/subsidies from the public sector (if these are the main source, it is called *government-funded PPP*) and fees paid by the users, like tolls in the road sector (if these are the main source, it is called *user-funded PPP*). Generally, from the public to the private partner, there are two types of fiscal commitments: direct liabilities and contingent liabilities (OECD, 2008; PPIAF, 2012; Funke, Irwin et Rial, 2013).

In this dissertation, the focus is on expenditures of the State with PPPs in the road sector. In this way, in the following section, there is a description of the *normal* costs for the Portuguese State with this sector. In Appendix 8, there is information regarding other sectors.

2.3.2. Road Sector

The type of concessions varies according to two factors, namely *Ownership* and *Payments* (Cardoso, 2011). Regarding this last factor, in Portugal, there are the two aforementioned

⁴⁰ In fact, "privately financed projects are mainly carried through in the roads sector because of EU subsidies and credits with low interest rates from the European Investment Bank" (Bult-Spiering et Dewulf, 2006).

scenarios: payments from the public sector and from users to the private partner. About the ownership of the assets, usually, after the contract's period, the public partner is the owner of the asset. Therefore, the residual value risk is allocated to the public partner (OECD, 2008).

The type of contracts in this sector is generally Design-Build-Finance-Operate-Transfer (DBFOT) (Cardoso, 2011). Globally, nowadays, twenty-three contracts are included in the SB.

Concerning the payments from the public sector, there are mainly payments for availability, for traffic service and for the service of tolls' collection. Thus, the contracts can be divided into three different groups, according to the delivered service and payments to private partners (Ernst & Young, 2012; DGTF, 2012):

1) Traditional concession with real tolls:

These are concessions of the State, and the real tolls are for the concessionaires. In other words, the private partner receives payments directly from the users (the tolls), which is their main source of revenue, and does not receive ongoing payments from the State. Therefore, these concessions, usually, have neither regular costs nor regular revenues for the public partner. There are five examples of this, which are Brisa, Oeste, Lusoponte, Douro Litoral and Litoral Centro.

2) Concessions with model of availability:

In this type of model, the EP retains the tolls, and in exchange it has to pay the concessionaires for the availability. This is a fixed payment that is paid on a regular basis, independently of the demand, but that can be reduced in case of unavailability (e.g. accidents and construction). This means that this payment only changes if the quality of the infrastructure is not what was defined in the contract⁴¹.

In this case, the demand risk is allocated to the public side (the revenues of the EP depend on the traffic). However, there are some advantages. An example of these is the protection of the public interest, since it gives financial incentives to concessionaires to deliver the service and have the infrastructure within negotiated standards. Other example is that the cost for the public partner is not uncertain; in fact, they "will never exceed the maximum availability payment" (Dochia et Parker, 2009; Ernst & Young, 2012).

⁴¹ A few remarks on the model of availability:

- Definition of availability in the Portuguese Law:
"a disponibilidade das vias consiste na aferição da qualidade do serviço prestado aos utentes e a aferição dos níveis de sinistralidade e dos níveis de externalidades por elas geradas" Source: Decree-Law n. 110/ 2009 18th of May.
- It can be divided into two categories (Ernst & Young, 2012):
"Pure availability"- the infrastructure or part of it has to be available for the purpose that was built, without any obstruction.
"Constructive availability"- in addition to the availability of the infrastructure, it is required a certain level of security, quality and performance.

Some examples are Grande Lisboa, Norte⁴² and the seven ex-SCUTs: Grande Porto, Norte Litoral, Costa de Prata, Beira Litoral e Alta, Interior Norte, Beira Interior and Algarve.

Previously, SCUTs were concessions with shadow tolls, in which the revenues of the private partner, called rents, were totally paid by the State (Cardoso, 2011). The direct payments from the State to private partners were a function of the traffic level. In this case, the user-payer system was substituted by the tax-payer system. In other words, it was the State who paid the tolls instead of the user of the roads (Bult-Spiering et Dewulf, 2006; Moreno, 2010; Ernst & Young, 2012; Estradas de Portugal, 2012). (See in the Appendix 9 the contract of Costa de Prata after the renegotiation)

3) With model of availability payments and payments for the service:

The EP receives tolls as revenues, and is has to do two kinds of payments to the private partner. It pays for the availability (this is the fixed counterpart for the availability of the infrastructure) and for the service, which is related to the traffic. So, these contracts have a fixed and a variable part (according to the traffic level). There are eight examples: the Túnel do Marão and the sub concessions Pinhal Interior, Litoral Oeste, Douro Interior, Baixo Tejo, Baixo Alentejo, Transmontana and Algarve Litoral (DGTF, 2012; Ernst & Young, 2012; Estradas de Portugal, 2012). (See in the Appendix 10 the contract of Transmontana)

⁴² Only since 2010 these two concessions are part of this group, before that, they were two traditional concessions with real tolls.

3. Methodology and Data Collection

3.1. Data Collection

The aim of this dissertation is to analyse the predictions presented in ten different State Budgets regarding how much the State will spend with PPP in the road sector during the period 2014-2031. In fact, different State Budgets present different predictions for the same period. These differences are also identified by Moreno (2010). He mentioned that in SB 2009, the NPV of the predicted net costs for the road sector was around 12 000 M€, whereas, in 2010, it was around 5 000 M€. Without explanation there is this huge difference, which he called a *blackout* (Moreno, 2010). Therefore, my objective is to understand the reason for those differences.

As a note, this analysis focuses only in gross costs. The gross costs for the State in this sector include contracted remunerations, investment's compensations and accepted Financial Re-equilibrium Agreements (FRAs) (UTAP, 2013).

Since the State Budget only presents the total predicted costs for the road sector, the Estradas de Portugal provided me the costs per project in order to be able to do this analysis. Thus, the data base is the predicted gross costs per project (24 PPP projects in the road sector) for the period 2014-2031 presented in ten different State Budgets (from SB 2005⁴³ to SB 2014).

For each project and for each SB I computed the Present Value (PV) of the predicted costs, corresponding to the sum of cash flows of the period 2014-2031. Thus, the difference of PVs will not be explained by the number of years. Nevertheless, I had to be cautious since the values were not immediately comparable. In some SBs, the values included the VAT, and some present the values at current prices and others at constant prices.

Therefore, firstly, in the SBs that included the VAT, I divided the values by the VAT, in order to have all predicted costs without VAT. The following rates were used (for SBs where the rate was not given, but it is said that the VAT is included, I applied the VAT of the end of the correspondent year):

⁴³ First SB that presents costs with PPPs.

SB	VAT	Source/ Information
2005	19%	Given by EP
2006	21%	Given by EP
2007	21%	Given by EP
2008	21%	Direcção-Geral dos Impostos, 2011
2009	20%	Given by EP
2010	-	Prices without VAT
2011	-	Prices without VAT
2012	23%	PricewaterhouseCoopers, 2012
2013	23%	PricewaterhouseCoopers, 2013
2014	23%	SB 2014

Table 1: VAT

Secondly, I computed the PV, but I had to take into account that some SBs presented the costs at current prices and others at constant prices. Therefore, for SB at constant prices I discounted the values at the rate of 4%, and for SBs at current prices I discounted at 6,08%. The rate 6,08% is the official discount rate of the State. It is composed by a real discount rate that is fixed in 4% and by a discount rate of the annual inflation, which was administratively fixed by the Despacho nº 13208/2003 in 2% (Ernst & Young, 2012). In this way, I obtained the PV for each SB with base-year the year of the corresponding SB. For example, I obtained for the SB 2006 the PV of the predicted costs with base-year 2006, whereas for the SB 2014, the PV with base-year 2014. Therefore, then, I converted all for the same base-year (2005). In order to do this, I used the real Consumer Price Index (CPI) (Source: INE, 2014). Since there is not the real CPI for 2014, I applied the predicted CPI growth rate presented in the SB 2014.

Thirdly, I built the graphs presented in the Appendix 12 and the following graph:

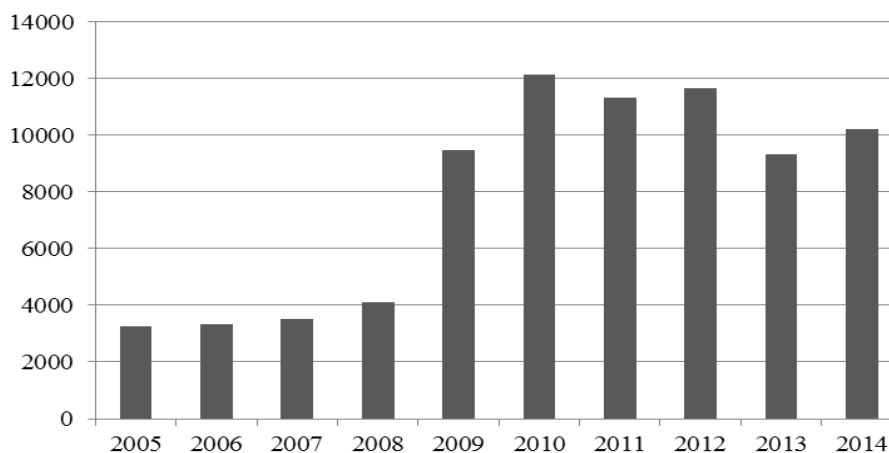


Figure 3: PV of the predicted costs per State Budget

X-axis: SBs

Y-axis: PV of predicted costs for the State (M€)

Analysing all the graphs, I could identify the differences from one SB to another. After this identification, I analysed possible explanations for those differences. To assess this, I analysed each PPP in the road sector (24 projects) and each State Budget (10 SBs, from the SB 2005 to 2014). In this way I recognized the main events regarding PPPs in the road sector. Then, I computed an econometric model based on panel data, which is described immediately.

3.2. Econometric Analysis

The analysis is based on a panel data model. The database consists of information on the several PPP projects since 2005 until 2014, retrieved from the annual SBs. The model has as dependent variable the logarithm of the PV of the predicted costs with regards to each project in each SB. The main objective of this analysis is to identify the factors that affect the predicted costs.

3.2.1. Independent variables

- Characteristics of concessions: *CAPEX* and *Kilometres*

Since I have panel data and I aim to understand the differences of the predictions over SBs, I have to take into account that projects are different. Hence, I include in the model these control variables, which may explain the differences from one project to another.

Actually, large scale projects, which can be translated as projects with higher CAPEX and more kilometres, represent projects that may have a higher burden for the State. CAPEX refers to the initial investment, which is one of the responsibilities of the private partners. These variables would explain why some projects have low costs and others have high costs. For instance, the concession Beiras Litoral e Alta, over the SBs, has PVs of the predicted costs around 902 M€. This contrasts with a smaller scale project as the concession Algarve, which presents values around 395 M€. The source of information was Cardoso (2011).

- Characteristics of concessions: *Risk allocation*

As explained earlier, in the Literature Review, risk allocation is an important feature of a PPP project and it can affect the cost for the State. In fact, costs related to FRAs are the outcome of the systems of risk sharing foreseen in the contracts (Assembleia da República, 2013). This variable is based on the matrix of risks for each project presented in the report of the Direcção Geral do Tesouro e das Finanças (DGTF, 2012). This report identifies several risks for each project. Regarding each risk, the report identifies if for a specific project that risk is shared, is allocated on the public or on the private partner. For example:

	Construction risk		Maintenance risk		(...)
	Deadlines	Unilateral changes	Failure to meet quality levels	Inflation	(...)
Algarve	private	public	Public	private	(...)
Baixo Alentejo	private	public	Private	shared	(...)
(...)	(...)	(...)	(...)	(...)	(...)

Table 2: Example of the matrix of risk allocation

I defined some criteria in order to create a variable that represents the information provided in this report. For each project, if a certain risk is allocated to the public sector, I attributed the number one. If the risk is shared, I attributed 0,5, otherwise it is zero.

	Construction risk		Maintenance risk		(...)
	Deadlines	Unilateral changes	Failure to meet quality levels	Inflation	(...)
Algarve	0	1	1	0	(...)
Baixo Alentejo	0	1	0	0.5	(...)
(...)	(...)	(...)	(...)	(...)	(...)

Table 3: Example of the matrix of risk allocation

In addition to this, I took into account the level of the risk, in other words, the probability of a certain risk to occur and its impact. In fact, for each risk, the report says if the probability of occurrence is high, medium or low, and it says if the risk would have a strong, medium or reduced impact. For each category I attributed a score:

Probability:	Score
High	3
Medium	2
Low	1

Table 4: Probability of Risk Occurrence

Impact:	Score
Strong	3
Medium	2
Reduced	1

Table 5: Impact of the Risk

Then, I multiplied this score by the allocation of the risk. For example, risk X for a certain project is allocated to the public partner and the probability of occurrence is medium and it would have a strong impact, thus, the score is $1 \times 2 \times 3 = 6$. In this way, I got a table like the following:

	Construction risk		Maintenance risk		(...)
	Deadlines	Unilateral changes	Failure to meet quality levels	Inflation	(...)
Algarve	0	3	2	0	(...)
Baixo Alentejo	0	3	0	1.5	(...)
(...)	(...)	(...)	(...)	(...)	(...)

Table 6: Example of the matrix of risk allocation

Finally, for each project I summed all scores and I got a total score. For example:

	Construction risk		Maintenance risk		(...)	Sum
	Deadlines	Unilateral changes	Failure to meet quality levels	Inflation	(...)	
Algarve	0	3	2	0	(...)	39,5
Baixo Alentejo	0	3	0	1.5	(...)	31
(...)	(...)	(...)	(...)	(...)	(...)	(...)

Table 7: Example of the matrix of risk allocation

At the end, the total score is the independent variable that I include in the econometric model. It can vary from 0 if all risks are allocated to the private partner, and the maximum score is 279, if all risks are fully borne by the public partner and those risks would have high probability of occurrence and strong impact. Thus, this variable means if a project has a higher score, more risks are allocated to the public partner. Table 8 presents the total score for each project.

	Risk Score
Algarve	39.5
Beira Interior	39.5
Interior Norte	39.5
Costa de Prata	39.5
Grande Porto	39.5
Norte Litoral	39.5
Beiras Litoral e Alta	39.5
Lusoponte	26
Norte	39.5
Oeste	26
Brisa	26
Litoral Centro	26
Grande Lisboa	39.5
Douro Litoral	26
Transmontana	31
Douro Interior	31
Túnel do Marão	39.5
Baixo Alentejo	31
Baixo Tejo	31
Litoral Oeste	31
Algarve Litoral	31
Pinhal Interior	31
AE Centro	31
A21/Rota Oeste	31

Table 8: Risk score per project

In the report of the DGTF, there is no information about the AE Centro and A21/ Rota Oeste. Nevertheless, I assumed that their score is equal to 31. Since it is the score of the sub concessions of EP, and this entity is also the direct public partner of the AE Centro and A21/ Rota Oeste⁴⁴.

These scores should change over time because the allocation of risks has changed for some projects. Nevertheless, the DGTF only presents the allocation of risks' matrix in one of its report, which has only the actual situation. Thus, this score is a time invariant variable, and a control variable.

⁴⁴ Sources: Jornal de Negócios (2009) and OJE (2009)

- Characteristics of concessions: *SCUTs model, availability payments model, model with payments for availability and service* and *traditional concessions*

In Portugal, PPPs projects in the road sector can be divided into different types, according to the delivered service and payments to private partners (Ernst & Young, 2012; DGTF, 2012). There are traditional concessions with real tolls, concessions with model of availability, concessions with payments for the availability and for the service and there were projects with shadow tolls (SCUTs).

Traditional concessions with real tolls include projects that usually do not have costs for the State, the private partner receives payments directly from the users. These projects are Brisa, Oeste, Lusoponte, Douro Litoral and Litoral Centro. Concessions with model of availability are projects with fixed and regular payments from the public partner to the private partner and users have to pay tolls. They are Grande Lisboa, Norte⁴⁵ and the seven ex-SCUTs: Grande Porto, Norte Litoral, Costa de Prata, Beira Litoral e Alta, Interior Norte, Beira Interior and Algarve. Previously, SCUTs were concessions with shadow tolls, on which, there were direct payments from the State to private partners and no costs for users. Moreover, there are concessions payments for the availability and for the service. In this case, the public partner has to do two kinds of payments to the private partner. There are eight examples: the Túnel do Marão and the sub concessions Pinhal Interior, Litoral Oeste, Douro Interior, Baixo Tejo, Baixo Alentejo, Transmontana and Algarve Litoral.

I included in the model, dummies variables with regard to these types of projects. For example the Transmontana is a project with payments for availability and service, thus, this project has one in the variable *model with payments for availability* and zero in the other variables.

In order to avoid multicollinearity problems, I will not include all variables. Thus, the variable *traditional concession* is not included in the model.

By including these variables I will understand if the costs for the State depend on the model and I will identify if some types are more costly than others. In addition to this, the variable *model with payments for availability* has a double meaning. It can also represent renegotiations of contracts. In fact, most of the renegotiations are related to changes of the type, and all the projects that changed from one type to another, they changed to the model with payments for availability. The SCUTs changed from models with shadow tolls to availability payments, as well as, the concessions Norte and Grande Lisboa that changed from traditional concessions to the model of availability payments.

⁴⁵ Only since 2010 these two concessions are part of this group, before that, they were two traditional concessions with real tolls.

- Characteristics of concessions: *North, Centre, Lisbon, South and More than a region*

PPPs projects in the road sector were built in different regions of Portugal. I include in the model dummy variables with regard to the geographical location of the projects. In this way, I will identify if projects built in some areas have more costs for the State than in other areas. Thus, they are also control variables, which may explain different predictions over projects and not over time.

To compute these variables, I divided the Portuguese territory by NUTS II (Nomenclature of territorial units for statistics): North, Centre, Lisbon, Alentejo, Algarve, Azores and Madeira. However, there are not project in Azores and Madeira. Moreover, in Alentejo, there is only one project, thus, projects in Alentejo and Algarve are included in the same variable, South. In addition to these, some projects are in more than one geographical area, I included these projects in a variable called *More than a region*. In order to avoid multicollinearity problems, I will not include all variables. Thus, the variable *traditional South* is not included in the model.

- Economic variable: *GDP growth*

The variable *GDP growth* is based on the predictions for this rate presented in each SB. This variable was included in the model in order to understand the influence of the economic environment on the predicted costs for the State with PPPs. According to the Literature Review, governments often undertake PPP projects because initially they usually do not affect the deficit and the public debt. Therefore, it would be more tempting for a government to apply this model during a difficult economic period.

- Political Variable: *Troika*

The variable *Troika* is a dummy variable that is one in the SB 2012, 2013 and 2014, which are the years that Portugal is under the Financial Assistance Programme. Troika is consisted by three entities, namely the European Commission, the European Central Bank (ECB) and the International Monetary Fund. In Portugal since April 2011, it has defined a set of measures for the country to execute as a counterpart of the external financing provided by these entities. To note that one of the measures was exactly the renegotiation of PPPs, in order to reduce the burden of the State⁴⁶.

⁴⁶ “Following the strategic plan presented by the government, PPP road contracts will be renegotiated in order to obtain substantial fiscal gains, notably in 2013, while ensuring a sustainable reduction in government liabilities” Source: Memorandum of Understanding on Specific Economic Policy Conditionality (Sixth Update – 20 December 2012)

Below, I present a summary (the descriptive statistics) of the variables included in the model⁴⁷:

Explanatory Variables	Obs.	Mean	Std. Dev.	Min.	Max.	Info.
<i>PV of the costs</i>	194	4,61	2,66	0	7,32	Logarithm
<i>CAPEX</i>	194	6,22	0,62	5,11	7,87	Logarithm
<i>Kilometres</i>	194	4,92	0,83	3,18	7,00	Logarithm
<i>Risk allocation</i>	194	34,70	6,19	26	40,5	Unit: score (from 0 to 279)
<i>GDP growth</i>	194	0,39	1,47	-2,8	2,4	Unit: %
<i>SCUTs model availability payments model</i>	194	0,23	0,42	0	1	1=SCUT, 0=other model
<i>model with payments for availability and service</i>	194	0,18	0,38	0	1	1=availability payments, 0=other model
<i>North</i>	194	0,32	0,47	0	1	1=project is located in the North of Portugal, 0=other region
<i>Centre</i>	194	0,35	0,48	0	1	1=project is located in the Centre of Portugal, 0=other region
<i>Lisbon</i>	194	0,13	0,34	0	1	1=project is located in the Lisbon area, 0=other region
<i>More than a region</i>	194	0,08	0,28	0	1	1=project is located in more than one region, 0=project is located in only one region
<i>Troika</i>	194	0,35	0,48	0	1	1=2012, 2013, 2014

Table 9: Descriptive statistics of the variables

⁴⁷ In addition to the aforementioned variables, I also tried to include other variables. Nevertheless, some of them were not statistically significant or captured other events. I included a variable that represents the interest rate of the public debt, but, it was not statistically significant. I also included a variable that represented the Government party during the discussion of the SB. This variable was one if the party *Partido Socialista* (PS) was in the Government and zero if the party *Partido Social Democrático* (PSD) was in the Government in October (when the SB is discussed). Nevertheless, this variable would be exactly the opposite of the variable *Troika*, since PS was in the government in the years before the arrival of Troika (except in October 2004).

4. Analysis of Results

4.1. Analysis of each project individually

In this section, I individually analysed the twenty-four projects that are included in the SBs. This supports the understanding of the overall reality regarding PPPs in the road sector in Portugal. As aforementioned, the twenty-four projects are not all included in all SBs. Some projects only integrate the last SBs because they were launched afterwards. The SB 2008 says that included projects are not only those that, at the time, were already contracted, but also those launched for the tendering process. In Appendix 11 there is information regarding the launch date and the contract's date of each project.

Oeste

This project was launched in 1997 (EP, 2011) and the contract's date is December 21st of 1998 (Assembleia da República, 2013). It is one of the PPPs with real tolls, based on the principle user-payer. According to the contract, no costs for the State were expected. Thus, theoretically, it is predictable that the PV of the predicted costs would be equal to zero in all analysed SBs. By analysing the graph in Appendix 12, until the SB 2010, one can see that PVs of the costs are zero, as expected. However, from the SB 2010 to the SB 2014, PVs of the costs are higher than zero. This means that, in these SBs, there are predicted costs for the State. This may only be related to FRAs, since there is not information regarding renegotiations of the base-case. Actually, according to the Ernst & Young (2012), there were six requests of FRAs.

On a curious note, it is expected (but not confirmed), that the concessionary will ask for a new compensation because of the decrease in traffic, which is the result of the introduction of tolls in the Costa da Prata concession (Assembleia da República, 2013).

Douro Litoral

The contract date of this project is December 28th of 2007. However, as far as I am concerned, this project should have been included in all analysed SBs, since the launch of the tendering process was in 2004.

Normally, this would be other auto-sustainable project, with real tolls and no costs for the State. As well as in the previous project, in Appendix 12, positive PVs of the costs are observable in the SBs 2010, 2011 and 2012. These expected costs may be the result of FRAs. In fact, concessions with real tolls normally do not have costs for the State, unless there are reasons for FRAs that lead to costs for the State (Assembleia da República, 2013).

Litoral Centro

The launch of the tendering process was in 1999 and the contract's date is September 30th of 2004 (EP, 2011). Thus, this project was included in all analysed SBs.

It is also a concession with real tolls, which normally does not imply costs for the State. The source of the concessionary's revenues are tolls charged from users. A reason for the expected costs in the SBs 2013 and 2014 is the approval of FRAs. See, in Appendix 12, the graph of this concession.

Lusoponte

Lusoponte is considered the first PPP in Portugal (Assembleia da República, 2013). It was launched in 1992 and the contract was signed in 1995 (EP, 2011). This is also a concession with real tolls, thus, with no costs for the public sector, since all revenues from tolls are for the concessionary.

However, as it is observable in the graph in Appendix 12, there are expected costs in all SBs. This is due to several FRAs and a renegotiation.

The following table has the several FRAs, which were mainly due to unilateral changes implemented by the public partner:

Agreement	Date
FRA I	24 th March of 1995
FRA II	23 th September of 1996
FRA III	17 th February of 1997
FRA IV	22 nd February 1999
FRA V (the Global Agreement)	3 rd July 2000 (2 nd contract)
FRA VI	27 th November of 2000
FRA VII	8 th June of 2001
FRA VIII	28 th of November of 2008
FRA IX	29 th March of 2012

Table 10: Lusoponte's FRAs

Source: Assembleia da República (2013), Pinto (2012) and UTAP (2013)

The first contract involved two bridges, namely, the *25 de Abril* bridge and the *Vasco da Gama bridge*. The private partner was responsible for the conception, projection, construction, financing, operation and maintenance of the new bridge (*Vasco da Gama*), and the operation and maintenance of the oldest one (*25 de Abril*). In this contract, there was an exclusivity clause, which means that the concessionary has rights regarding any bridge that would cross the river Tagus during the lifetime period of the contract (Pinto, 2012). In both bridges, users had to

pay tolls. In fact, the equalitarian principle was established, which means both bridges would have the same price for users.

At the time, this principle was very controversial. Not only there would be tolls during August on *25 de Abril* bridge, but also the prices would also have to rise for the rest of the months. This was the starting point for the renegotiation of the contract. Actually, there was a protest on July 24th of 1994 (citizens blocked the bridge). Thus, this led to unilateral changes, such as a non-actualization of the price of tolls and there were no tolls in August. Therefore, the concessionary requested FRAs to “correct the impact of these unilateral changes on the financial balance of the project” (Pinto, 2012).

In the second contract, it was decided that the private partner would be compensated during the lifetime of the concession, due to unilateral changes implemented by the public partner (Assembleia da República, 2013). In addition to this, there was a change in the risk allocation regarding demand risk and financing risk (from private to shared allocation).

According to Pinto (2012), “the initial funding of the project had no participation of the government, it was structured solely with cohesion funds (EU) and private funds. However, after 15 years and several FRAs the government has become the biggest contributor to the funding of the construction of *Vasco da Gama bridge*”.

In the graph in Appendix 12, it is observable two significant changes on the predictions. From the SB 2008 to 2009 the predicted costs decrease, this may be related to the FRA VIII. The other change is the costs’ decrease from the SB 2011 to 2012. This may be also related to a FRA, the FRA IX.

Brisa

The contract for this concession was signed in 1972. This is one of the traditional concessions with real tolls. Thus, theoretically, there are no costs for the State, and in fact, there are not predicted costs for the period 2014-2031 in any SB.

In 1985, the base-case was modified. There were other changes, and the last one was changed by the Decree-Law n. 247- C/2008, 30th of November. This was a consequence of the Global Agreement between the State, the EP and Brisa on the 22nd of December of 2008. One of the reasons for this agreement was requested FRAs from the concessionaire. And, the decisions of this agreement were the increase of the lifetime of the contract and the definition of payments from the State to the private partner (Assembleia da República, 2013).

Costa de Prata

This was launched in 1998 and the contract was signed on May 19th of 2000. This was a SCUT, a project with shadow tolls, which payments from the State to the private partner depended on the traffic. However, there was a revision of the contract to adapt to the new model of

management and financing (NMGFSR). After this renegotiation (October 2010), payments from the State to the private partner depend on the availability and real tolls were introduced. Thus, this renegotiation may impact the predictions in the SB 2011 and subsequent SBs.

Grande Porto

This was also a SCUT, a project with shadow tolls. However, real tolls were introduced on July 5th of 2010, thus, this affects the SB 2011 and subsequent SBs.

Initially, this was launched in 1998 and the contract was signed on August 28th of 2002. At that time, the payments from the State to the private partner depended on the traffic. It was, apparently, a free service for users. After the renegotiation, the payments depend on the availability.

Norte Litoral

This was a SCUT, a project with shadow tolls. However, real tolls were introduced on July 20th of 2010, thus, this affects the SB 2011 and subsequent SBs.

Initially, this was launched in 1999 with the Decree-Law n. 119-B/99 of 14th of April, and the contract was signed on August 31st of 2001 (Assembleia da República, 2013). At that time, the payments from the State to the private partner depended on the traffic. After the renegotiation, the payments depend on the availability.

Beiras Litoral e Alta

This was a SCUT, a project with shadow tolls. However, real tolls were introduced on July 5th of 2010; thus, this affects the SB 2011 and subsequent SBs.

Initially, this was launched in 1998 and the contract was signed on the 20th of April of 2001 (Assembleia da República, 2013). At that time, the payments from the State to the private partner depended on the traffic. According to the Assembleia da República (2013), there were two main reasons for launching SCUTs' projects, namely, the fast implementation and the non-encumbrance of the SB by transferring the financing responsibility to the private sector.

Interior Norte

This SCUT project was launched in 1998 and the contract was signed on the December 30th of 2000 (Assembleia da República, 2013). Like other SCUTs, the total cost for the public partner was the sum of contracted payments (*SCUT's tolls*), costs with expropriations, with FRAs and with the widening of roads (Assembleia da República, 2013). On October 13th of 2011, the Government approved the Decree-Law that implements real tolls in this concession⁴⁸. Therefore, this renegotiation affects the SB 2012 and subsequent SBs.

⁴⁸ Source: DN Portugal (2011)

Beira Interior

This SCUT project was launched in 1997 and the contract was signed in 1999 (EP, 2011). On October 13th of 2011, the Government approved the Decree-Law that implements real tolls in this concession too⁴⁹. Therefore, this renegotiation affects the SB 2012 and subsequent SBs.

Algarve

This SCUT project was launched in 1998 and the contract was signed in 2000 (EP, 2011). On the October 13th of 2011, the Government approved the Decree-Law that implements real tolls in this concession too⁵⁰. Therefore, this affects SBs from 2012 onwards.

Norte

The launch of this project was in 1997 and the contract was signed on July 9th of 1999 (EP, 2011). In this contract, initially, there were no costs for the State. This explains the graph in Appendix 12 until the SB 2010. However, there was a renegotiation of the initial contract. The new contract, which was signed on July 16th of 2009, established payments for availability from the public to the private partner. In fact, this can be easily verified in the graph in Appendix 12.

Grande Lisboa

The launch of this project was in 2003 and the contract was signed on January 10th of 2007 (EP, 2011). Thus, this project is included in all SBs. Initially, as observable in Appendix 12, there were no expected costs for the State, which corresponds to what was defined in the initial contract. However, there was a renegotiation of the contract. The new contract, which was signed on July 5th of 2010, established payments for availability from the public to the private partner. Thus, this may explain the predicted costs from the SB 2010 onwards that are observable in the graph in Appendix 12.

Túnel do Marão

The launch of this project was in February of 2007, thus, it is only included from the SB of 2008 onwards. In fact, it is explicitly said in the SB 2008, that the launch of this project was being planned. The contract was signed in April of 2008.

The costs for the public partner have two components, costs for the availability (a fixed component) and payments for the service (which depends on the traffic).

However, the State decided to terminate the contract on June 17th of 2013. According to the Unidade Técnica de Acompanhamento de Projetos (UTAP), this was determined on reasonable grounds, and the justification was an infringement by the concessionaire (UTAP, 2013). This may be the reason for the decrease from SB 2012 to 2013 that is verified in the graph in Appendix 12.

⁴⁹ Source: DN Portugal (2011)

⁵⁰ Source: DN Portugal (2011)

Transmontana

The launch of this project was on November 22nd of 2007, thus, it is only included from the SB of 2009 onwards (actually, this is explicitly said in the SB of 2009). The contract was signed on December 9th of 2008. However, it was rejected on November 2nd of 2009. The new contract was signed on June 1st of 2010. This situation is like a renegotiation of the contract, and this may be the reason for the difference between SBs 2009 and 2010, which it is observable in the graph in Appendix 12.

The cost for the public partner with this project has two components: costs for the availability (fixed) and payments for the service (which depends on the traffic). This is included in the group of sub concessions, which are the result of the National Road Plan, signed in 1998 and that followed the recommendations of the European Commission. These are the main reasons in favour of the development of those sub concessions (Assembleia da República, 2013). However, they had some problems. One of them was the rejection of the prior approval from the NAO (Assembleia da República, 2013). Actually, in five out of the seven sub concessions (Transmontana, Algarve Litoral, Baixo Alentejo, Douro Interior and Litoral Oeste), their initial contracts were rejected. Afterwards, there was a process of reformulation of the contracts, and these contracts were already approved by the NAO. On a curious note, between the signature of the contract and the rejection from the NAO, the construction work had already started. In fact, at the time, it was legal to execute the contract before the NAO's approval⁵¹. Thus, if the contract was cancelled, the public partner would have to pay high compensations (Assembleia da República, 2013).

Douro Interior

The launch of this project was on November 22nd of 2007, thus, it is included from the SB of 2009 (actually, this is explicitly said in the SB of 2009). The contract was signed on the November 25th of 2008. However, it was rejected on November 2nd of 2009. The new contract was signed on March 15th of 2010. The cost for the public partner with this project has two components, costs for the availability (fixed) and payments for the service (which depends on the traffic).

Baixo Alentejo

The launch of this project was on December 11th of 2007, thus, it is included from the SB of 2009 onwards (actually, this is explicitly said in the SB of 2009). The contract was signed on January 31st of 2009. However, it was rejected on November 17th of 2009. The new contract was signed on June 16th of 2010. This may be the reason for the difference between SBs 2009 and 2010, which it is observable in the graph in Appendix 12.

⁵¹ Nowadays, the law is different.

Baixo Tejo

The launch of this project was on December 11th of 2007, thus, it is included from the SB of 2009 onwards (actually, this is explicitly said in the SB of 2009). The contract was signed on January 24th of 2009. For this project and for the Pinhal Interior, there was also a process of reformation of contracts. However, there was no rejection, because they were corrected before the request. The final contract was only signed on April 28th of 2010.

Litoral Oeste

The launch of this project was in the 1st quarter of 2008, thus, it is included from the SB of 2009 onwards (actually, this is explicitly said in the SB of 2009). The contract was signed on the 26th of February of 2009. However, it was rejected on November 23rd of 2009. The new contract was signed on July 16th of 2010.

Algarve Litoral

The launch of this project was on March 26th of 2008, thus, it is included from the SB of 2009 onwards (actually, this is explicitly said in the SB of 2009). The contract was signed on April 20th of 2009. However, it was rejected on November 23rd of 2009. The new contract was signed on May 28th of 2010.

Pinhal Interior

The launch of this project was on June 12th of 2008, thus, it is included from the SB of 2009 onwards (actually, this is explicitly said in the SB of 2009). The contract was signed on April 28th of 2010. For this project and for the Baixo Tejo, there was also a process of contracts' reformation. However, there was no rejection, because they were corrected before the request. The final contract was only signed on July 19th of 2010.

AE Centro

The launch of this project was on the 1st quarter of 2008 (Assembleia da República, 2013), thus, it is included in the SB of 2009 (actually, this is explicitly said in the SB of 2009). In addition to the seven aforementioned sub concessions, it was determined to launch more, but it did not happen. This project is one of the examples. The others are Alto Alentejo, Serra da Estrela, Ribatejo, Tejo Internacional and Vouga (Assembleia da República, 2013). As it is observable in the graph in Appendix 12, there are only predicted costs in the SB 2009 and 2010.

A21/ Rota Oeste

The first time that there is a reference about this project is in the SB 2010. It says that, the launching of the tendering process for new roads (Rota Oeste, Ribatejo, Vouga Serra da Estrela and Tejo Internacional) would begin during 2010. However, some PPPs were cancelled. An example of these, were the new roads that the launching process had not already started.

4.2 Analysis of each State Budget

In this section, there is an overall analysis, in which all State Budgets are analysed and compared. Moreover, the project with more impact on the difference from one SB to another is identified. In the following graph, in which the x-axis has the SBs and the y-axis has the PV of the costs for the public partner (M€), the differences between SBs are observable:

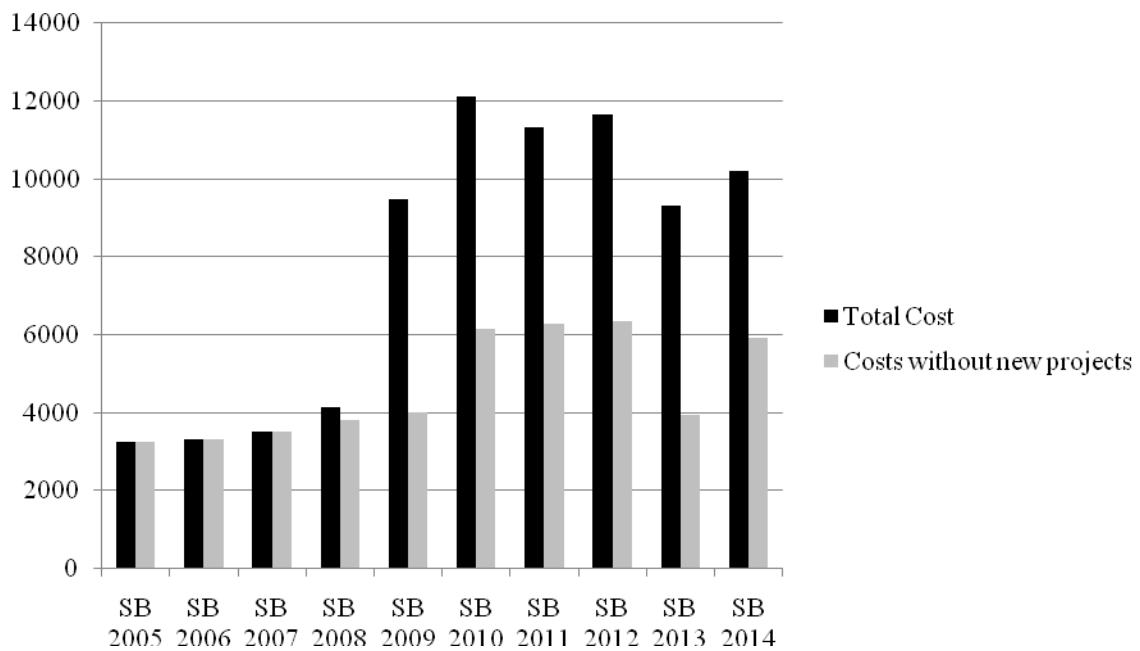


Figure 4: PV of the predicted costs in each SB

X-axis: SBs
Y-axis: PV of predicted gross costs for the State (M€)

From the SB 2005 to 2008, PVs of the predicted costs on the road sector were relatively similar, with an average around 3 366 M€. The increase from SB 2007 to 2008 is mainly explained by the introduction of Túnel do Marão. From 2008 to 2009, there was a large increase. Actually, in 2009, there were eight more projects with contracted costs for the State. They were the reason for this increase, in fact, without including these new projects (grey bar in the graph), the difference between SB 2008 and 2009 would be insignificant. From 2009 to 2010, there was also an increase, which may be linked to renegotiations and FRAs. Nevertheless, in 2011, it decreases. Contrarily to other SBs, this one explains the differences between this SB and the previous one. It says that the reduction of net costs is due to the introduction of real tolls in SCUTs and because the investment on the AE Centro was postponed (SB, 2011). SBs 2013 and 2014 present lower predicted costs than the previous one. This may be linked to the attempt to reduce costs. In fact, in the SB 2013, it is said that the predicted reduction from 2012 to 2013 is related to renegotiations of concessions with the availability model. The concessions are the following: Costa de Prata, Grande Porto, Norte Litoral, Algarve, Beira Interior, Interior Norte,

Beira Litoral Alta, Norte and Grande Lisboa. Several measures were applied in order to achieve that objective. One of them was the reduction of the internal rate of return to shareholders that was defined in the base-case (SB, 2013). The data that was provided by EP has an item in 2013 called *Reduction of Charges*, thus, I may conclude that these renegotiations are included in this item. Actually, without including it, the PV of the road sector's costs would increase by 5%. During December 2012, the process of renegotiation for reducing costs regarding several concessions, started. In the first quarter of 2013, seven memorandums of understanding and protocols were already signed, in order to achieve the objectives for 2013 (UTAP, 2013). From the SB 2013 to 2014, predicted costs increased. In fact, this is denoted in the SB 2014. It says that there are factors that the Government does not control that increase public costs. However, the Government still wants to conclude renegotiations to reduce some costs. Thus, there is still an item called *Reduction of Charges*. As far as I am concerned, in this item and in the SB 2014 are included renegotiations with sub-concessions, concessions Algarve and Norte Litoral. These are the projects that are still waiting for agreements. As aforementioned, seven projects were renegotiated during 2013, namely Costa de Prata, Grande Porto, Beira Litoral e Alta, Norte, Grande Lisboa, Beira Interior and Interior Norte (UTAP, 2012). In addition to this, the Government also decided to start negotiations with regard to concessions Brisa and Lusoponte, in order to have additional savings (SB, 2014)⁵².

On a curious note, there are great challenges in 2014. This is the year that payments regarding sub concessions of the EP start being paid. Thus, renegotiation processes are already underway, in order to alleviate the costs for the public partner (SB, 2014).

Below, I present the percentage changes from one SB to another. In addition to this, there is an analysis with regard to the projects that contributed most for the change in the road sector from one SB to another⁵³.

	SB2006	SB2007	SB2008	SB2009	SB2010	SB2011	SB2012	SB2013	SB2014
Roads	1%	6%	17%	130%	28%	-7%	3%	-20%	10%

Table 11: Percentage change of the PV of the predicted total costs from one SB to another

From 2005 to 2006, Beiras Litoral e Alta is the concession that contributes most to the 1% increase. Regarding the increase from the SB 2006 to 2007 in the road sector, the major contribution is from Norte Litoral (the contribution is 2%, the PV of this concession's costs increases 17%). From 2007 to 2008, Túnel do Marão is the concession that contributes most for the 17% increase (the contribution is 9%). This project was launched in 2007, so the SB of 2008

⁵² Additional source: TVI24 (2013)

⁵³ Formula: $\frac{PV\ of\ the\ costs_t - PV\ of\ the\ costs_{t-1}}{PV\ of\ the\ costs_{t-1}}$

is the first one to include it. From 2008 to 2009, AE Centro and Pinhal Interior are the concessions that contribute most to the increase of 130% (contributions are 35% and 29% respectively). The launch of these projects was in 2008. Therefore, they were included in the SB 2009. There were other projects that were launched at the time, but these presented lower predicted costs. From 2009 to 2010, the highest contribution for the 28% increase is from the concession Norte (the contribution is 14%). In fact, the SB 2010 was the first one after the renegotiation of this concession. This was when it changed from a project with no costs for the public partner to a project with availability payments from the public to the private partner. From 2010 to 2011, the AE Centro is the one that contributes most to the 7% decrease (the predictions decreases 100%). In fact, the project was postponed, and it was not included in the SB 2011. From 2011 to 2012, the concession that contributed most to the increase of 3% is Litoral Oeste (the contribution is 2%). The predicted costs of Litoral Oeste increases by 26%. From 2012 to 2013, the reduction (-20%) is chiefly explained by the item called *Reduction of Charges*. Finally, from 2013 to 2014, the increase (10%) is explained by the increase of the item *Reduction of Charges* (its contribution is 27%). This item includes all expected renegotiations, but some of them were already determined. Thus, the impact of these renegotiations is allocated to each of them in the SB 2014, and not included in the item *Reduction of Charges*.

4.3 Analysis of the econometric model

As aforementioned, this analysis is based on a cross-sectional time series data model. The database consists of information on the several PPP projects since 2005 until 2014, retrieved from the annual SBs. The model is presented below (individual-specific effects model), and has as dependent variable the logarithm of the PV of the predicted costs with regard to each project in each SB:

$$Y_{it} = \alpha_i + \beta_1 \ln(\text{CAPEX}_i) + \beta_2 \ln(\text{Kilometres}_i) + \beta_3 (\text{Risk allocation}_i) + \beta_4 (\text{SCUTs model}_{it}) + \beta_5 (\text{availability payments model}_{it}) + \beta_6 (\text{model with payments for availability and service}_i) + \beta_7 (\text{North}_i) + \beta_8 (\text{Centre}_i) + \beta_9 (\text{Lisbon}_i) + \beta_{10} (\text{More than a region}_i) + \beta_{11} (\text{Troika}_{t-1}) + \beta_{12} (\text{GDP growth}_t) + \varepsilon_{it}$$

Where,

ε_{it} is i.i.d. over i and t

$i = 1, \dots, 24$, which corresponds to the following projects:

Oeste, Algarve, Beira Interior, Interior Norte, Costa de Prata, Grande Porto, Norte Litoral, Beiras Litoral e Alta, Lusoponte, Norte, Brisa, Litoral Centro, Grande Lisboa, Douro Litoral,

Transmontana, Douro Interior, Túnel do Marão, Baixo Alentejo, Baixo Tejo, Litoral Oeste, Algarve Litoral, Pinhal Interior, AE Centro and A21/Rota Oeste
 t= 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013 and 2014 (corresponding to each SB)

Below, I present the results of the model both using fixed as random effects:

Model with fixed effects		Model with random effects	
In PV of costs	Coefficient	In PV of costs	Coefficient
<i>GDP growth</i>	-0,13*** (0,04)	<i>CAPEX</i>	0,91*** (0,30)
<i>SCUTs model</i>	5,64*** (0,33)	<i>Kilometres</i>	-0,27 (0,21)
<i>availability payments model</i>	5,81*** (0,30)	<i>Risk allocation</i>	-0,004 (0,03)
<i>Troika</i>	-0,22 (0,14)	<i>GDP growth</i>	-0,13*** (0,04)
<i>constant</i>	2,41*** (0,14)	<i>SCUTs model</i>	5,80*** (0,30)
Time invariant variables are included in the intercept *** p<1%, ** p<5%, * p<10%; std errors in parenthesis N=194; R ² = 0,31; F(4,166)= 110,51; Prob > F =0		<i>availability payments model</i>	5,95*** (0,28)
		<i>model with payments for availability and service</i>	5,80*** (0,29)
		<i>North</i>	-0,45 (0,51)
		<i>Centre</i>	-0,15 (0,45)
		<i>Lisbon</i>	0,55 (0,58)
		<i>More than a region</i>	-1,02 (0,66)
		<i>Troika</i>	-0,23 (0,14)
		<i>Constant</i>	-3,25 (2,18)
		*** p<1%, ** p<5%, * p<10%; std errors in parenthesis N=194; R ² = 0,93; Wald chi2(12)= 842,57; Prob>chi2=0	

As observable in the results, the model with fixed effects includes time invariant variables in the intercept. They are related to the characteristics of the projects that usually do not change over time, namely *CAPEX*, *Kilometres*, *Risk allocation*, *model with payments for availability and service*⁵⁴, *North*, *Centre*, *Lisbon* and *More than a region*. Nevertheless, the choice between fixed or random effects should not be based on the fact that I would want to include time invariant variables. The suitable option between fixed and random effects is identified by running the

⁵⁴ Projects with payments for availability and service, contrarily to other projects, had always the same model.

Hausman test. This tests if the predicted coefficients from both options are equal (H0). This analysis is relevant, since if there are random effects both estimators (random and fixed) are consistent, but the fe estimator is inefficient and the re estimator is efficient. Contrarily, if there are fixed effects, using the re estimator, I get inconsistent estimates, in other words, biased estimates. Otherwise, I get consistency with fe estimators. In conclusion, if the p-value is insignificant (Prob>chi2 higher than 5%), I should use random effects. Otherwise, I should use fixed effects. With the Hausman test, I concluded that I should apply random effects, since the p-value is 64% (> 5%). Therefore, the results are the following:

In PV of costs	Coefficient
<i>CAPEX</i>	0,91*** (0,25)
<i>Kilometres</i>	-0,27 (0,21)
<i>Risk allocation</i>	-0,004 (0,05)
<i>GDP growth</i>	-0,13** (0,06)
<i>SCUTs model</i>	5,80*** (0,74)
<i>availability payments model</i>	5,95*** (0,79)
<i>model with payments for availability and service</i>	5,80*** (0,44)
<i>North</i>	-0,45 (0,32)
<i>Centre</i>	-0,15 (0,28)
<i>Lisbon</i>	0,57 (0,45)
<i>More than a region</i>	-1,02 (0,72)
<i>Troika</i>	-0,23* (0,14)
<i>Constant</i>	-3,25 (2,09)

robust std. errors in parenthesis

*** p<1%, ** p<5%, * p<10%

N=194; R²=0,93; Wald chi2(12)= 1167,72; Prob>chi2=0

Globally, this model explains 93% of the dependent variable. With the results of the model, I can note that the economic and political environment of the country has an impact on the predictions regarding how much the public partner will spend with PPPs of the road sector. When the GDP growth decreases, the PV of the predicted costs increases. As already mentioned, probably, it is *easier* for a government to invest through a PPP model than a TIP model during difficult economic scenarios, because the investment can be off budget. Over the SBs, when the predicted GDP growth decreases by one percentage point, the PV of the costs increases by 0,13%. In addition to this, it is verified that the SBs discussed during the years that Portugal was under the Financial Assistance Programme, SB 2012, 2013 and 2014, present lower predicted costs than the previous ones. This represents the renegotiations of the last years, which aim in reducing the costs of the public partner. Other type of renegotiations is represented by the variables related to the model of payment. Actually, these variables are statistically significant, and I can conclude that comparing to the traditional model with real tolls, the others models have, on average, higher costs. But, more important than this conclusion, I can also analyse the impact of the renegotiations, which change specific projects from one model of payment to another, on the predicted costs. Some projects changed from models with shadow tolls (SCUTs) to the model of payments for availability. And, on average, this change leads to an increase of the predicted costs. They increase, on average, by 16%, *ceteris paribus*. For example, Beira Interior is one of the projects that changed from SCUT to the availability model. With regard to the results of the model, I can analyse the predicted costs for this project before and after its renegotiation, taking into account that other variables are constant. According to the results of the model, the PV of the predicted costs of Beira Interior before the renegotiation is around 796 M€, and after the renegotiation is 925 M€.

$$\begin{aligned} \text{Ln (PV of the costs)} = & -3,25 + 0,91 \times \text{Ln(CAPEX)} - 0,27 \times \text{Ln(Kilometres)} - 0,004 \times (\text{Risk} \\ & \text{allocation}) + 5,80 \times (\text{SCUTs model}) + 5,95 \times (\text{availability payments model}) + 5,80 \times (\text{model with} \\ & \text{payments for availability and service}) - 0,45 \times (\text{North}) - 0,15 \times (\text{Centre}) + 0,57 \times (\text{Lisbon}) - 1,02 \times \\ & (\text{More than a region}) - 0,23 \times (\text{Troika}) - 0,13 \times (\text{GDP growth}) \end{aligned}$$

- Beira Interior before renegotiation:

$$\begin{aligned} \text{Ln (PV of the costs)} = & -3,25 + 0,91 \times \text{Ln}(628) - 0,27 \times \text{Ln}(178) - 0,004 \times (39,5) + 5,80 \times (1) + 5,95 \times \\ & (0) + 5,80 \times (0) - 0,45 \times (0) - 0,15 \times (1) + 0,57 \times (0) - 1,02 \times (0) - 0,23 \times (0) - 0,13 \times (0,2) = 6,68 \\ \text{PV of the costs} = & e^{6,68} = 796 \end{aligned}$$

- Beira Interior after renegotiation:

$$\ln(\text{PV of the costs}) = -3,25 + 0,91 \times \ln(628) - 0,27 \times \ln(178) - 0,004 \times (39,5) + 5,80 \times (0) + 5,95 \times (1) + 5,80 \times (0) - 0,45 \times (0) - 0,15 \times (1) + 0,57 \times (0) - 1,02 \times (0) - 0,23 \times (0) - 0,13 \times (0,2) = 6,83$$

$$\text{PV of the costs} = e^{6,83} = 925$$

Thus, the difference is 129 M€, the predicted costs increase by 16%.

In addition to this, the concessions Norte and Grande Lisboa changed from traditional concessions to the model of availability payments. According to the result of the model, this renegotiation also increases, on average, the predicted costs. For example, according to the results of the model, the PV of the predicted costs of Norte before the renegotiation is 2,44 M€, and after the renegotiation is 935 M€, *ceteris paribus*.

- Norte before renegotiation:

$$\ln(\text{PV of the costs}) = -3,25 + 0,91 \times \ln(879) - 0,27 \times \ln(175) - 0,004 \times (39,5) + 5,80 \times (0) + 5,95 \times (0) + 5,80 \times (0) - 0,45 \times (1) - 0,15 \times (0) + 0,57 \times (0) - 1,02 \times (0) - 0,23 \times (0) - 0,13 \times (0,2) = 0,89$$

$$\text{PV of the costs} = e^{0,89} = 2,435129651$$

- Norte after renegotiation:

$$\ln(\text{PV of the costs}) = -3,25 + 0,91 \times \ln(879) - 0,27 \times \ln(175) - 0,004 \times (39,5) + 5,80 \times (0) + 5,95 \times (1) + 5,80 \times (0) - 0,45 \times (1) - 0,15 \times (0) + 0,57 \times (0) - 1,02 \times (0) - 0,23 \times (0) - 0,13 \times (0,2) = 6,84$$

$$\text{PV of the costs} = e^{6,84} = 934,4891347$$

Thus, with this change on the model of payment, the predicted costs increase by 38275%, on average, *ceteris paribus*.

Therefore, I can conclude that, on average, these types of renegotiations increase the predicted costs.

Regarding the control variables, only CAPEX is statistically significant⁵⁵. Actually, projects with a higher CAPEX have, as expected, higher costs for the public partner. On average, when the CAPEX increases 1%, the PV of the costs increases by 0,91%.

Summarily, the predictions presented in the SBs are affected by the economic context of the country and by renegotiations of the contracts. In this econometric analysis, renegotiations include the ones that are related to the change of the model of payment and to the renegotiations stipulated in the Memorandum of the Troika.

⁵⁵ Regarding the variable *kilometres* I thought that the result (the fact that is not statistically significant) was due to an outlier: the project Brisa. Brisa is the project with more kilometres but during the analysed period it has no predicted costs for the public partner. Therefore, I computed a model without it, but the result was still that this variable is not statistically significant.

5. Conclusion

It is unquestionable that the PPP model has been a way to stimulate the public investment.

Theoretically, this model can bring positive effects to the society as a whole. Due to the share of know-how and resources between the private and public partners, this can lead to the maximization of the collective satisfaction. However, countries still have several challenges to deal with, in order to achieve the benefits of this type of financing.

In Portugal, several projects were undergone by PPPs, and it is one of the countries with greatest experience on the area. Over the years, the Portuguese State has been improving the way it deals with PPP projects. For instance, in the last two years it has been trying to reduce its burden. In addition to this, Portugal is considered an example regarding the information provided in the SBs, since they present the predicted net costs for each sector in a long-run perspective.

However, as in many other countries, in Portugal there are still many aspects of this partnership that need to be improved. First of all, I have to emphasize the need for more transparency. The lack of information was one of the main limitations for the development of this dissertation. It is obvious that there are great differences regarding the predicted costs for the public partner for exactly the same period of time over State Budgets, but they do not clearly present their explanations. For instance, it is not obvious on which SB a certain renegotiation has impact and in which way it affects the predictions. In addition to this, there is several information about FRAs that is not disclosed, and that obviously affects the predictions. Regarding this lack of transparency, a simple way to improve the information provided in the SBs would be to present the predictions not only by sector, but also for each project separately, like the data provided me by the Estradas de Portugal, S.A. They should also disclose the net and the gross costs. Furthermore, it would be important that the values in different SBs should be more readily comparable. Regarding this, the OECD (2002) suggested that a SB “should be reconciled with forecasts contained in earlier fiscal reports for the same period”. In addition to this, SBs should include information with regard not only to direct but also indirect costs of all partnerships for the public sector.

Nevertheless, with the information publicly available, I was able to understand some of the reasons for different SBs presenting different predictions regarding the cost that the State will bear during 2014-2031. In this dissertation I had as objectives to assess which factors can affect the predictions and understand the reason why different SBs have different predictions. Therefore, I computed an econometric model that aimed to explain the PV of the predicted costs by project in each SB. According to the result, the predictions, regarding how much the State will spend with PPPs of the road sector, are affected by the changes of the model of payment (a

type of renegotiation). The model of payment is related to the fact that the PPP projects in the road sector can be included in different groups, according to the delivered service and payments to private partners. I concluded that projects that change from SCUTs or traditional concessions to the model of payments for availability, on average, increase their predicted costs. Moreover, the expected GDP growth has also an impact on the PV of the predicted costs. In periods with lower GDP growth the PV of the costs usually increases. This may be linked to the idea that governments apply the PPP model to push expenditures to the future, because investments can be off budget. Actually, this can be more tempting during periods of economic downturn. Thus, the predictions are also affected by the economic environment. In addition to this, they also are affected by the fact that Portugal was in the last years under a Financial Assistance Programme (which also had as consequence some renegotiations). I verified that on average the predicted costs are lower in the last years and this may be linked to the presence of Troika in Portugal. Summarily, the variables of the model that are statistically significant are, in fact, *SCUTs model*, *availability payments model*, *model with payments for availability and service*, *GDP growth* and *Troika*.

In addition to this, through data analysis I was also able to understand some of the reasons why different SBs present different predictions. Summarily, I concluded that from the SB 2005 to 2007 the predictions are relatively similar. However, from the SB 2007 to 2008 they increased. This is mainly explained by the introduction of a new project, Túnel do Marão. From SB 2008 to 2009, there was a higher increase, which was due to the launch of the sub concessions of the EP. From SB 2009 to 2010, the increase was the consequence of some renegotiations. For example, the concession Norte until 2009 was a traditional concession with no costs for the State. In 2009 it was renegotiated and it became a project with payments for availability. Moreover, I also verified, as in the econometric analysis, that the decrease in the last two SBs (SB 2013 and 2014) reflects the efforts that the State is making to reduce its costs.

To conclude, everyone can take some lessons out of the Portuguese experience with PPPs. I think that the decision-makers in Portugal are aware of the partnerships that went well and the ones that should be perfected. Hence, governments should take this opportunity to enhance their role in favour of the satisfaction of the collective needs and improve the management of public financial resources, leading to a sustainable economy.

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Appendixes

1. TIP vs PPP

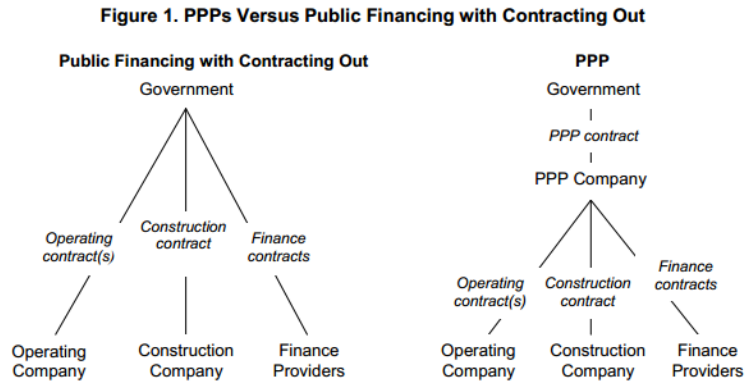


Figure 5: TIP vs PPP

Source: Posner, Ryu et Tkachenko, 2009

In the graph above, the relations between the involved entities in the PPP model and in the TIP model are presented. In addition to this, there are other differences between these two models. Two of them are expenditure and revenue flows and the risk allocation. For instance, the capital expenditure of the government is usually lower and of the private entity is higher in the PPP model (OECD, 2008). With regard to current expenditures, in the PPP model, the government usually has mandatory costs every year during the lifetime of a contract. Contrarily, with TIP projects, the government usually has costs for O&M, but the amount can be decided each year (Posner, Ryu et Tkachenko, 2009).

Regarding risk allocation, it is easy to understand the difference between TIP and PPP with the following graph:

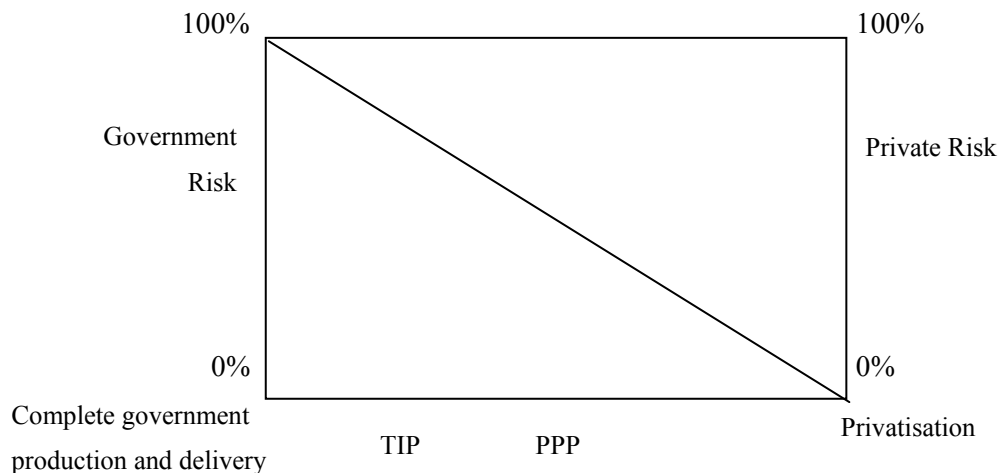


Figure 6: TIP vs PPP

Source: OECD, 2008

There are two complete different situations: the *complete government production and delivery* and the *privatisation*. In this last situation, the government is not involved in any phase and the private partner is the owner of the asset. Thus, the private entity can maximize its profits. In the *TIP model*, the government defines the quality, the quantity and the design of the service or good that buys directly from the private entity. Then, the government transfers directly or indirectly to citizens. The *PPP model* is in the middle of these extreme situations. The government also defines the quantity and the quality of the service or good, but the private entity can design it. Contrarily to TIP, the government does not buy it directly from the private entity. Actually, it buys the several services that the private entity can provide with the asset during a period of time. The private entity is responsible for this provision and for the O&M of the asset (OECD, 2008). In this model, there are different types. This depends on the role of the private partner. In other words, it depends on the responsibility that the private entity assumes. These types are: Build-own-maintain (BOM), Build-own-operate (BOO), Build-develop-operate (BDO), Design-construct-manage-finance (DCMF), Design-build-operate (DBO), Buy-build-operate (BBO), Lease-own-operate (LOO), Build-operate-transfer (BOT), Build-own-operate-transfer (BOOT), Build-rent-own-transfer (BROT), Build-lease-operate-transfer (BLOT) and Build-transfer-operate (BTO) (Posner, Ryu et Tkachenko, 2009).

2. Risks

Risks related to PPPs are the following (Schwartz, Corbacho et Funke, 2008; Cardoso, 2011):

- Construction risk: this includes problems with the design of the project, and also “cost and schedule overruns”
- Financial risk: if the generated cash flows are not enough to repay loans and invested capital
- Demand risk: if demand decreases and consequently the cash flow declines
- Availability risk: “the possible lack of continuity and low quality of service provision”. For example, if an infrastructure is not available and/or it is not available as defined (with the characteristics that were defined in the contract)
- Political risk: if the government takes a decision that affects negatively the potential revenues of the private partner. This can include the legislative risk, since the State is responsible for the legislation. If it publishes a law that affects the revenues/costs which were contractually defined. Moreover, this can also include the risk of unilateral changes by the public partner.
- Force Majeure risk: risks that cannot be controlled by neither the public nor the private partner, such as natural resources

- Residual Value risk: “uncertainty regarding the market price of the infrastructure asset at the end of the contract period”
- Environmental Assessment risk: An infrastructure is only built if there is an approval that declares that it does not have negative externalities for the environment
- Expropriation risk: The responsible for this risk is who has to expropriate the land in order to build an infrastructure. If this entity cannot do it during the defined period, which affects the construction phase (because the infrastructure is not ready to be operational at the defined date), it has to compensate the other partner (who may not receive cash flows during that period)

3. Contingent liabilities

A contingent liability is a potential liability, which is only converted as an actual liability and has impact on the budget if a certain event occurs (OECD, 2002; PPIAF, 2012). They are associated with some risks. For example, it is defined in a contract that if a force majeure event occurs, the public partner has to compensate the private partner. However, this is a cost that initially cannot be measured and it is impossible to know the timing. Contrarily, a direct liability does not depend on the occurrence of a future situation. It includes what I call *normal* costs, such as availability payments and shadow tolls. It is defined in the contract when they are paid (PPIAF, 2012).

The OECD recommends the disclosure of the total amount related to contingent liabilities and division by categories that depend on their nature. In the situation that it is not feasible to present it in this way, contingent liabilities should be at least enumerated and described (OECD, 2002). In addition to this, the PPIAF describes some ways to budget these liabilities. One possibility is to “create additional budget flexibility”, for example, by having a contingent line from which payments that are not expected can be made. Other possibility is to “create a contingent liability fund” (PPIAF, 2012).

4. The process of renegotiation in Portugal

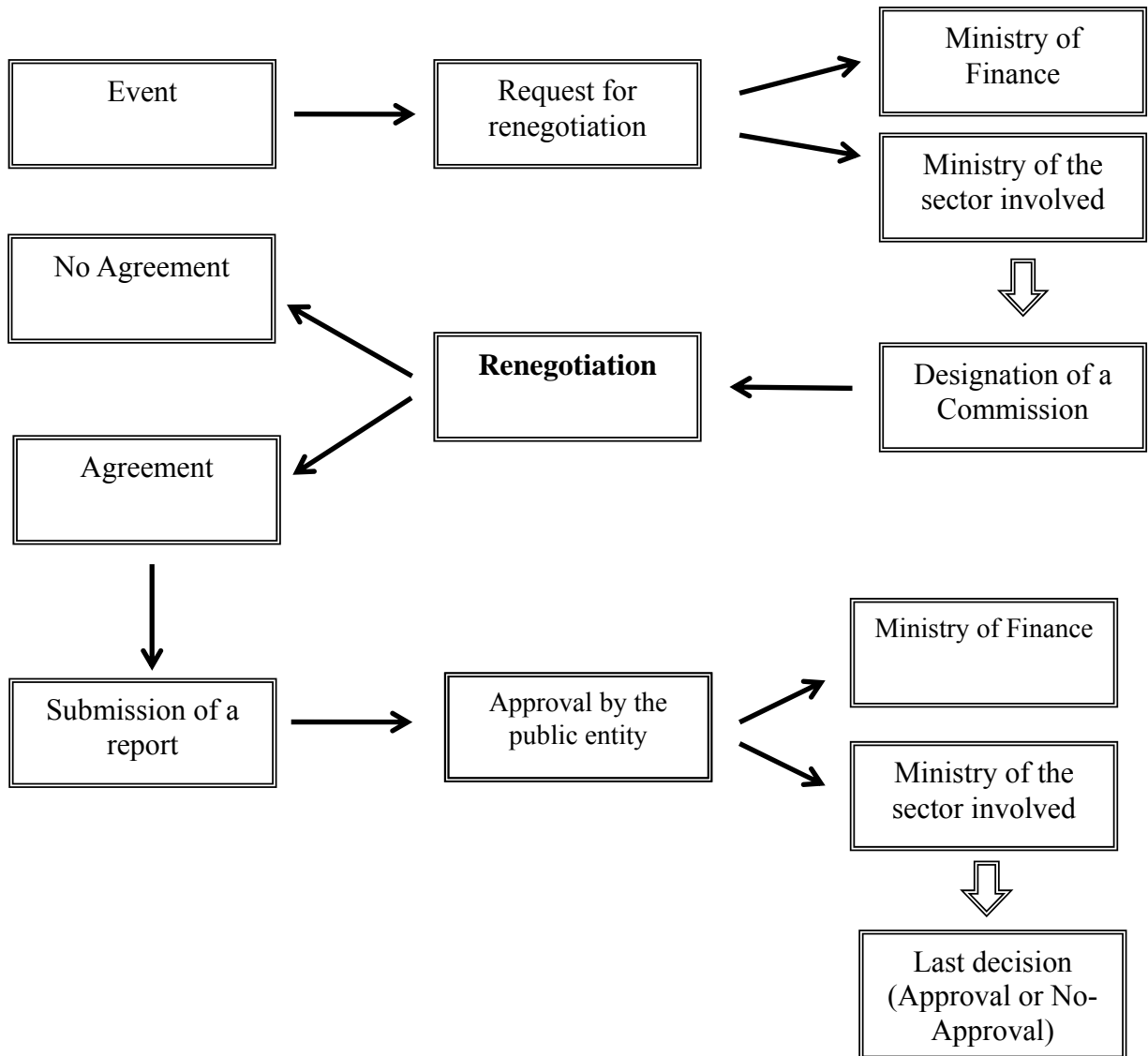


Figure 7: The process of renegotiation in Portugal

Source: Cardoso, 2011

5. Summary of the History of PPPs

PPPs have emerged in the decade of 50 and 60 in the U.S.A. as *joint ventures* (Bult-Spiering et Dewulf, 2006). In Europe, the pioneer was the U.K. in the 90's (Bult-Spiering et Dewulf, 2006; Posner, Ryu et Tkachenko, 2009; Moreno, 2010). The PPP model has been heavily applied since 1990: "In the 1800s, many railways were built under concessions that guaranteed private investors a minimum rate of return. In the 1960s and 1970s, concessions were used to finance investments in French and Spanish highways. But the use of PPPs increased in the 1990s and 2000s, partly with the development in the United Kingdom of PPPs in which the government

was the main purchaser of the project's services (in our terminology, government-funded PPPs)" (Funke, Irwin et Rial, 2013).

6. Concession

A concession is a PPP. However, there is a distinction between *Pure PPP* and *Concession PPP*. In the *Pure PPP* model, the private partner receives payments mainly from the public partner. In the *Concession PPP* model, typically, there are no regular costs for the government; the project is auto-sustainable. The main source of revenues of the private partner is payments from the users. Thus, revenues depend on the demand. In this context, the private partner bears most of risks (particularly, demand risk). The public partner is usually called the grantor, whereas, the private partner is called the concessionaire (OECD, 2008; Burger et Hawkesworth, 2011; Sarmiento, 2013).

7. Estradas de Portugal, S.A

It is a public company. In 2007, it was defined, with the NMGFSR*, that the EP was the grantor of new projects in the road sector. Thus, the Government is no longer the direct public grantor of new contracts with private partners. Regarding, the pre-existing roads (before this decision) the State is still the direct grantor until the end of each contract. However, the EP includes in its budget the cost and the revenue of the State with those projects.

Summarily, there are three entities and two contracts. The entities are public partners, the EP and the Government. There is a global contract (during 75 years) between the Government and the EP, and there are contracts between the EP and private partners. Therefore, since this decision, the EP has sub concessions and it is called the global concessionaire of the State. It became responsible for the conception, project, construction, financing, conservation, operation, requalification and enlargement of the national road network. However, it delegates some of these responsibilities on private partners (DGTF, 2009; Moreno, 2010; Estradas de Portugal, 2012; Azevedo, 2013).

*NMGFSR- Novo Modelo de Gestão e Financiamento do Sector Rodoviário

The objective of this new model was to guarantee the auto sustainability of the road sector and reduce the cost for the Government. In addition to this, it aims at dividing the functions of operation and supervision, in order to increase efficiency and improve transparency. The first one is one of the responsibilities of the EP⁵⁶. In this context, the aforementioned global contract

⁵⁶ The InIR is responsible for the monitoring and the supervision (Estradas de Portugal, 2012).

between the Government and the EP was signed. In this new model of management, new projects to be developed by the EP were identified. Thus, the tendering process regarding the following concessions was launched: Auto-estrada Transmontana and Douro Interior (RCM n° 177/2007 de 10.12), Alto Alentejo, Baixo Alentejo, Baixo Tejo, Litoral Oeste, Auto-estrada do Centro (RCM n° 181/2007 de 11.12), Algarve Litoral (RCM n° 56/2008 de 26.03) and Pinhal Interior (RCM n° 106/2008 de 07.07) (Azevedo, 2013; Estradas de Portugal, 2012).

8. Costs for the State with PPPs in the railway and health sectors

8.1 Railway Sector

There are three PPPs in the railway sector, which are the Eixo Norte-Sul, the Metro Sul do Tejo (MST) and the PPP1.

In this sector, the gross costs from the State to private partners depend on the demand of the MST. The State has to compensate the private partner when the volume of traffic is less than what was contractually defined (Moreno, 2010; Ernst & Young, 2012).

Moreover, the Eixo Norte-Sul had, theoretically, no costs for the State. However, in reality, it became a project highly subsidized by the State. This was due to the fact that the traffic risk was allocated to the public partner. The real traffic was lower than predicted, thus the State had to compensate the concessionaire. Therefore, the State decided to renegotiate the contract. The renegotiated payments for the private partner comprise compensations, user rates and payments for the provision of public services. Although it enabled the State to reduce its burden, it was not at a zero-cost. Nevertheless, this is considered an example of a good renegotiation, in the perspective of the State (Moreno, 2010).

The PPP1 is the first PPP of the high-speed network in Portugal (DGTF, 2011). Regarding this PPP, its approval has been rejected by the NAO, so the Government cancelled the project. According to Ernst & Young, if the project is suspended, future costs for the State probably will be related to indemnities (Ernst & Young, 2012).

8.2 Health Sector

In the health sector there are eight PPP contracts in hospitals. PPPs in this sector are divided into two distinct groups, two waves: the first wave includes the hospitals Cascais, Braga, Vila Franca de Xira and Loures. The model of this wave is composed by two contracts. One for the clinical management (provision of health service), which the duration is 10 years, and another for the management of hospital building (the infrastructure), which the duration is 30 years. The second wave has a different model. This wave includes the Lisboa Oriental⁵⁷ and Algarve hospitals, and there is only a contract regarding the management of the hospital building. In this

⁵⁷ Lisboa Oriental = Todos-os-Santos (DGTF, 2009).

case, only the public sector is responsible for the management of the health care's provision (DGTF, 2009; Moreno, 2010).

In this sector, costs for the public partner are payments for the hospital production and additional protocols that are contracted by the National Health System (NHS). For hospital buildings, it pays availability payments with a fixed and a variable part (linked to inflation) (Ernst & Young, 2012).

In addition to these, there are other two projects, Centro de Medicina Física e Reabilitação do Sul (CMFRS) and Centro de Atendimento do Serviço Nacional de Saúde (CASNS). For CMFRS, it pays for contracted clinic production for hospitalization and external appointments. And for CASNS, payments depend on the quantity of contracts (Ernst & Young, 2012).

9. Contract of Costa de Prata after renegotiation

CHAPTER XIII- Payments from the grantor

Annual Payment from the public partner to the private partner is based on the following formula:

$$R_t = Dis_t - Ded_t \pm \sum (Sin)_t$$

R_t - Payment in year t

Dis_t - Payment regarding availability in year t

Ded_t - deductions regarding non-availability in year t

Sin_t - value that depends on the level of accidents in year t

10. Contract of Transmontana

CHAPTER XVIII- Payments from the grantor

Annual Payment from the public partner to the private partner is based on the following formula:

$$R_t = Dis_t + Ser_t - Ded_t \pm \sum (Sin)_t$$

R_t - Payment in year t

Dis_t - Payment regarding availability in year t

Ser_t - Payment regarding the delivered service in year t

Ded_t - deductions regarding non-availability in year t

Sin_t - value that depends on the level of accidents in year t

11. Launch date of projects

Projects	Launch date	Contract's date
Brisa		1972
Lusoponte	1992	1994
Oeste	1997	1998
Norte	1997	1999
Beira Interior	1997	1999
Costa de Prata	1998	2000
Algarve	1998	2000
Interior Norte	1998	2000
Norte Litoral	1999	2001
Beiras Litoral e Alta	1998	2001
Grande Porto	1998	2002
Litoral Centro	1999	2004
Grande Lisboa	2003	2007
Douro Litoral	2004	2007
Túnel do Marão	2007	2008
Transmontana	2007	2008
Douro Interior	2007	2008
Baixo Tejo	2007	2009
Baixo Alentejo	2007	2009
Litoral Oeste	2008	2009
Algarve Litoral	2008	2009
Pinhal Interior	2008	2010

Table12: Launch date of projects

Source: EP (2011)

12. Costs for the public partner with PPP projects in the road sector

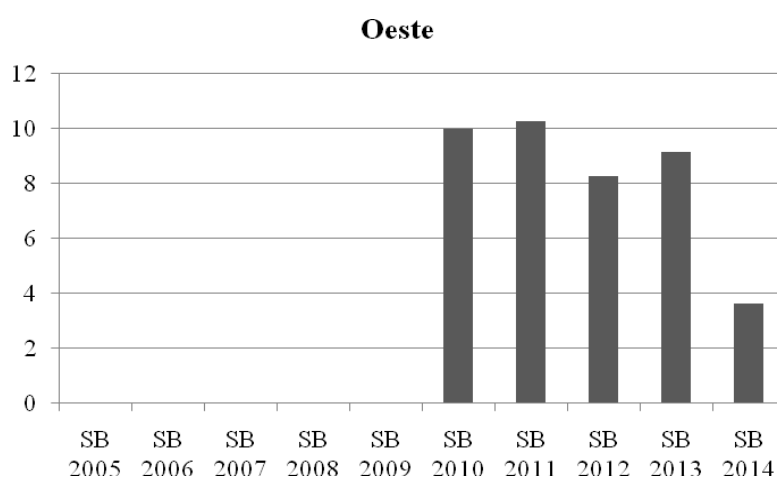


Figure 8: PV of the predicted costs for the State per SBs

X-axis: SBs

Y-axis: PV of predicted costs for the State (M€)

Douro Litoral

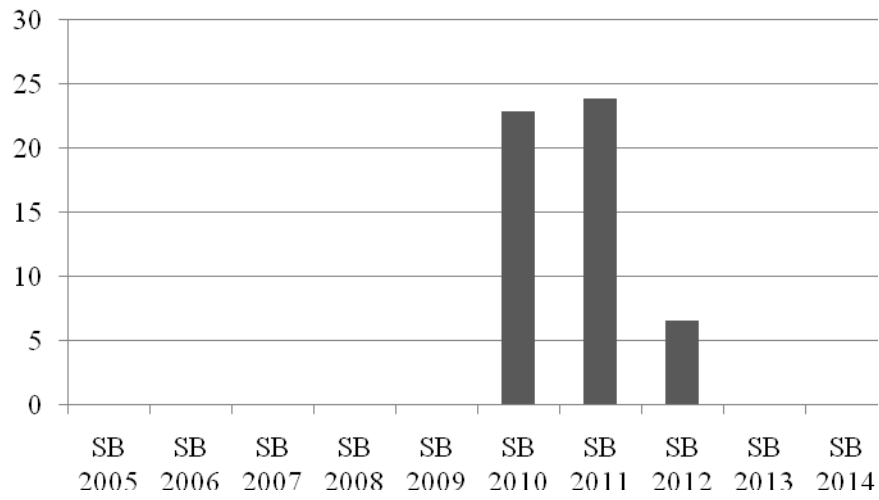


Figure 9: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

Litoral Centro

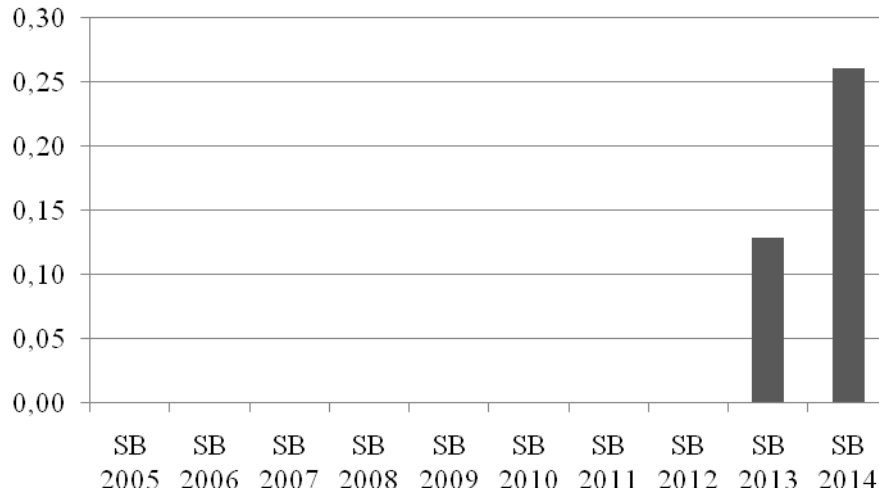


Figure 10: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

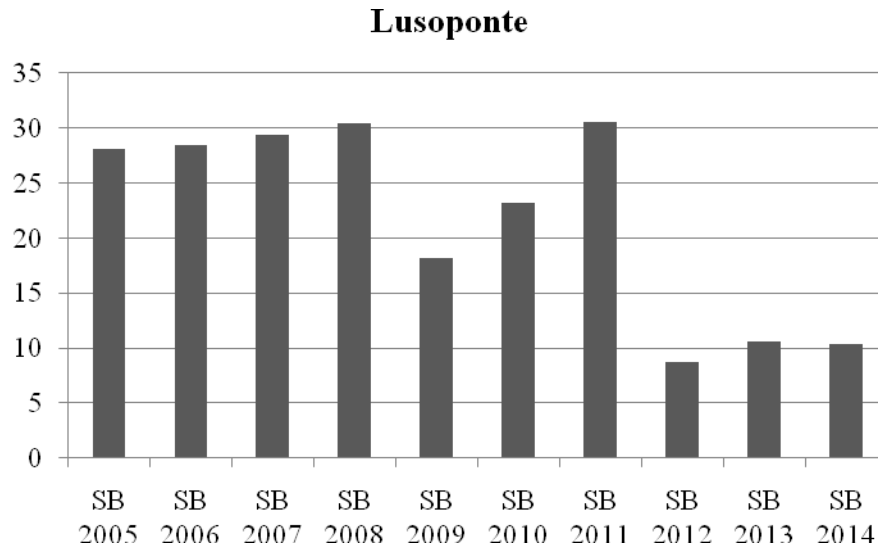


Figure 11: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

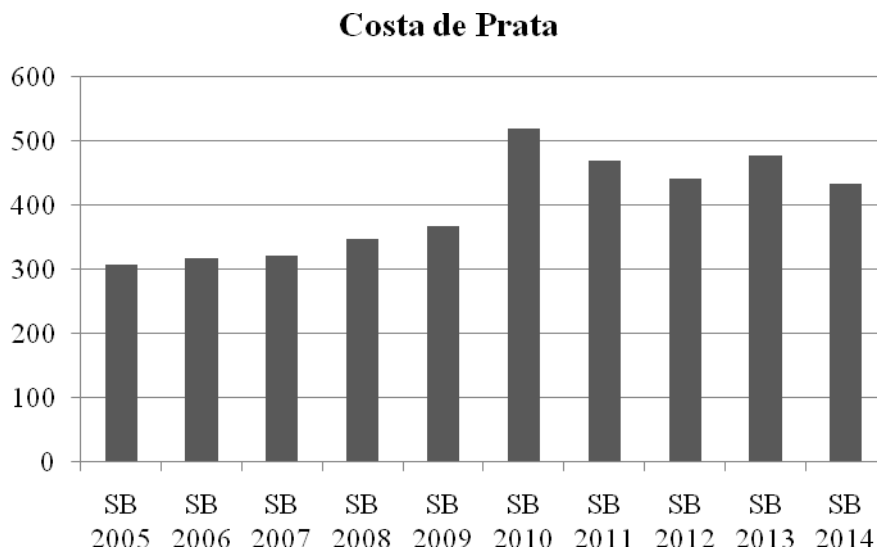


Figure 12: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

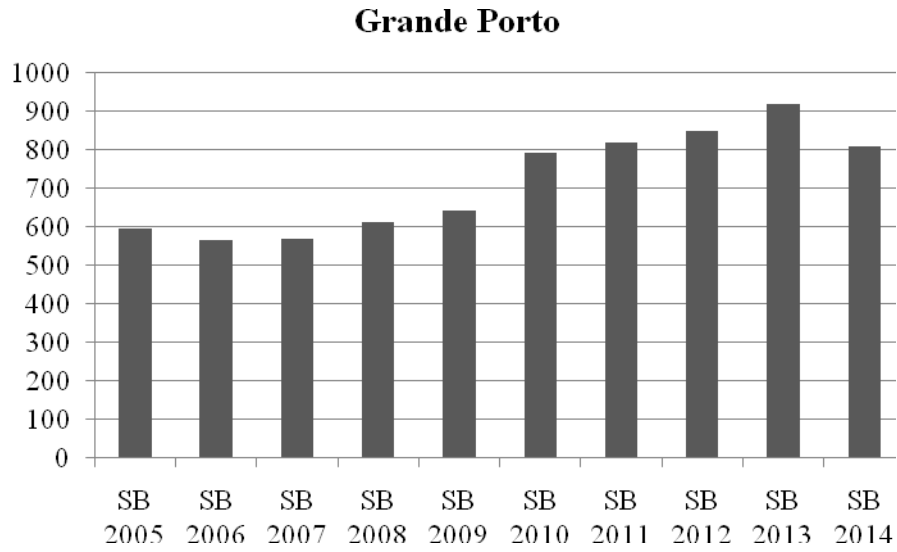


Figure 13: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

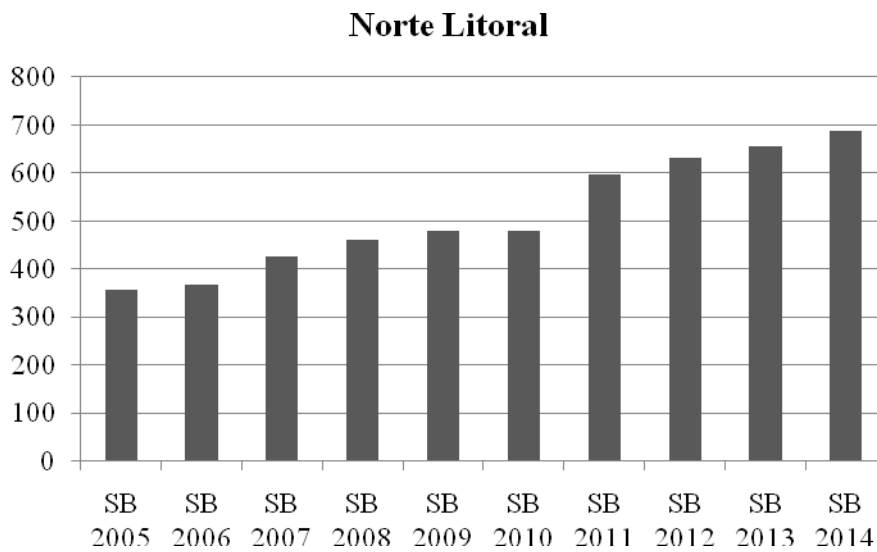


Figure 14: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

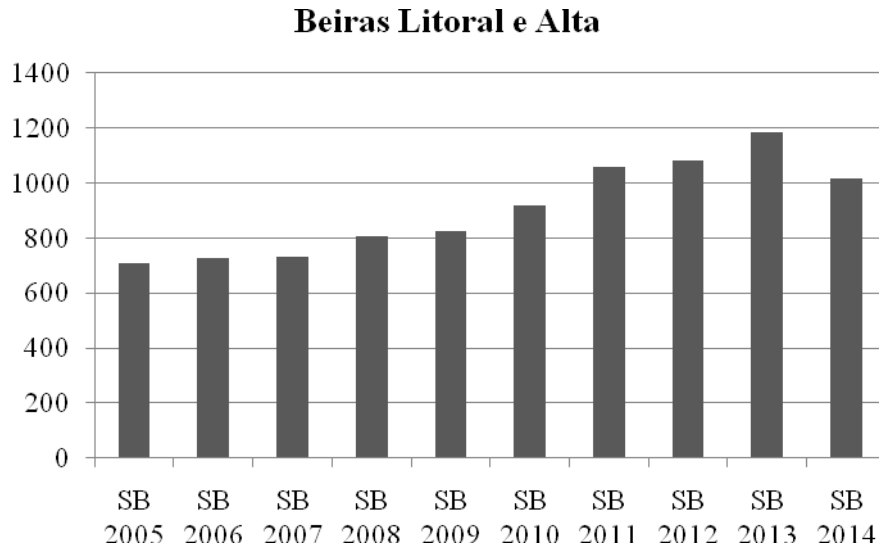


Figure 15: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

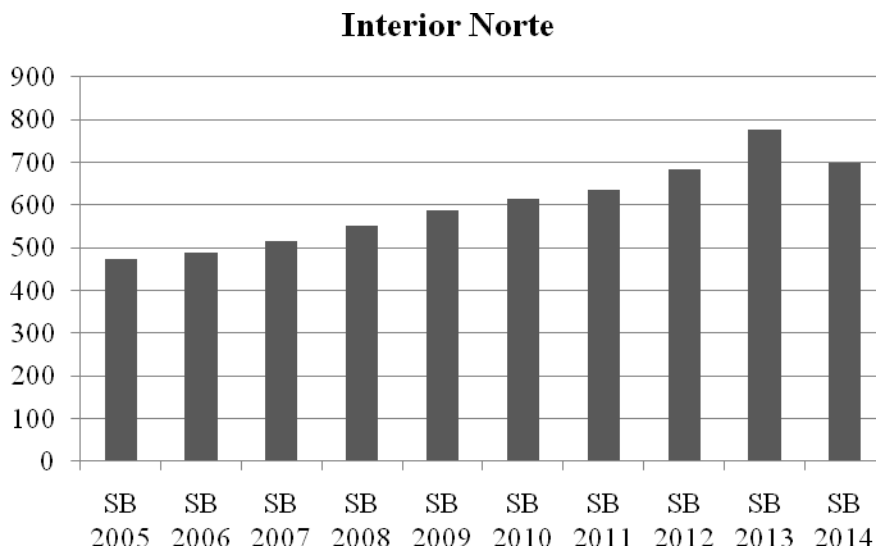


Figure 16: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

Beira Interior

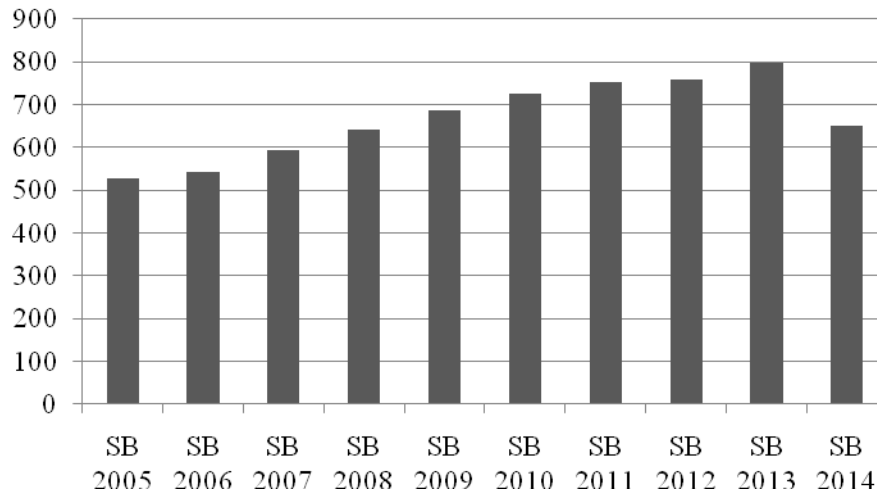


Figure 17: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

Algarve

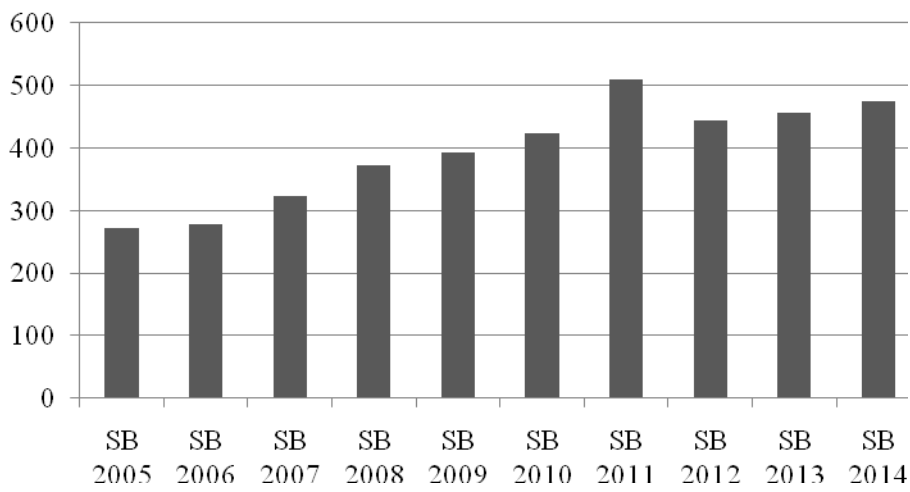


Figure 18: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

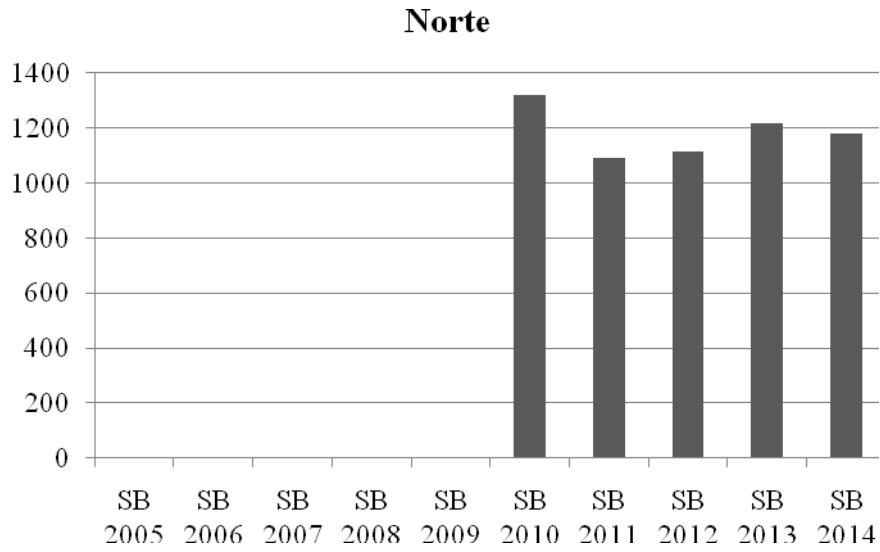


Figure 19: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

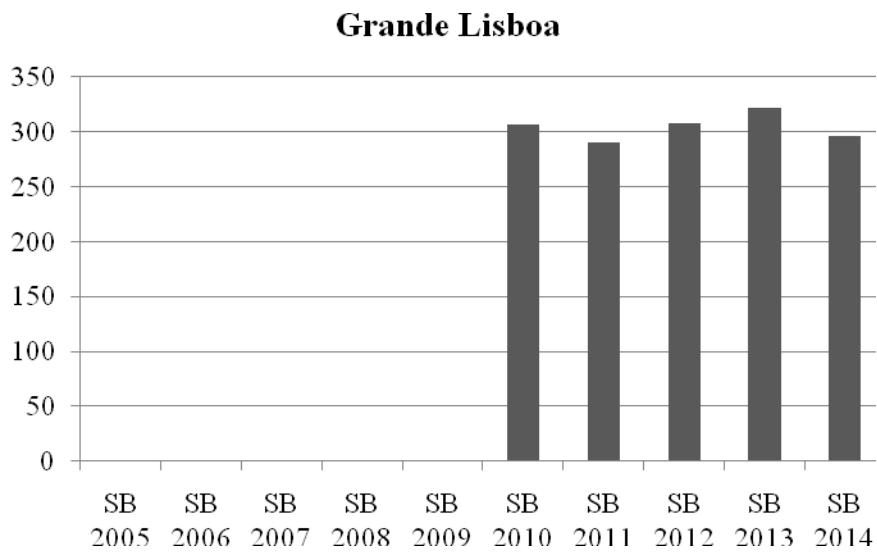


Figure 20: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

Túnel do Marão

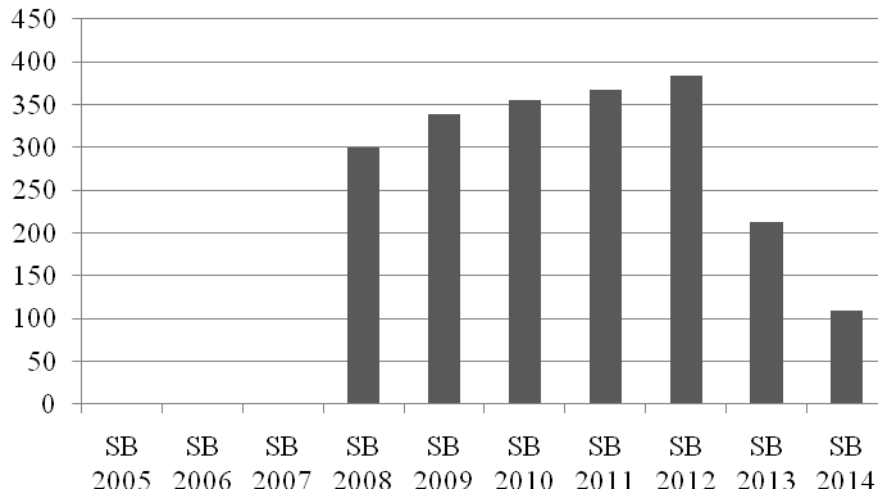


Figure 21: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

Transmontana

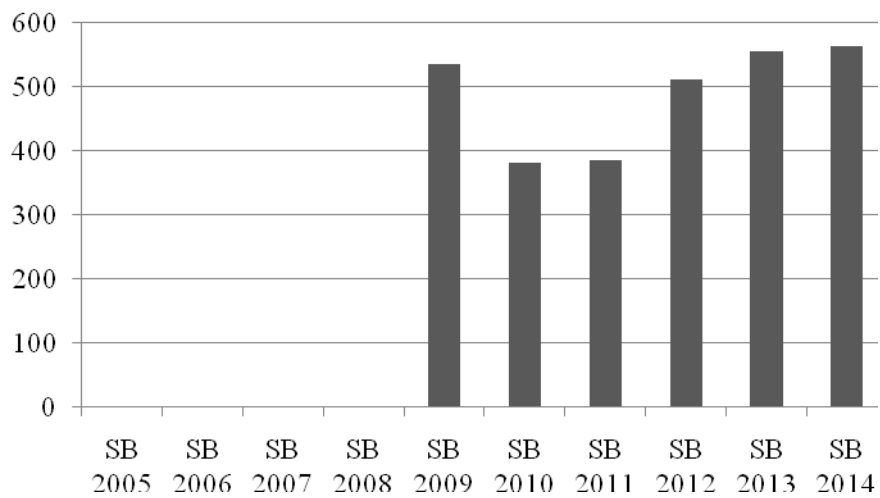


Figure 22: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

Douro Interior

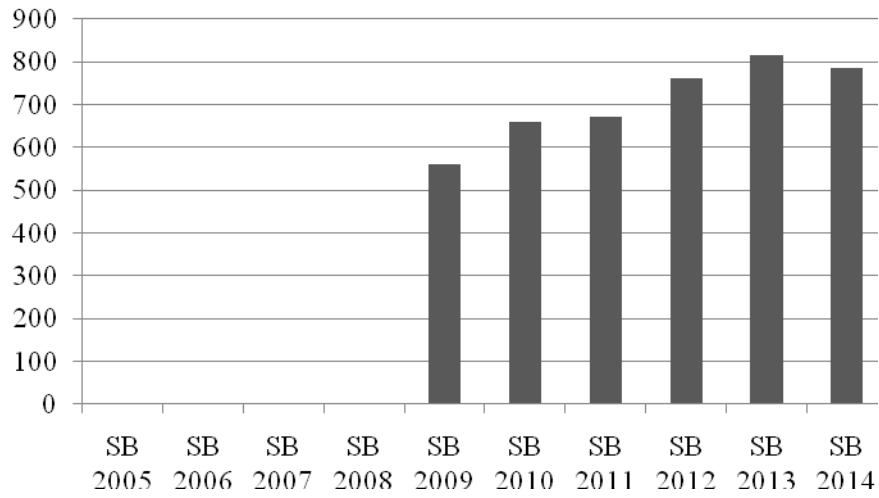


Figure 23: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

Baixo Alentejo

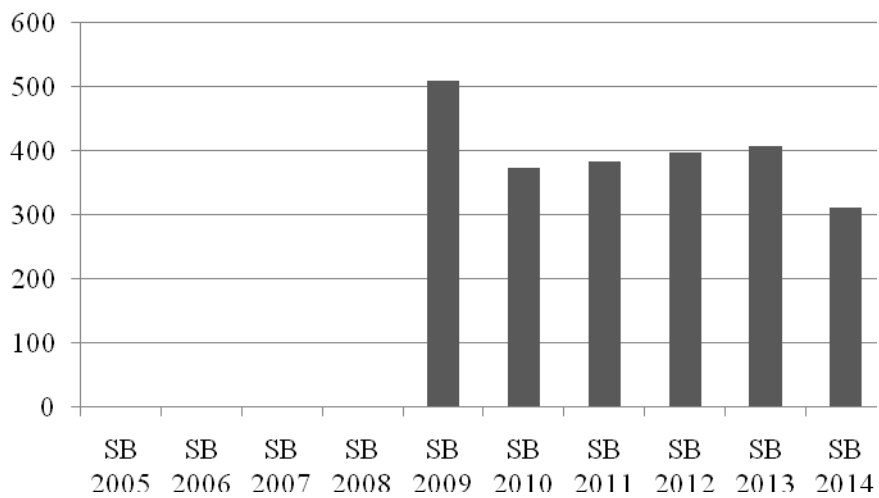


Figure 24: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

Baixo Tejo

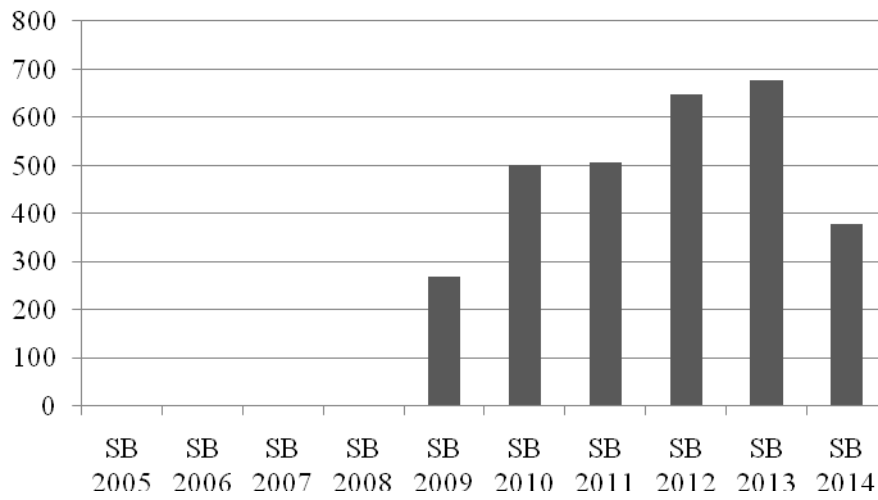


Figure 25: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

Litoral Oeste

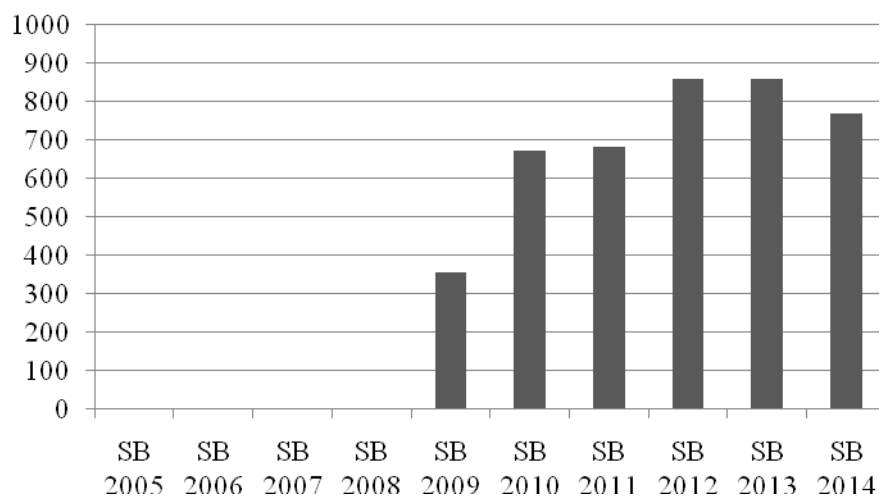


Figure 26: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

Algarve Litoral

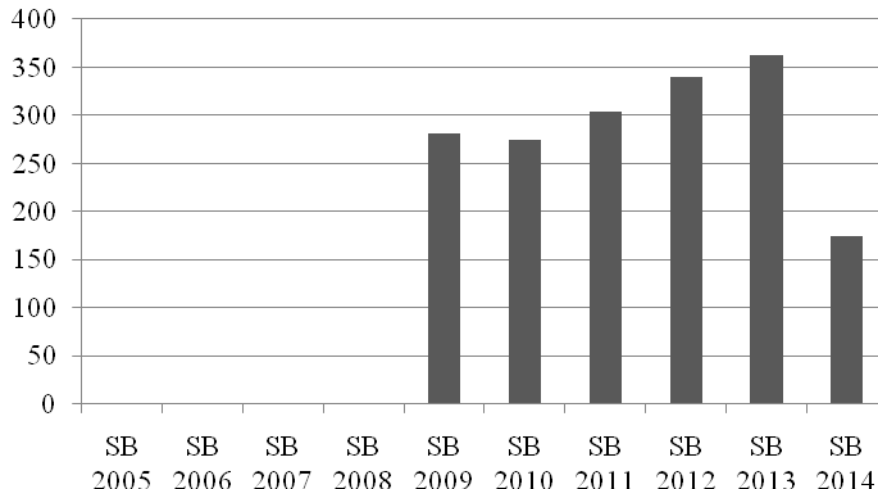


Figure 27: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

Pinhal Interior

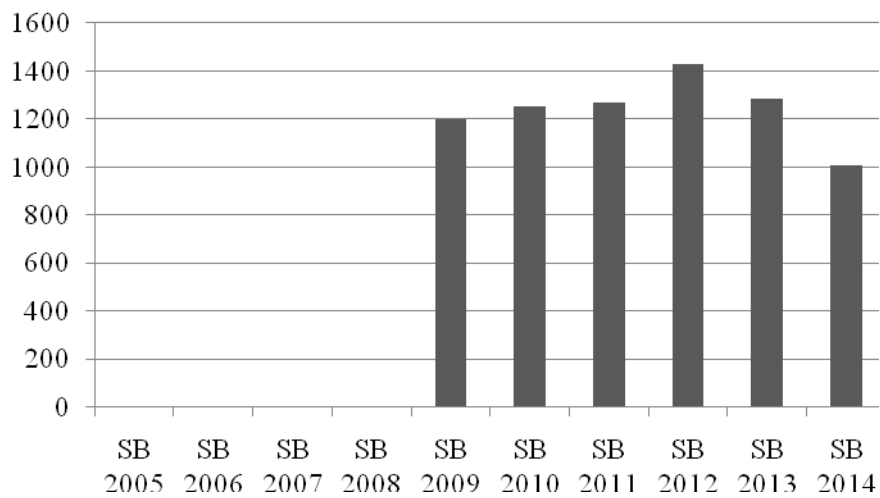


Figure 28: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

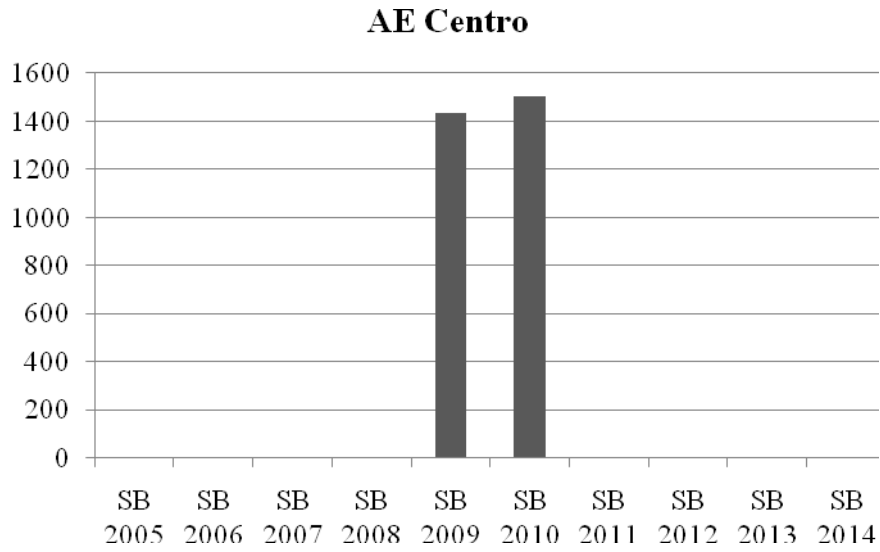


Figure 29: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)

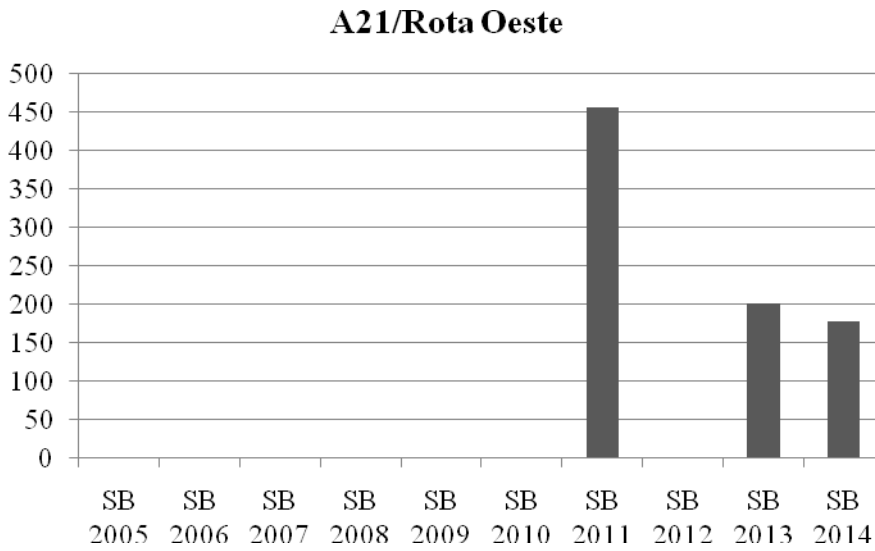


Figure 30: PV of the predicted costs for the State per SBs

X-axis: SBs
Y-axis: PV of predicted costs for the State (M€)