MASTER OF SCIENCE IN
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MASTER´S FINAL WORK
DISSERTATION

DOES A PUBLIC-PRIVATE PARTNERSHIP CONCESSION AWARD AFFECT FIRM VALUE?

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SUPERVISION:

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Abstract

Since the mid-1990s, public-private partnerships emerged in Portugal as an important and intensively used mechanism to close the wide infrastructure gap in several areas, such as transport, health or education. So far, few studies have been performed on the Portuguese Public-private Partnership experience. Moreover, the majority of the studies are focused in the public sector point of view concerning these projects. Therefore, the private party knows little about the financial impact of public-private partnerships. This study assesses the impact of the award of public-private partnership concessions on the expected profitability of a firm by using event study methodology. The previous method is implemented to measure if there is an 'abnormal' stock return, associated with the announcement of the concession award, to determine whether the participation in these projects increase the firm's value. Stock prices are viewed as reliable indicators of a firm's value since they are assumed to reflect all the available information about the firm's current and future profit potential. Therefore, if any new information resulting from the concession award announcement is expected to affect a firm's current and future profit, the security price changes as soon as the market learns of the announcement. Results indicate that, on average, the impact of the concession announcements on stock returns is negative and suggest that the participation in these projects do not add value to the firms.

Key Words: Public-Private partnership; Concession award; Firm´s value; Event study; Abnormal return; Cumulative abnormal returns.

Resumo

Em Portugal, desde meados da década de noventa, as parcerias público-privadas emergiram como um importante mecanismo para superar a *insfractructure gap* em vários setores, tais como o rodoviário, o da saúde ou da educação. Até ao momento, poucos estudos foram realizados sobre a experiência portuguesa em relação a estas parcerias. Além disso, a maioria destes estudos incidiram preferencialmente na perspetiva do setor público e, por esse motivo, pouco se sabe sobre o impacto financeiro destas parcerias relativamente ao setor privado. O Estudo apresentado avalia o impacto da concessão de parcerias público-privadas na rentabilidade esperada das empresas participantes. Para realizar este estudo foi aplicada a metodologia de estudos de eventos. Este método permite analisar se existe um efeito anormal no retorno das ações, associado ao anúncio da atribuição da concessão, nas empresas participantes, com o propósito de avaliar se o envolvimento nestes projetos cria valor para essas empresas. Se for expectável que a rentabilidade, atual e futura, das empresas premiadas com as concessões venha a ser afetada, o preço das ações altera-se logo que mercado toma conhecimento da atribuição dessas concessões. Por esse motivo, os preços das ações são vistos como indicadores sólidos do valor de mercado de uma empresa. Os resultados obtidos sugerem que, em média, o impacto do anúncio destas concessões no retorno das ações é negativo e, por isso, estas parecem não acrescentar valor ás empresas.

Palavras Chave: Parceria público-privada; Prémio de concessão; Valor de empresa; Estudo de eventos; Retorno anormal; Retornos anormais acumulados.

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Index of Abbreviations

AR - Abnormal Return

CAPM - Capital Asset Pricing Model

CAR - Cumulative Abnormal Return

DGTF - Direcção Geral de Tesouro e Finanças

EC - European Commission

EIB - European Investment Bank

EP - Estradas de Portugal

EPEC - European PPP Expertise Centre

ESCAP - Economic and Social Commission for Asia and the Pacific

EU - European Union

EURIBOR - Euro Interbank Offered Rate

IMF - International Monetary Fund

MST - Metro Sul do Tejo

OECD - Organisation for Economic Co-operation and Development

O&M - operations and maintenance

PPP - Public Private Partnership

PSC - Public Sector Comparator

SCUT - Sem Custos para o Utilizador

SIRESP - Sistema Integrado de Redes de Emergência e Segurança de Portugal

SPV - special purpose vehicle

UTAP - Unidade Ténica de Acompanhamento de Projectos

VfM - Value for Money

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1. Introduction

Traditionally, among the various functions, the public sector is primarily responsible for providing citizens with a set of public services (such as health, education or welfare) and for constructing basic infrastructures (roads, bridges, railways, etc.). Nonetheless, governments soon realized that they did not have the resources necessary to implement all the necessary projects (Sarmento, 2013a). It is in this context that the concept of public-private partnerships (PPPs) became relevant over the last decades. A PPP is a relation between the public and private sector, often with the aim of carrying the private sector resources, expertise and efficiency into a public project. In Portugal, since the mid-1990s, PPPs emerged as an important and intensively used mechanism to close the wide infrastructure gap in several areas, such as education, health, water and sanitation but particularly in transport (highways, bridges), avoiding government´s budget constraints at the moment of the investment (Sarmento & Reeneeboog, 2014c).

But why do private entities have an interest in taking part in PPPs? The public authority must sell the project's concept, transforming the project from a desirable activity in the eyes of government to a business opportunity capable of attracting private sector capital and management (Farquharson et al, 2011). There is a diversity of benefits that could flow to firms inserted in a successful PPP project. These are major government contracts that usually contribute to a higher notoriety, a better public image, to increase confidence and strength the market position of the firms. Moreover, in PPPs the private entities assume the highest financial risk, but at the same time they receive the highest return if all goes according to plan (Yescombe, 2007; Mckinsey & Company, 2009). Thus, we will assert the hypothesis that when a PPP concession is awarded, that is, when a link is established between a firm and the PPP project, firm performance will be positively

affected, due to the anticipation of future benefits. If the participation in a PPP matter, then the award of the concession is capitalized into equity prices and firm´s value goes up.

Consequently, the objective of this study is to explore whether the previous hypothesis is true. Given this, our challenge is to investigate, in the Portuguese scenario, if the award of a PPP concession is linked to a change in firm value. We will follow the event study method that can help researchers assess the financial impact of an unanticipated event, such as the public announcement of a PPP concession award, on a portfolio of firms associated with that event. According to this methodology, stock prices are viewed as reliable indicators of a firm's value, since they are assumed to, at any given time, reflect all the available information about the firm's current and future profit potential.

Thus, we examined every Portuguese PPP, between 1995 and 2010, and selected the publicly traded firms, of the concessionaires awarded with a PPP concession, to implement our study. Posteriorly, we measured the impact on the stock prices of those firms, at the time of the public announcement, by the government, of the PPP concession awarded to them. Therefore, we are able to analyze whether the award of these concessions has a positive effect on a firm´s performance, creating value to the firms inserted in the PPP projects.

It is important to highlight the lack of previous empirical research regarding the financial impact of a PPP project in firm performance. Although the event study method is highly applied to assess the financial impact of unanticipated events on a firm´s value, there are no past studies related with PPP projects, which proved to be one of our major difficulties for this analysis to be done. Another limitation regarding the study was the dimension of our sample, which is relatively small. We measured the firm's performance as the daily

stock quotes, thus our sample becomes restricted to the firms listed on stock exchanges. Since the publicly traded firms represent, in diverse cases, the minority of the firms present in the concessionaires awarded with the PPP concessions, this was a constraint to our analysis. Nonetheless, this sampling issue should not distract us from our main findings.

The rest of the study is organized as follows: Section 2 presents the literature review focused on: the concept of PPP; the difference between PPPs and other government procurement models; PPP advantages and disadvantages; the shareholder structure of these types of projects; and finally the procedure of a PPP tendering process. Section 3 describes the Portuguese PPP scenario. Section 4 presents the description of the data selected; explains the event study methodology implemented in our analysis; and finally our regression method with the description of the variables. In section 5, the results obtained from the applied methodology are analyzed. Lastly, section 6 contains the conclusions of the study, limitations and recommendations for future research.

2. Literature Review

2.1. Public Private Partnerships: Concept

Since a large number of agents and institutions are using the concept public-private partnership, the available literature on this topic presents several definitions for this type of project. Hence, this is an extremely complex matter, therefore, its definition is neither universal nor unanimous.

Regarding the European Commission, "the term public-private partnership is not defined at Community level. In general, the term refers to forms of co-operation between public authorities and the world of business which aim to ensure the funding, construction,

renovation, management and maintenance of an infrastructure of the provision of a service" (EC, 2004, p.3).

According to the European Investment Bank (EIB, 2004, p.2), "public-private partnerships is a generic term for the relationships formed between the private sector and public bodies often with the aim of introducing the private sector resources and/or expertise in order to help provide and deliver public sector assets and services".

The International Monetary Fund (IMF, 2007, p.38), refers to PPPs as "arrangements in which the private sector supplies infrastructure assets and services that have traditionally been provided by the government."

The Organisation for Economic Co-operation and Development (OECD, 2008, p.12) defines a public-private partnership "as an agreement between the government and one or more private partners (which may include the operators and the financers) according to which the private partners deliver the service in such a manner that the service delivery objectives of the government are aligned with the profit objectives of the private partners, and where the effectiveness of the alignment depends on a sufficient transfer of risk to the private partners".

In Portugal, the legislation regarding PPPs, which emerged in 2003, provides the following definition[1]: "a contract or union of contracts, by which private entities designated by private partners, undertake before a public partner, to perform upon a payment the development of an activity aimed to satisfy a collective need and where the responsibility for the investment, financing, operation and associated risks are entrusted in whole or in part, to the private partner".

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[1] Decree-law nº 86/2003 of 26 April, revoked by decree-law nº141/2006 of 27 July, revoked by decree-law nº 111/2012 of 23 May.

As mentioned previously, there are several definitions of what constitutes a PPP project. Nevertheless there are some key elements common to all of them: (1) the existence of a contract between private and public organizations to develop a specific infrastructure; (2) PPPs are normally used by governments to address the infrastructure gap or the population's need for public services (under the budgetary constraints); (3) the PPP concession period is long term (typically 15 – 30 years); (4) the main objective for the public sector regarding these projects is to create Value for Money (VfM) (explained in section 2.3.); (5) the role that the private partner assumes in the project must be well established; (6) the private partner should incorporate in the project all his expertise, innovation and efficiency; (7) risk sharing between the public and private sector; (8) the risks should be allocated to the entity best able to manage them; (9) the financing of the project is mostly assured by private entities, frequently through project finance transactions (Grimsey & Lewis, 2004; Sarmento, 2013a; Robinson et al, 2010).

2.2 Differences between PPPs and other government procurement models

Procurement models range from traditional public procurement to full privatization (Holmes et al, 2006). According to Sarmento & Renneboog (2014a), to mark the boundaries of a PPP's role and scope among procurement models, it is opportune to introduce the various phases of the project: (1) conception, (2) design, (3) construction, (4) financing, (5) operations and maintenance (O&M), and (6) residual value or transfer of the infrastructure from the private sector to government at the end of the contract.

The difference between procurement models rest in the assessment, allocation and management of risk (associated with the previous phases of the project) between public and private sector, as shown in Figure 1 (Basílio, 2011).

[Insert Figure 1 Here]

Except for the case where the government is entirely responsible for the design, construction, management, financing and operation of capital assets and the services that the assets generate, all these models involve the private sector to some extent (OECD, 2008). In a traditional public procurement, the government sets out the specifications and design of the asset, calls for bids on the basis of this detailed design and pays for construction of the asset by a private provider. The public sector has to fund the full cost of construction, including any cost overruns. The O&M of the asset are entirely handled by the public sector, and the contractor takes no responsibility for the long-term performance of the asset after the (relatively short) construction-warranty period has expired (Yescombe, 2007; Sarmento & Renneboog, 2014a). Hence, even with the involvement of the private sector in some of the phases of the project, the government remains responsible for all of these phases and, therefore, assumes practically all the risks. Contrariwise, in a privatization the government is not involved at all. The asset or service is completely transferred to the private partner along with all inherent responsibilities, risks and rewards (Savas, 2000; Cruz & Marques, 2011). PPPs are situated between traditional public procurement and privatization (OECD, 2008). In a PPP, the responsibilities over the several stages of a PPP project are divided between the public and private sectors and, consequently, risks are allocated between both parties. Actually, in a PPP, the public sector purchases a service under specific terms and conditions. Generally, the private sector is responsible for the design, construction, financing and O&M phases, whereas political risks, administrative licenses and other risks remain with the public sector (Grimsey & Lewis, 2002; Sarmento & Renneboog, 2014a). The main differences between PPPs, traditional public procurement and privatization, under the government's perspective, are summarized in Table I.

[Insert Table I Here]

In several countries, there are virtually no differences between a PPP model and a conventional concession model. However, in some other countries, like Portugal, a legal distinction exists between these two models (Sarmento & Renneboog, 2014c). Thus, in these cases it is important to clarify the difference between a PPP and conventional concession, since a PPP turns out to be a form of concession and, therefore, both share several features. Concessions and PPP concessions have in common that both involve a private party to operate, maintain and carry out investment in an asset/service over a concession period and a government that normally regains control of the asset/service at the end of this period. The two main distinguishing characteristics concern payment and risk allocation. Regarding payment, in a concession the private partner usually pays a fee to the government to obtain this right, which usually does not occur in a PPP. In a PPP the private partner commonly receives payments from the government ("service fees") over the life of the PPP concession (on a pre-agreed basis) which are intended to repay the financing costs and give a return to investors. Although both PPPs and concessions involve the transfer of risk to the private partner, the level of risk transferred is higher in the case of a concession i.e. the private partner usually carries the bulk of risk during the concession period (OECD, 2008; Basílio, 2011).

In Portugal, the distinction between PPP and concession is very much similar to what as mentioned above and it is the following: in a concession the project does not imply expenditures to the State, being the financing sustainable only with its own revenues, obtained from demand. Moreover, in a concession no public payments are incorporated in the contract and, as referred previously, almost all risks are allocated to the private partner. Whenever, incorporated in the contract, public payments are given to the private

partner because the generated revenues are not enough for the project to be profitable, then it is a PPP (Sarmento, 2013a).

2.3. PPP advantages and disadvantages

The international experience with PPPs has been mixed. There are many cases of successful PPP projects, where the goals of both public and private sector have been accomplished. However, there are several other projects that failed to achieve their expectations, with renegotiated contracts, deadlines not met or projects that required substantial subsidies to be completed. (Engel et al, 2007) Hence, academic studies are skeptical about PPPs as an alternative use of public funds, since the advantages of these projects often embed potential disadvantages. Next is the enumeration, followed by a detailed description, of several of the main advantages and disadvantages concerning these projects.

The advantages explained are the following: (1) bring to a public project the expertise and efficiency of the private sector; (2) achievement of Value for Money; (3) risk sharing between public and private sector; (4) better allocation of risk; (5) off-balance sheet debt; (6) construction of infrastructures that otherwise would not be feasible due to budget restrictions; (7) implementation of much needed projects sooner due to the limited dependence of public investment. The disadvantages described are: (1) temptation to avoid budget constraints; (2) excessive investment in assets with no economic or social rationality; (3) insufficient risk transfer to the private sector; (4) lack of service quality; (5) inability to create Value for Money.

A strong argument in favor of PPPs is the ability of governments to bring the private sector´s expertise and efficiency to a public project and, therefore, obtain several benefits from it: better allocation of risk, reduced life cycle costs, greater innovation, improved

service quality, faster implementation and generation of additional revenue. All this normally contributes to the achievement of the main objective of this type of projects which is to create better VfM compared to the case where a government delivers the service (European Commission, 2003; OECD 2008). In a public-private partnership scheme, VfM consists in the idea that PPPs can produce a flow of services at least equivalent in quality to that which could be provided by the public sector, but at a lower overall cost (Sarmento 2010).

PPPs allow an allocation and management of risks between public and private sector that otherwise would only be supported by the State (Sarmento, 2013a). The public sector should ensure a sufficient and effective transfer of risk to the private partners to encourage them to operate efficiently. Moreover, risk must be allocated to the entity best able to manage it (Grimsey & Lewis, 2004). These are not limited to construction but other types of risks as well, depending on the complexity of the project itself (Sarmento 2010). Grimsey & Lewis (2002) state that VfM requires an equitable allocation of risks between the public and private sectors. Thus, the optimal allocation of risk is a critical point in achieving an improved VfM and, therefore, a key objective of all PPP projects (Grimsey & Lewis, 2005).

According to Grimsey & Lewis (2005), one of the most frequent advantages attributed to PPPs is the "off-balance sheet" accounting of this transaction. Investments are considered private because long-term construction and availability, or demand risk, are transferred to the private sector. Investments are not considered in the deficit and the debt during the construction years, placing the government in a better fiscal position. Only the future payments from government to the PPP will be accounted for in the public budget. (Sarmento & Renneboog, 2014b). However, this tendency originated criticism by many

academics since governments can have the temptation to avoid budget constraints, raising concerns about the affordability of these projects in the future. Considering the PPP´s payments only in the medium and long term, along with the temptation to implement as much projects as possible, could imply a high burden on governments' future budgets (Sarmento & Renneboog, 2014a).

Another important advantage is the possibility of building infrastructures that otherwise would not be feasible due to budget restrictions (Grout, 2005). Furthermore, with PPPs governments can implement much needed projects sooner, since the dependence of public investment is limited, therefore there is no need to wait for future government budget cycles for funding (European Commission, 2003). Nevertheless, this advantage embeds some negative effects. Since PPP projects have no immediate impact in the budget deficit, governments may be less careful in their choice of projects. Hence, there is a risk of excessive investment in infrastructures with little (or even no) economic or social rationality and therefore unnecessary (Sarmento, 2013a).

The privet sector involvement in these projects often entails problems as well. A common argument by the critics is that there is no substantive risk transfer to the private sector (Grimsey & Lewis, 2007). Thereby, since the private sector assumes few risks, there are no incentives to seek greater management, innovation and efficiency (Sarmento & Renneboog, 2014a). Another issue commonly pointed out is the lack of service quality due to little or no competition that the private sector faces in these projects. This occurs because the State is not always able to fulfill its regulatory role or properly monitor the contracts. Finally, the gains in efficiency with the private partner may not be enough so that the PPP generate VfM, considering the superior financing cost of the private sector in comparison to the public sector. This is due to the concept of sovereign debt in the

majority of countries that are considered, at least in theory, riskless. To overcome this situation and achieve an improved VfM, the private must be more efficient than the public sector in the remaining components of the global cost of these types of projects. This means lower conception, construction, operation and maintenance costs (Sarmento 2013).

2.4. PPP Shareholder Structure

Before addressing specifically the shareholder structure of a PPP, it is important to clarify some concepts behind it, in order to fully understand this topic.

The growth of the PPP concept is closely linked to the financing technique known as 'project finance' (Yescombe, 2007). Project finance is a method of raising long-term debt to finance a capital-intensive project (such as an infrastructure project), based on lending, generally supported by bank loans, against the cash flow generated by the project alone (Tan, 2007; Gatti, 2012). Through this financing method, the private party forms a consortium which initially is known as a concessionaire, created particularly for a PPP project (Kwak et al, 2009). When the PPP contract is signed, the concessionaire is referred to as a "special purpose vehicle" (SPV), also known as project company (Chinyio and Gameson, 2009). According to Sarmento & Renneboog (2014a, p.8), "the SPV represents a legal individual company that, however, only operates and owns one specific project/concession during the contract period. It is this company that will sign the PPP contract with the government. This company will be responsible for all stages of the project when they fall under the private sector (for instance, this comprises the phases of the design, construction, financing, operation and maintenance)." Regarding PPPs, the SPV owns and operates exclusively the PPP project and is not allowed to invest in any other activity. The SPV´s cash flows, generated by the PPP project, are controlled by the lenders, who have priority of repayment and can only rely on the future cash flows of the

project for these loan payments (explanation further below). Usually, the SPV is created by a very limited number of shareholders as this makes the complex arrangements for developing and controlling a PPP project easier to coordinate (Yescombe, 2007). The typical contract framework of a SPV, concerning PPPs, is represented in Figure 2.

[Insert Figure 2 Here]

The shareholders of SPVs are also known as sponsors (Sarmento, 2013b). These are the ones who are responsible for bidding, developing and managing the project. Therefore, both the public authority and the lenders have to consider whether the sponsors have experience in the sector concerned, if they worked together successfully in the past, financing capacity to support the SPV, reasonable equity invested, among other factors, in order to be considered appropriate partners for the project. Moreover, these entities often require the sponsors to retain their equity investment until the construction of the project is complete. This occurs because both entities rely on the ability of the sponsors to manage the completion of what is usually the most risky phase of a project. The public authority and lenders will generally allow share transfers to take place without requiring their permission from a reasonable period (after a year or so) as from the completion of construction (Yescombe, 2007). In these types of projects, it is a natural step for banks to move from acting as lenders to sponsors, investing in PPP projects. Thus, Yescombe (2007) states that the typical sponsors for PPP projects can be divided into two main categories:

-Operational Sponsors. These are private companies for whom investment is part of a strategy for securing other business as subcontractors to the project company. These are primarily construction firms;

-Lenders. Financial entities only interested in the investment and not partake in the business as subcontractors. These are mainly banks.

Regarding operational sponsors, these companies are interested in supplying plants, materials, and services to the SPV, signing subcontracts with the project company. The aim of this subcontractors/sponsors is to participate in the project´s finance deal, handling the design and construction of the plant in the initial phase of the project and then, during the operational phase, as shareholders of the SPV. When the subcontractor is also a shareholder in the SPV, the firm will benefit directly if the project succeeds. Hence, subcontractors will be highly motivated to finish the infrastructure on time, within budget, and in accordance with the performance specifications of the contract. Afterwards, in the operational phase, the project will begin to generate cash flows, and, as a shareholder in the SPV, subcontractors will start earning dividends along with the profit of the subcontracting work they undertake (Gatti, 2012). There are inherent conflicts of interest in subcontractors acting as investors in the SPV, when dealing with issues related to the subcontracts. However, subcontractors with a substantial equity involvement usually keep a separation between this investment and the contractual relationship with the project company, it is important to ensure that their own decisions are made in a balanced way (Yescombe, 2007).

Concerning lenders, as previously mentioned, these are primarily banks. As previously mentioned, it is common for banks to move from acting as lenders to investors in PPP projects. Even if an equity investment may be a relatively small addition to the funding they have already committed to the project, thus the risks of this investment are higher, therefore, the return can be substantially higher as well. Although these investments in equity capital are riskier, they are similar in nature to the risks that are assessed before

banks provide the traditional loans for the project. Again, there are potential conflicts of interest between these investments and lending roles. Even so, some banks only act as lenders or investors, not both (Yescombe, 2007; Gatti, 2012).

There are several features that make PPP´s projects attractive to sponsors. The main ones are described below. Esty (2004) reports project finance to have debt levels of 70%–90%, with equity covering the remaining part. Hence, in order to obtain debt financing for the SPV, shareholders have to offer priority payment to the lenders, out of the project company's cash flow, thus accepting that they will only receive any return on their investment after the lenders have been satisfied. Therefore, shareholders assume the highest financial risk, but at the same time receive the highest return from SPV if all goes according to plan (Yescombe, 2007).

Creating a project company makes it possible to isolate the sponsors almost completely from events involving the project if financing is done on a non-recourse or limited-recourse basis (Gatti, 2012). This means that there are no financial guarantees from the shareholders to the banks (Sarmento, 2013a). Therefore, lenders can only rely on the future cash flow of the PPP project for loan repayments with project assets as collateral, they have no claim on the sponsoring firms' assets and cash flows. As result, the shareholders of the existing firms can therefore benefit from the separate incorporation of the new project into an SPV (Tan, 2007; Gatti, 2012). Another feature of this type of projects is that the high level of risk allocation among participants in the transaction allows a debt-to-equity ratio that would otherwise would not be possible. This has a great impact on the return of the transaction for shareholders (Gatti, 2012).

One major drawback for sponsors is that structuring and organizing these type of projects is much more costly than the traditional corporate financing. This happens because in a project finance, the concession contracts are complex and incomplete (Esty, 2004).

2.5. PPP Tendering Process

Considering the complexity of PPP tendering process, each country has its own unique approach to soliciting and evaluating the project proposals. However, there are certain common steps involved in the tendering process of countries that have a matured PPP programme. Although the details of each of these steps may vary and differ in approach from country to country, their purpose is very much similar (ESCAP, 2011). Figure 3 represents the principal steps of a typical PPP tendering process.

[Insert Figure 3 Here]

Competitive tendering protocols should be followed in awarding PPP concessions. The PPP tendering process needs to be transparent and neutral, to ensure fair competition to avoid criticism of sponsor selection or political favoritism (Zhang, 2005). The main objective of such process is to award the PPP concession to the right bidder i.e. the most suitable private concessionaire, which is comprised of the main shareholders (sponsors) of the project (as explained in section 3.5), to ensure that the investment offers VfM (Kwak et al, 2009; EPEC, 2015). The tendering process only begins after the public authority assess if the PPP option is the best alternative to accomplish the project, among the different government procurement models, applying the public sector comparator (PSC) (Sarmento, 2013a). The PSC is a hypothetical constructed benchmark[2] to assess the VfM of a conventionally financed procurement in comparison with a PPP scheme for

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[2] The anglo-saxon expression "Benchmark", in this case, refers to the application of a parameter to compare investments. (Source: Damodaran, http://pages.stern.nyu.edu/~adamodar/).

delivering a publicly funded service (Grimsey & Lewis, 2004). Afterwards, a project management team is set up by the public authority to ensure that all the required skills are effectively applied. There are several pre-tender tasks that the project team needs to perform, the most relevant are described next. All aspects of the PPP arrangement (e.g. responsibilities, risk allocation, payment mechanism) need to be developed in greater detail with the ultimate goal of producing the draft PPP contract. After this, the project team will need to select a competitive procurement procedure. European Union (EU) legislation allows four procurement procedures: open, restricted (these two are referred to as "standard procedures"), negotiated and competitive dialogue. It is also required for the project team to define the bid evaluation criteria in order to tailor the PPP concession award criteria to the particular project and contract terms to achieve the best possible results. Finally, a full draft PPP contract should be attached to the invitation to tender (EPEC, 2015).

After all these procedures, the public tender is issued and the public authority advertises the project to potential private investors, often publishing it in a public gazette and government websites. The interested bidders undergo a prequalification stage with the purpose of creating a shortlist that includes only those that appear to be capable of carrying out the PPP project. Bidders on the shortlist are invited to submit detailed proposals that are then evaluated in accordance with the pre-determined evaluation criteria. The evaluation in this stage focuses on technical and financial feasibilities of the proposals. The government may select one or a few preferred bidders to negotiate with (Kwak et al, 2009; EPEC, 2015). A bidder should only be selected as the preferred bidder and subsequently awarded with the PPP concession when it satisfies some requirements, e.g. meeting output specifications, whole life Value for Money, acceptance of key

contract terms and required transfer of risks, confirmation of access to finance and a cohesive consortium (HM Treasury, 2010). Once the preferred bidder is selected, the last details of the PPP contract are negotiated. After all PPP related agreements and conditions are reached, the PPP concession is awarded to the winner concessionaire and the contract is implemented.

3. The Portuguese PPP experience

The history of PPPs in Portugal started in 1993 with the project of Vasco da Gama Bridge. Since then, PPPs were frequently applied to the construction of infrastructures, especially in the road sector (highways). Currently the PPP universe in Portugal is composed of 32 partnerships involving the road, health, railway and security sectors. From these partnerships, 21 are in the road sector[3], 8 in the health sector, 2 in the railway sector and 1 in the security sector. The periods from 1998-2001 and 2008-2010 were the ones wherein more PPPs were awarded. From 1998 to 2014, the cumulative investment in these projects was roughly 14,364 million euros, of which 93% is in the road sector (UTAP, 2015). The investment of the private partners by sector is presented in Figure 4.

[Insert Figure 4 Here]

According to Macário et al (2015), the Portuguese investment in PPPs is remarkably higher than in other EU countries, as observed in Figure 5. When weighted with GDP, it is about five times the average of the investment in other European countries.

[Insert Figure 5 Here]

The positive side of the PPP experience in Portugal is that with just traditional procurement models, the development of so many infrastructures in such a short time, would not have been possible due budget restrictions. Despite that, since the Portuguese

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[3] Túnel do Marão concession contract was rescinded by the Portuguese State in 2013.

PPP legislation in the first years was not rigorous, several projects were poorly selected by the public sector. Moreover, some contracts were disadvantageous to the State in terms of profitability and risk allocation to the private sector. Finally, there is a significant burden on governments' future budgets regarding PPPs (Sarmento, 2013a).

Concerning the private sector, the financing until 2008 was plentiful and cheap. Hence, the majority of PPPs, especially in the road sector, have financing rates relatively low. The financing contracts are also, normally, at the Euribor reference rate plus a spread. In most PPPs, the spread is 1% to 2%. These are very advantageous conditions, particularly in the current conjuncture. The return to the shareholders (sponsors) of the concessionaires varies from project to project. Still, in the road sector the return is usually high, in some cases even around 16%-17%, which causes controversy at the public and academic level. (Sarmento, 2013a; Sarmento & Reis, 2013). The shareholders of these private concessionaires are mostly composed of Portuguese construction companies and commercial banks. In some projects, there is also the participation of foreign construction companies, mainly from Spain (to more detailed information about the concessionaires' structure and model of operation, consult DGTF, 2012).

3.1. Sectorial Framework

3.1.1. Road Sector

In the last decades, the road sector in Portugal experienced several waves of investment. The first wave of investment in highways, during the 1980s and 1990s, was before the PPP era. A traditional concession model with real tools was attributed to Brisa, corresponding to the main Portuguese road routes that, connected the principal cities of the country. After the first investment wave, the road sector in Portugal is characterized by two waves of investment in PPPs. The first wave of PPPs, launched between 1999 and

2002, was mostly composed by the so-called SCUTs[4] highways (Sarmento & Reis, 2013). The SCUTs extend over a total of 930 kilometers of highways, mainly in economically disadvantaged regions, originally with shadow tolls. Therefore, the payments to the private consortia were assumed by the State in lieu of the users. The SCUTs are no longer operating with shadow tolls, due to budget restrictions, but with real electronic tolls, with the users paying for the use. Nowadays, these projects are known as 'ex-SCUT' and their concession is awarded based on an availability model. This means that the individual concessionaires charge the tolls, but these revenues are totally channeled to the government. In exchange, the concessionaires receive a compensation for the availability of the road (Sarmento, 2013a; Sarmento & Reis, 2013). The second wave of road PPPs was launched between 2007 and 2009, when the Portuguese government awarded new highway projects to public bids, under the supervision of Estradas de Portugal (EP). EP is an entirely state-owned company that became the concession grantor, which explains why these roads are usually referred to as "sub-concessions". All of these projects are similar to the current version of the ex-SCUT contracts. This mean that the roads have real tolls whose revenues revert to the concession grantor (EP), while the concessionaires receive payments based on availability (Sarmento & Reis, 2013).

Currently the 21 road PPPs are allocated in the following way. The traditional concessions with real tolls are composed by: Brisa, Douro Litoral, Litoral Centro, Oeste and Lusoponte; Concessions with an availability model, containing: the ex-SCUT concessions of Grande Porto, Norte Litoral, Costa de Prata, Beira Litoral/Alta, Interior Norte, Beira Interior and Algarve and the concessions of Norte and Grande Lisboa;

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[4] SCUTs stands for "*sem custos para o utilizador*", meaning that there is no costs to users (as government pays a shadow toll).

Finally, the sub-concessions assigned by EP are: Pinhal Interior, Litoral Oeste, Douro Interior, Baixo Tejo, Baixo Alentejo, Transmontana and. Algarve Litoral (UTAP, 2015).

3.1.2. Health Sector

The Health sector is characterized by two waves of PPPS. In the first wave (2002-2005), hospitals (Loures, Cascais, Vila Franca de Xira and Braga) adopted two different partnerships: one concessionaire responsible for the construction and management of the hospital facilities, with a time horizon of 30 years and the other concessionaire, responsible for providing clinical services, for a much shorter period (usually 10 years). These kinds of partnerships were very complex since the arrangement implied articulation between two different concessionaires with different tasks and time horizons. Thus, the second wave, decided in 2006, adopted the most common model. The privet sector is responsible just for the construction and management of the hospital facilities and the clinical services are now responsibility of the Portuguese National Health Service. For this wave, a new hospital in the eastern part of Lisbon is expected and a hospital for the south region of the country is also being considered (Basílio, 2011; Sarmento, 2013a).

3.1.3. Railway Sector

There are currently two PPPs in this sector, the Fertagus Concession and the Metro Sul do Tejo (MST) concession (UTAP, 2015). The Fertagus concession is accountable for the urban rail transportation between Lisbon and the south bank, across the 25 de Abril Bridge. The MST concession operates a light (above-ground) rail transit system in the south bank of the Tagus River.

3.1.4. Security Sector

SIRESP (Sistema Integrado de Redes de Emergência e Segurança de Portugal), the operator of the National Security and Emergency of Portugal is a PPP project promoted by the Ministry of Internal Administration and is the first in this sector. The purpose of the SIRESP contract was the conception, management and maintenance of an integrated digital trunking system to the Portuguese emergency and security network. The contract was signed in 2006 with a duration of 15 years (DGTF, 2012).

4. Data & Methodology

In Portugal, during the last decades, PPPs were intensively used, with several large firms taking part of these projects. Thus, the objective of this study is to test the financial impact of the concession award of a PPP on the change of a firm´s value. We set the hypothesis that the award of a PPP concession has a positive effect on a firm´s performance since markets anticipate future benefits to the firms involved in these concessions.

We measure the firm´s value as the daily stock quotes, meaning that our sample becomes restricted to firms that are listed on stock exchanges. Thereby, we conducted this analysis for the publicly traded firms present in the Portuguese PPPs, at the time of the public announcement of the respective PPP concession award. The detailed description of the selected data and the subsequent methodology process, implemented in the study, are presented next.

4.1. Description of the data

Since virtually all the shareholders of the Portuguese PPP concessionaires are either from Portugal or Spain, we only selected public firms from these countries to implement our analysis. Thus, our search led to a dataset composed of 17 different publicly traded firms[5] inserted in 26 PPP concessions. Nevertheless, it is common for many of these firms to participate in multiple PPP concessions. Of these 17 firms, 11 are from Portugal and 6 are from Spain, listed respectively on Euronext Lisbon and Bolsa de Madrid (the main Spanish stock exchange) stock exchanges. The remaining shareholders of the concessionaires were excluded because they consist in privately held firms and consequently unnecessary for this analysis. Of the 26 PPPs, 21 are from the road sector, 4 from the health sector and 1 from the railway sector (the PPP from the security sector, SIRESP, was excluded due to reasons explained afterwards). In order to obtain the names of the firms and the announcement dates of each PPP concession, we went to the Unidade Técnica de Acompanhamento de Projetos (UTAP) official website and relied on their information available to the public.

Since several PPPs were launched many years ago, a few of the firms present in our dataset suffered substantial modifications throughout the years. There are some firms that are now extinct, others were sold or merged while others are not listed on a stock exchange anymore. Despite that, the fundamental point here is to consider the situation of the firms at the time of the public announcement by the government of the respective PPP concession award, as this is the required period of time to implement our methodology.

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[5] Our dataset is composed mainly by construction firms and commercial banks. In order to facilitate the explanations, we will denominate these entities simply by "firms".

The Brisa, Fertagus and SIRESP concessions were excluded from our analysis because none of the firms present in these projects were listed on Euronext Lisbon nor Bolsa de Madrid stock exchanges at the time of the concession announcements. Furthermore, the 8 PPPs in the health sector are justified due to the fact that each hospital (Loures, Cascais, Vila Franca de Xira and Braga) has adopted two different partnerships: one concessionaire responsible for the construction and management of the hospital facilities and the other concessionaire responsible for providing clinical services. However, in order to organize and simplify the data, we analyzed both partnerships of each hospital as a single partnership. This is possible because the announcement dates and the shareholders from both concessionaires of each hospital are identical. The prior statements explain why from a universe of 33 Portuguese PPPs, our dataset only includes 26 of those. Table II displays the publicly listed firms selected in each PPP project, the year of the PPP concession announcement, whether the firm is from Portugal or Spain and the PPP sector of activity.

[Insert Table II Here]

4.2. Methodology

4.2.1 Event Study methodology

As previously mentioned, the purpose of this study is to test the impact of a PPP concession award on the change of a firm´s value. Event study methodology measures the financial impact of an unanticipated event on the expected profitability of firms associated with that event. These unanticipated events can include the announcement of unexpected corporate earnings, mergers or the signing of a major government contract, such as a PPP. This approach allows a researcher to confidently determine whether there is an 'abnormal' stock price effect associated with the specific unanticipated event. If any

new information resulting from an unexpected event is believed to affect a firm's current and future earnings, the security price changes as soon as the market learns of the event. Therefore, stock prices are viewed as reliable indicators of a firm's value (Agrawal and Kamakura, 1995). In this analysis, the unanticipated event is considered to be the public announcement date of a PPP concession award[6].

In accordance to Mc Williams and Siegel (1997), this methodology is based on estimating a market model for each firm and then calculating abnormal returns (ARs). These abnormal returns are assumed to reflect the stock market's reaction to the arrival of new information. The abnormal returns represent returns earned by the firm after the analyst has adjusted to the "normal" return process. That is, the rate of return on the stock is adjusted by subtracting the expected return from the actual return. Any significant difference is considered to be an abnormal, or excess, return.

Even though just 17 different firms constitute our dataset, some of those are involved in several Portuguese PPP projects. Thus, every time a specific firm takes part in multiple PPPs, each case counts as a new observation. This happens due to the fact that every PPP has a different concession announcement date. Therefore, the computation of abnormal returns, even if performed for the same firm, is completely independent from project to project. With this in mind, considering the 26 PPP concessions of our dataset, we calculated abnormal returns for 44 publicly traded firms. To prevent "confounding issues[7]", we removed 4 publicly traded firms, concerning 3 PPP concessions, from the

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[6] We assume that the award of a PPP concession is only know by the market and investors when it is publicly announced by the government. We are assuming that there are no situations of leakage of information.

[7] This is the situation where the stock prices are "contaminated" by the occurrence of other unrelated events around the event date, resulting in a failure to capture the real impact of the event of interest.

study. The confounding events consisted in a takeover notice and dividend payments around the dates of the PPP concession announcement.

In this study we compute daily abnormal returns and, in what follows, we always assume the same event window for the computations. The event window comprises the 10 days prior the event[8], as well as the 10 days after the event. This event window is considered to prevent the possibility that the market did not react immediately to the information contained in the event announcement.

Following Mc Williams and Siegel (1997), in event study literature, abnormal returns are commonly defined as: Abnormal Returns: Actual Returns – Normal Returns

The Actual Return is the real daily stock return of a firm, and is computed with the following formula:

Equation (1) $R_{it} = \dfrac{Price_{it} - Price_{i,t-1} + Dividends_t}{Price_{i,t-1}}$

Where,

R_{it} is the daily rate of return on the stock price of firm i on day t,

$Dividends_t$ are the dividends on stock i on day t.

The Normal or Expected Return is the return expected from the market. It is introduce as the required return from the Capital Asset Pricing Model (CAPM):

Equation (2) $E(R_{it}) = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$

Where,

$E(R_{it})$ is the expected daily rate of return on the stock price of firm i on day t,

R_{mt} is daily rate of return on a market portfolio of stocks[9] on day t,

α_i is the intercept term,

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[8] As said before, we define our event to be the day of the public announcement of the PPP concession.
[9] For this purpose we used the PSI 20 Index for Portuguese firms and IBEX 35 Index for Spanish firms. We obtained these series from Datastream data base.

β_i is the systematic risk of stock i (slope),

ε_{it} is the error term, with $E(\varepsilon_{it}) = 0$.

The α and β parameters are obtained from the regression of R_{it} on R_{mt} over an estimation period preceding the event. In our case, the estimation period comprises the 229^{10} days prior to the event period. From the previous formulas, the researcher derives estimates of the daily abnormal returns (AR) for the ith firm using the following equation:

Equation (3) $AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$

Posteriorly, the generation of cumulative abnormal returns (CAR) requires summing up the daily ARs of the event window. Therefore, our CAR series comprises the accumulated ARs for the periods of: 10 days, 5 days and 1 day prior the event and 1 day, 5 days and 10 days after the event. Consequently, after performing the computation for the 44 publicly traded firms selected, our final sample is composed of 264 observations of cumulative abnormal returns. Table III exhibits the descriptive statistics of the CAR series we get. These results suggest that, on average, the cumulative abnormal returns around the event are negative.

[Insert Table III Here]

It is standard practice in an event study to examine CARs for various days surrounding the event date, for two reasons: First, analyzing ARs surrounding the event day allows for uncertainty regarding the actual date of the event. Second, it allows the researcher to capture the cumulative effect of an event, since the effect may be spread over several days surrounding the event day. This is due to the gradual availability of information and

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[10] There are 250 trading days in our samples for the calculations of ARs. Since our event window includes 21 trading days (includes the event day at time 0), the remaining 229 trading days before the event window are considered to be the estimation period.

interpretation of the event´s impact on future firm profitability (Agrawal and Kamakura, 1995).

In order to test the statistically significance of the cumulative abnormal returns, we have to assume the standard assumption that the values of CAR_i are independent and identically distributed. In this ways, we can compute the average cumulative abnormal returns (ACAR) as follows:

Equation (4) $$ACAR_t = \frac{\sum_{i=1}^{N} CAR_i}{N \times std\ dev}$$

where $i = [1, 2, \dots, 44]$, N = 44, and where std dev corresponds to the standard deviation of CAR_i.

The test statistic used to assess whether the average cumulative abnormal return is significantly equal to zero (null hypothesis) is:

Equation (5) $$Z = ACAR_t \times N^{0.5}$$

We repeat this procedure for each period of CAR computations (10 days, 5 days and 1 day prior the event and 1 day, 5 days and 10 days after the event). Table IV reports the statistics we get.

[Insert Table IV Here]

Figure 6 shows the frequency of CAR observations for both Portuguese and Spanish shareholders and Figure 7 presents the frequency of CAR observations for both road sector PPPs and remaining PPP sectors.

[Insert Figure 6 and Figure 7 Here]

Figures 8 and 9 show, respectively, the frequency of CAR observations for each publicly traded firm and for each year containing PPP concession announcements.

[Insert Figure 8 and Figure 9 Here]

4.2.2 Variables Description and OLS Regression

The impact of a PPP concession award on the stock returns of a firm can be affected by the origin country of the firms (domestic or foreign shareholder) and the PPP´s sector of activity (roads, health and railways). Therefore, applying the OLS method, we are able to run a time series cross-sectional regression, with the CAR series as dependent variable, on our set of explanatory/independent variables, *Shareholderpt* and *Roads*.

Our OLS regression is therefore:

Equation (6) $CAR = \beta_0 + \beta_1 Shareholderpt + \beta_2 Roads + \mu_i$

The explanation of the independent variables, as well as the expected impact in the dependent variable, is presented next.

Shareholderpt is a dummy variable that takes the value 1 if the analyzed firm is Portuguese and the value 0 if it is a Spanish firm. These are Portuguese projects wherein the majority of the shareholders are from Portugal. Therefore, the impact on notoriety, public image, market position or advertisement, from the participation in Portuguese PPPs, is presumably superior for the domestic firms comparatively to the foreign firms. Thus, the award of these PPP concessions is expected to have a greater impact on the value of a Portuguese firm than a Spanish firm. Moreover, since most of the capital invested in these projects is financed by the Portuguese shareholders, these firms take great portion of the responsibilities, but also of the returns inherent to a PPP project. Besides that, the Spanish firms involved in the Portuguese PPPs are substantially larger than the Portuguese firms, whence these projects are expected to have a superior importance and impact on the firm´s performance of the Portuguese shareholders. Hence, considering all this, we anticipate a positive reaction from the domestic investors regarding the award of a PPP concession to the Portuguese firms. They expect beneficial

effects on the firm´s expected return, considering the presumable commitment of the Portuguese firms to the PPP projects.

Roads variable is 1 if the PPP concession is from the road sector and 0 if it is from one of the remaining sectors (health care and railways). The vast majority of Portuguese PPPs are from the road sector. Thus, this sector contains the main PPP projects, where the majority of the shareholder's capital is invested. The road sector PPPs are therefore major projects for the involved firms in terms of responsibilities, but also potential returns. This is true, particularly, for the construction firms since, in the majority of the concessions, they are the ones who invest most of the capital and resources. Furthermore, the road sector, normally, carries fewer risks than the other sectors: since most of the road sector PPPs are based on an availability model, the demand risk is assumed by the government and not by the shareholders. Besides that, the technological risk (critical, for instance, in the health sector concessions) is not allocated in the road sector projects. Therefore, considering all these aspects, we expect that the market reacts positively to the award of a road sector concession, generating positive abnormal returns and, therefore, adding value to the firm.

According to Mc Williams and Siegel (1997), some authors standardize the CAR values to interpret the results. However, we decided not to standardize the CAR values for three main reasons:: (1) standardized coefficients are in general more difficult to interpret, (2) do not add any information that may help to compare effects from different explanatory variables, and (3) may add seriously misleading information (King, 1986).

The Breusch-Pagan and White tests (not reported) were conducted to test for the presence of heteroscedasticity and showed no sign of the latter. Moreover, in Table V, we also observe no presence of multicollinearity by looking at the correlation matrix.

[Insert Table V Here]

5. Results

In what follows, this empirical section is organized in two parts. The first part tests the different effects of the independent dummy variables on firm´s value. The second part includes fixed effects in the model, in order to observe how the independent variables behave considering, in the regression, which observation as belonging to a specific subgroup (in this case, a specific year or a specific firm).

Table VI presents the relation between the stock returns of our sample of 44 firms and the independent variables, *Shareholderpt* and *Roads*. The *Shareholderpt* takes the value 1 if the firm is Portuguese and *Roads* takes the value 1 if the concession is from the road sector. In column 1, we model the relation between the *Shareholderpt* variable and the abnormal stock returns. In column 2 we model the relation between the *Roads* variable and the abnormal stock returns. In column 3, we model the relationship between the two explanatory variables and the abnormal stock returns. The first conclusion we can infer is that the *Shareholderpt* variable is significant at a 5% level. However, the coefficients for this variable are negative, which contradicts our projections. We expected that Portuguese shareholders would have a positive effect on the cumulative abnormal stock returns. The market seems to react negatively to the participation of a domestic firm in a Portuguese PPP concession. The variable *Roads* is not statistically significant at a 10% level. Despite that, it is a surprise that this variable has a negative coefficient since we anticipated that the participation in a road concession would increase a firm´s value.

[Insert table VI Here]

Table VII shows the results when we run the model with time-fixed effects. Therefore, when controlling the regression for year effects, we can observe that the two variables are

statistically significant at a 1% level. The sign of the coefficients seems to be consistent with what happened on the previous model. Once again, there is a negative effect on the cumulative abnormal returns when a Portuguese firm is awarded with a PPP concession. We can also observe that, including year effects, the *Roads* variable is now statistically significant at a 1% level. Therefore, investors seem to react negatively to the involvement of the firm in a road sector PPP. It is interesting to note that the time variable *2008.year*, when CAR is explained by the *Shareolderpt* variable (column 1) and when is explained by the two independent variables (column 3), is statistically significant at a 1% level. In column 2, when the dependent variable is explained by the *Roads* variable, the *2008.year* variable is statistically significant at a 10% level. The negative effect of this particular year on the abnormal stock returns may be explained by the financial crisis, which had a global impact and, therefore, stock markets dropped worldwide.

[Insert Table VII Here]

Table VIII shows the results when we control the model for firm effects. Firm effects explore the relationship between the abnormal stock returns and the independent variables within a specific firm. Each firm has its own individual characteristics that may or may not influence the cumulative abnormal returns. We observe negative coefficients for the independent variables, which is consistent with what happens on the previous models, contradicting our expectations once again. However, when controlling for firm effects, the two independent variables are not statistically significant at a 10% level. Nonetheless, since we have included, in the model, the specific effect of each firm on its own abnormal stock returns, it is normal that the *Shareholderpt* and *Roads* variables lose the explanatory power in the regressions.

[Insert Table VIII]

6. Conclusions, main limitations and suggestions for future research

6.1. Conclusions

This study attempts to explore whether the announcement of a PPP concession award can have an impact on a firm´s value. The framework is the Portuguese PPP scenario. PPPs in Portugal emerged as an important and intensively used mechanism to close the wide infrastructure gap in several areas over the last years. PPPs are major government contracts with much relevance for the firms involved in these projects. Therefore, we set the hypothesis that if the involvement in a PPP concessions matter, then, the link established between a firm and the PPP concession will lead to an increase in a firm's value. This will be recognized by the market and capitalized into equity prices as an anticipation of future benefits, such as: substantial return on the investment; a higher notoriety; better public image; better investment potential; more opportunities to expand its business interests; and the possibility of winning other government contracts.

To test the hypothesis, we run an OLS regression of the cumulative abnormal returns on a set of explanatory variables, which control for the origin country of the shareholder and the PPP´s sector of activity**.**

The results we get are consistent across all the analysis we performed, leading us to reject our initial hypothesis that the participation in a PPP concession adds value to the firm. All statistically significant coefficients, from the models tested previously, suggest that Portuguese firms and a road sector concessions have a negative impact on the cumulative abnormal returns. Therefore, on average, investors seem react negatively to the involvement of a Portuguese firm in a PPP concession. They also seem to react negatively when a firm is awarded with road sector PPP concession.

However, these negative effects that a PPP concession award seem to have on firm performance may be explained by several reasons: the reduced weight of the PPP project for the firm, the existence of confounding events around the announcement date of the concession, investors not immediately aware of the effect of the project to the firm. Also, these negative results may be related with some distrust, by the public opinion and some economic and political sectors, associated with PPPs in our country. The Portuguese PPP experience, in general, has not been positive. Some of the projects have failed since governments were not prepared for the level of complexity that several of these contracts entailed, due to the lack of proper legal framework regarding PPPs in the first years. Consequently, deadlines were not met and contracts have been constantly renegotiated, affecting the financing conditions of the projects. Hence, the several causes of concern about the use of PPPs in Portugal may have led investors, over the years, to be skeptical and reluctant regarding these partnerships, anticipating that the involvement in these projects could jeopardize firm´s value.

6.2 Main limitations

Despite our conclusions, we should stress that even though stock price reactions around the time of the PPP concession announcement reflect investors' expectations regarding the future performance of the firm, they do not reveal the outcome themselves.

An important limitation of this study is the fact that no structured pioneered online information source, that allows us to get access to premium information, exists in Portugal. Hence, it is impossible for us to control for possible leakage of information regarding a concession announcement. For instance, we can believe that the award of a PPP concession by the government is preceded by some rumors. However, we have no tolls to identify when those rumors started coming out in press. In order to bypass this

limitation, we were forced to assume that there is no leakage of information surrounding an announcement. Moreover, it is extremely difficult to control for confounding events in our analysis. This is due to the fact that numerous PPPs were launched several years ago and, at the time, major sources of records for financially relevant events (such as the Wall Street Journal in the United States of America) did not exist. Another issue is that in event study literature there are many variations in the application of the methodology. In performing an event study, researchers face several options at different points of the process, which can be confusing when implementing the method.

6.3. Suggestions for future research

Finally, we should stress that the evidence presented in this study, although pioneer in Portugal, opens several doors for future research. It will be interesting to explore the impact of PPP concessions on a firm´s value considering other countries to analyze a larger samples of projects and firms. Thus, with more firms in the sample, from divers sectors of activity, it is possible to consider more explanatory variables to the model, in order to get more robust results. It is also interesting to test, in detail, the effect of PPP concessions on firms from different sectors of activity. For instance, the role of lenders and operational sponsors, in the projects, is distinct. Therefore, it is opportune to assess if there are certain sectors of activity that may benefit more from the involvement in these concessions.

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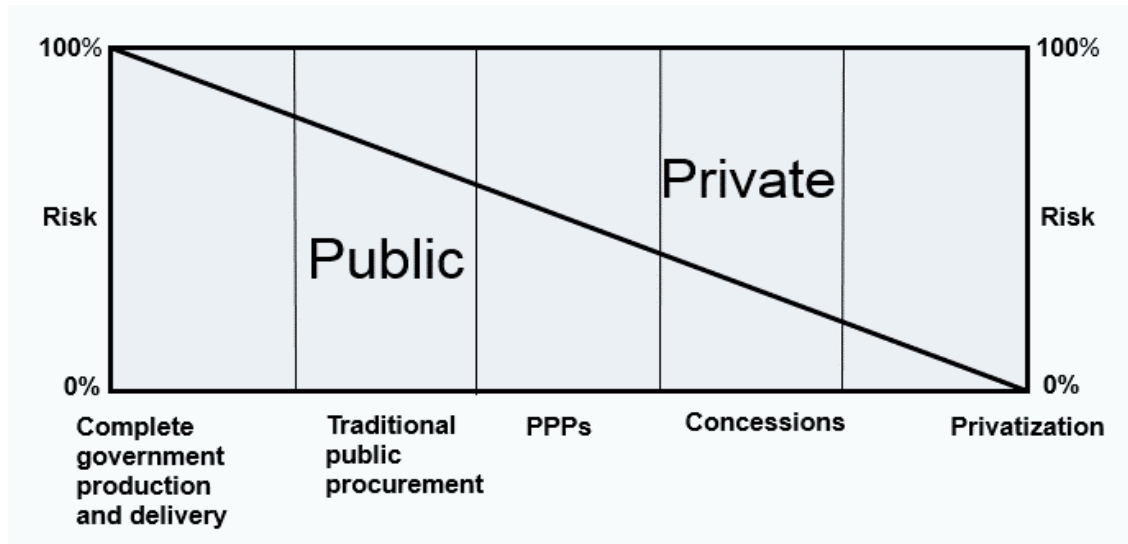
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Appendices

Figures

Figure 1: The spectrum of combinations of public and private participation, classified according to risk and mode of delivery.

Source: Own exhibit. Adapted from Public-Private Partnerships: In Pursuit of Risk Sharing And Value for Money, OCDE 2008.

Figure 2: A typical PPP structure.
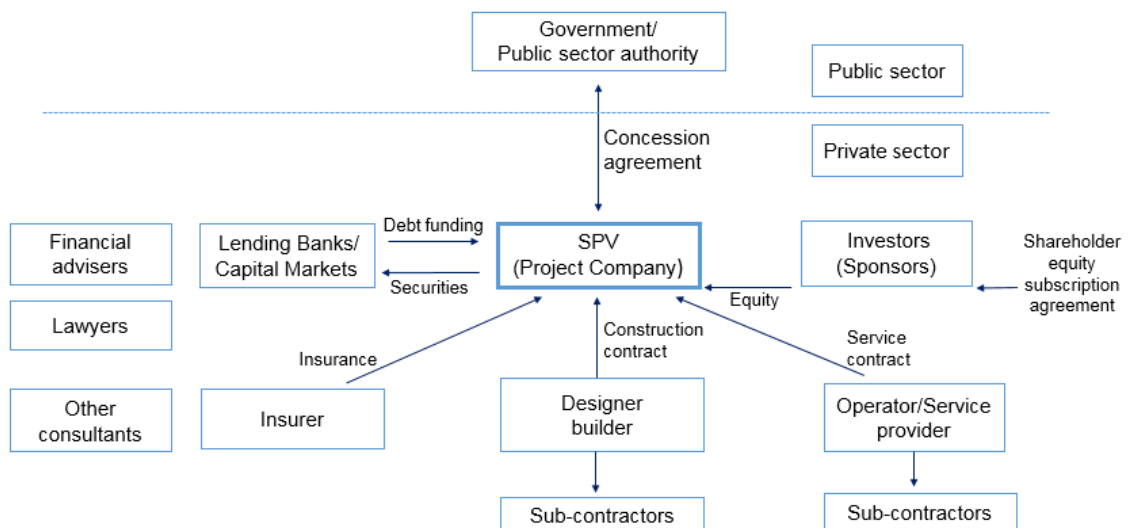
Source: Anatomy of Public–Private Partnerships: Their creation, financing, and renegotiations, Sarmento & Renneboog, 2014.

Figure 3: PPP Tendering Process.
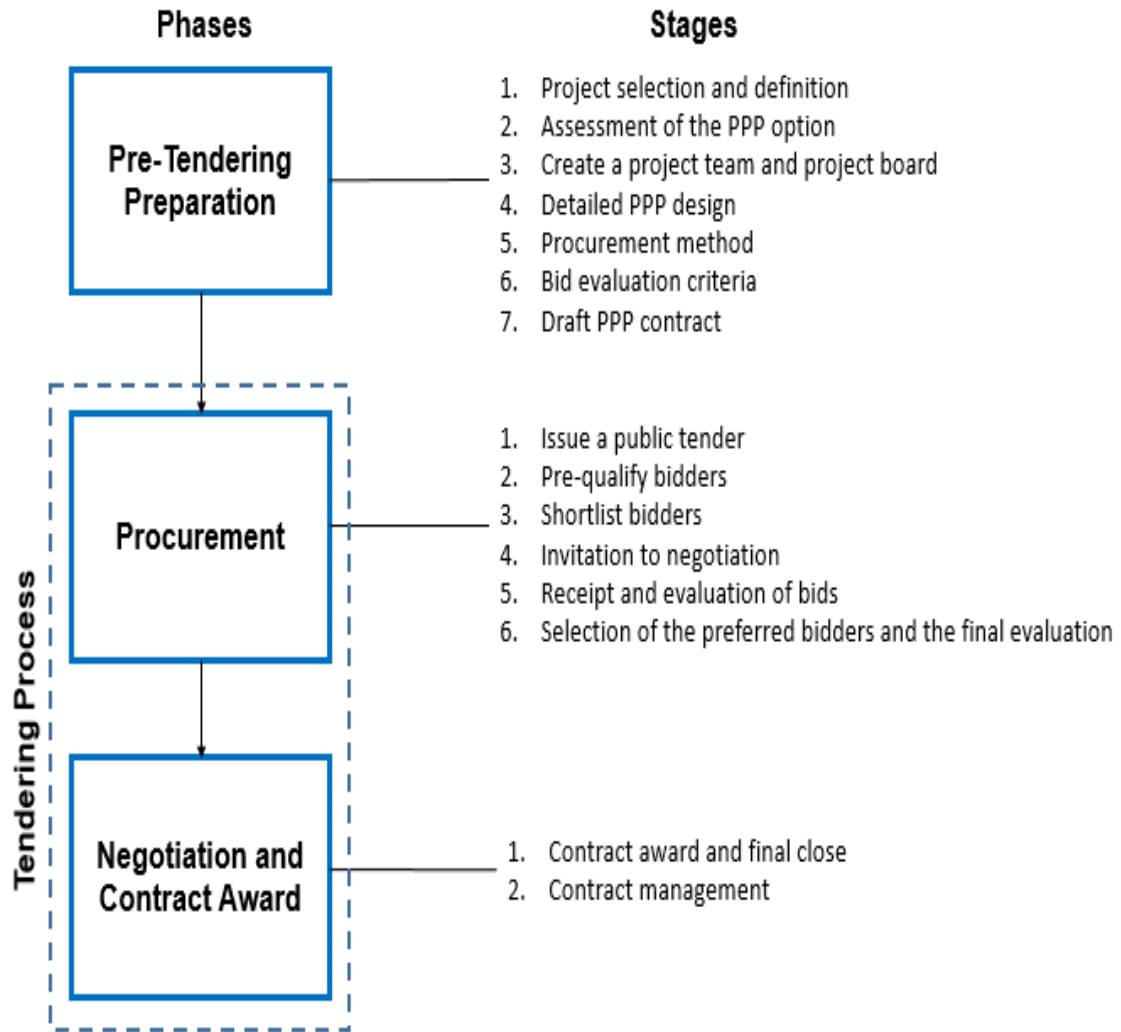
Source: Own exhibit. Adapted from Towards a Comprehensive Understanding of Public Private Partnerships for Infrastructure Development, Kwak et al, 2009.

Figure 4: Investment of the private partners by sector.

Values in millions of euros
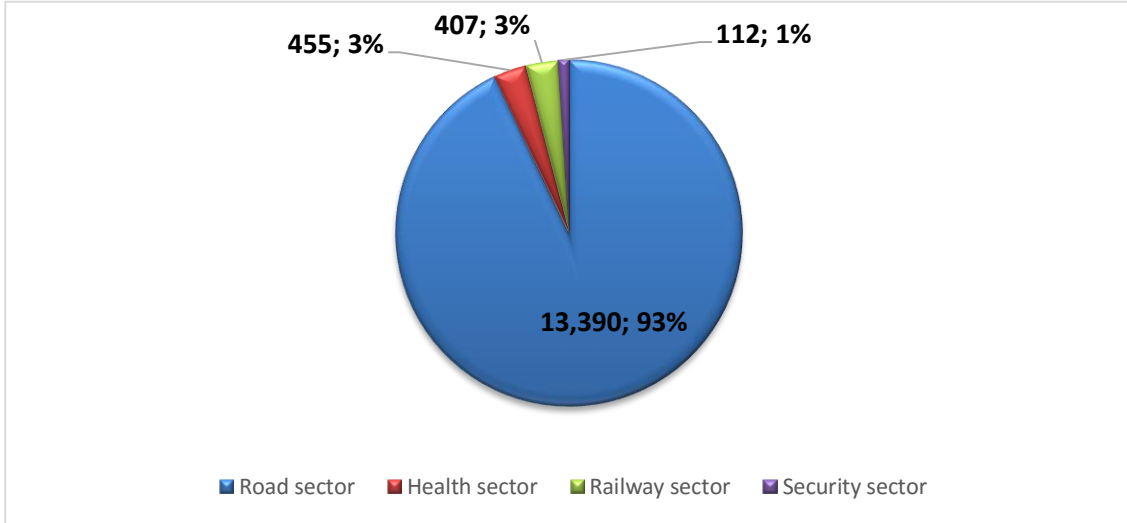
Source: UTAP (2015), from the data provided by the private partners – cumulative investment from 1998 to 2014.

Figure 5: Total estimated investment in PPP projects (cumulative until 2009) weighted with GDP.
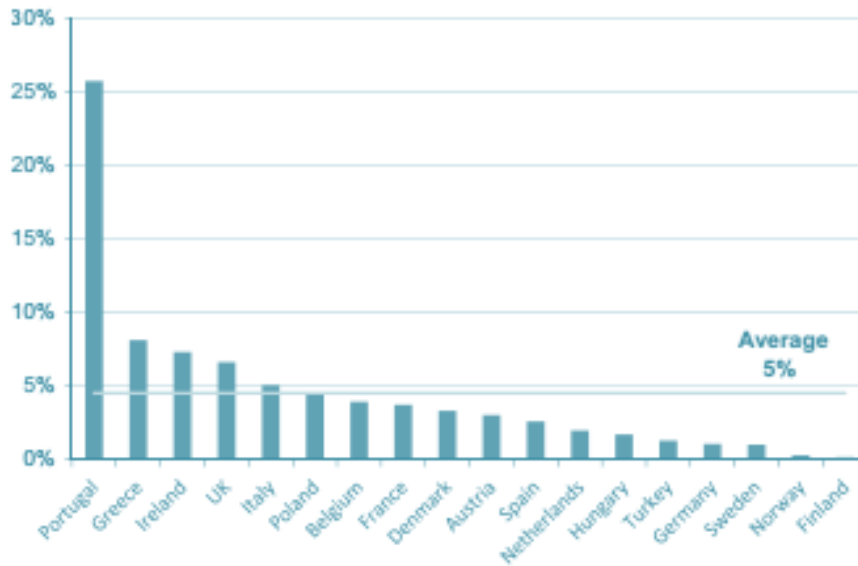
Source: Understanding pitfalls in the application of PPPs in transport infrastructure in Portugal, Macário et al, 2015.

Figure 6: Frequency, and respective percentage, of cumulative abnormal returns observations for both Portuguese and Spanish Shareholders.
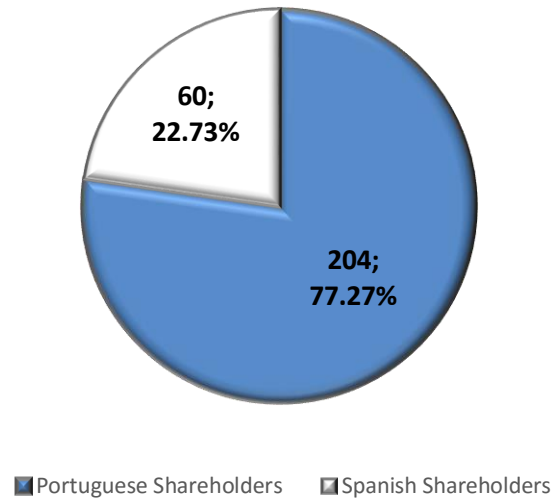
Source: Own Exhibit.

Figure 7: Frequency, and respective percentage, of cumulative abnormal returns observations for both road sector PPPs and remaining PPP sectors (Health and Railway).
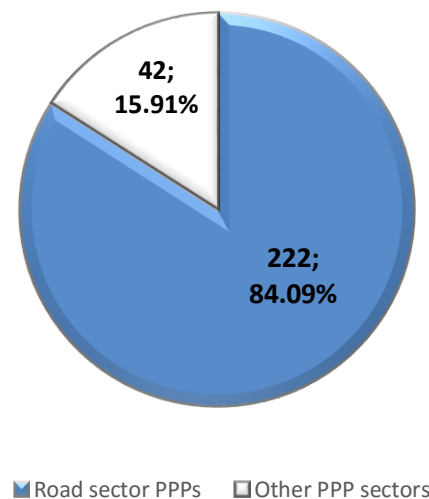
Source: Own exhibit.

Figure 8: Frequency, and respective percentage, of cumulative abnormal returns observations for each publicly traded firm selected.

Source: Own exhibit.

Figure 9: Frequency, and respective percentage, of cumulative abnormal returns observations for each year containing PPP concession announcements.

Source: Own exhibit

Tables

Table I: **Differences between PPPs, traditional public procurement and privatization under the government's perspective.**

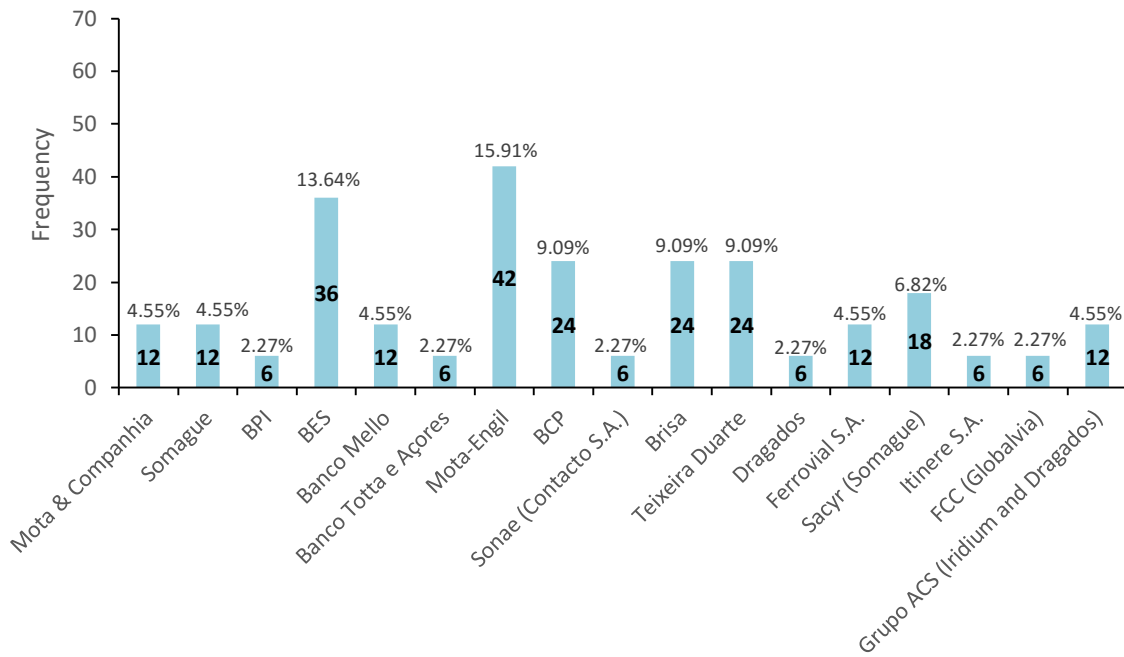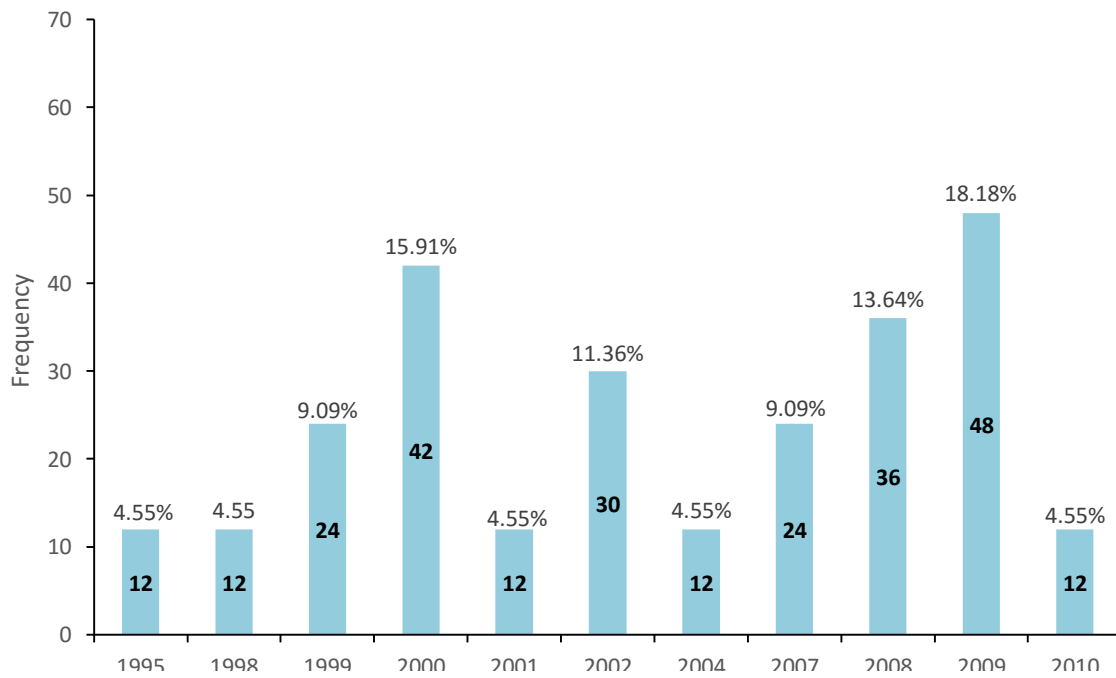| CHARACTERISTICS	TRADITIONAL PROCUREMENT	PPPs	Privatization
Project responsibility	Government is responsible for all stages of the project	Government is responsible for planning the output and outcomes of the project and usually also for payments. The other issues are the private sector´s responsibilities.	Private sector is responsible for all stages of the project.
Risks	Risk is entirely (or almost entirely) assumed by public sector.	Risk is shared between public and private sector. Private sector assumes several risks, (usually: design, construction, financing, operations and, in some cases, demand).	Risk is completely assumed by private sector.
Costs	Private sector is only responsible for construction costs of the asset.	Private sector is responsible for the 'whole life costing - capital and operational expenditures (capex; opex) - of the project.	Private sector is responsible for all of the project costs.
Budget treatment	Capital and operational expenditures (capex; opex) are public expenditures, affecting government budget and national debt.	No impact on budget during the investment stage (PPPs are off-balance sheet). Only payments, during operational stage, are public expenditures.	No public funds. Private sector pays a price for buying the business.
Financing	Investment is financed through the public budget (i.e., taxes or public debt).	Investment is financed by private sector, equity and debt (usually through a syndicated bank).	Investment are completely private.
Contract	There is only a construction contract between government and a private firm.	There is a concession contract, for a number of years (usually 30 y or more), specifying the conditions of design, construction, financing, operation, payments and residual value/transfer.	There is a selling contract of the asset/service to the private firm, without time limitation.
Ownership	Asset is owned by public sector.	Asset is public or reverts to public at contract end.	Asset is completely private.

Source: Anatomy of Public–Private Partnerships: Their creation, financing, and renegotiations, Sarmento & Renneboog, 2014.

Table II: PPP name, publicly traded firm name, PPP Year, Firm´s county and PPP sector selected to our analysis.

PPP Name	Firm Name	PPP Year	Firm´s Country	PPP Sector
Lusoponte	Mota & Companhia Somague	1995	Portugal Portugal	Roads
Oeste	BPI Somague	1998	Portugal Portugal	Roads
Norte	BES Banco Mello Banco Totta e Açores	1999	Portugal Portugal Portugal	Roads
Beira Interior	Dragados	1999	Spain	Roads
Algarve	Ferrovial SA (Cintra and Ferrovial Agroman)	2000	Spain	Roads
Costa da Prata	Mota & Companhia Mota-Engil BES Banco Mello BCP	2000	Portugal Portugal Portugal Portugal Portugal	Roads
Interior Norte	Soane (Contacto)	2000	Portugal	Roads
Beira Litoral e Alta	BCP	2001	Portugal	Roads
Norte Litoral	Ferrovial SA (Cintra and Ferrovial Agroman)	2001	Spain	Roads
Grande Porto	Mota-Engil BES BCP	2002	Portugal Portugal Portugal	Roads
Litoral Centro	Brisa BCP	2004	Portugal Portugal	Roads
Gandre Lisboa	Mota-Engil BES	2007	Portugal Portugal	Roads
Douro Litoral	Teixeira Duarte Brisa	2007	Portugal Portugal	Roads
Túnel do Marão	Sacyr (Somague) Itinere	2008	Spain Spain	Roads
Douro Interior	Mota-Engil BES	2008	Portugal Portugal	Roads
Transmontana	FCC (Globalvia)	2008	Spain	Roads
Baixo Tejo	Teixeira Duarte Brisa	2009	Portugal Portugal	Roads
Baixo Alentejo	Grupo ACS (Iridium and Dragados)	2009	Spain	Roads
Litoral Oeste	Brisa	2009	Portugal	Roads
Algarve Litoral	Grupo ACS (Iridium and Dragados)	2009	Spain	Roads
Pinhal Interior	Mota-Engil	2010	Portugal	Roads
MST	Teixeira Duarte Mota-Engil	2002	Portugal Portugal	Railway
Hospital de Cascais	Teixeira Duarte	2008	Portugal	Health
Hospital de Braga	Sacyr (Somague)	2009	Spain	Health
Hospital de Loures	Mota-Engil BES	2009	Portugal Portugal	Health
Hospital de Vila Franca de Xira	Sacyr (Somague)	2010	Spain	Health

Source: Own Table.

Table III: CARs – Descriptive Statistics.

Nº of observations	264
Mean	-0,01433
Quartile 25	0,0108
Quartile 50	-0,0069
Quartile 75	-0,0364
Std Dev.	0,059438
Min	-0,28341
Max	0,300367

Source: Own calculations based on CAR series.

Table IV: Statistically Significance of ACARt.

As we can observe, considering a 5% level of significance, for the periods of 1 day, 5 days and 10 days after the event, we reject the null hypothesis. Thus, the ACARs for the periods after the event are statistically different from zero. If significant, the cumulative abnormal return is assumed to measure the average effect of the event on the value of n firms. We are assuming that there is no leakage of information, and therefore, it makes sense that the ACARs statistically significant different from zero are the ones after the event announcement.

Nº of the days to the event	Nº of observations	ACARt	Z stat
10 days prior	44	-0.09	-0.62
5 days prior	44	-0.17	-1.15
1 day prior	44	-0.27	-1.77
1 day after	44	-0.31	-2.06
5 days after	44	-0.42	-2.81
10 days after	44	-0.61	-4.05
	T=264		

Source: Own calculations, based on CAR Series.

Table V: Correlation Matrix.

The correlation matrix shows no evidence of strong correlations between variable pairs.

Correlation Matrix	CAR	Shareholderpt	Roads
CAR	1		
Shareholderpt	-0,1381	1	
Roads	-0,0448	0,0607	1

Source: Own Table.

Table VI: Regressions of CAR series on our set of explanatory variables, *Shareholderpt* and *Roads*.

We looked to each firm that exchanges in the Euronext Lisbon and Bolsa de Madrid and collected the daily stock prices in order to compute the abnormal returns. For these computations, we also used the PSI 20 Index for the Portuguese firms and IBEX 35 Index for the Spanish firms. *Shareholderpt* is a dummy variable that takes the value 1 if the analyzed firm is Portuguese and the value 0 if it is a Spanish firm. *Roads* is 1 if the PPP concession is from the road sector and 0 if it is from one of the remaining sectors (health care and railways). In column 1, we model the relation between the *shareholderpt* variable and the abnormal stock returns. In column 2 we model the relation between the *Roads* variable and the abnormal stock returns. In column 3, we model the relationship between the two explanatory variables and the abnormal stock returns. Robust standard errors in parentheses *** $p<0.01$, **$p<0.05$, * $p<0.1$.

VARIABLES	(1) CAR	(2) CAR	(3) CAR
Shareholderpt	-0.0196**		-0.0192**
	(0.0094)		(0.0092)
Roads		-0.0073	-0.0059
		(0.0099)	(0.0096)
Constant	0.0008	-0.0082	0.0055
	(0.0085)	(0.0090)	(0.0130)
Observations	264	264	264
R-squared	0.0191	0.0020	0.0204

Source: Own Table.

Table VII: Regressions of CAR series on our set of explanatory variables, *Shareholderpt* and *Roads*. Regressions include year effects.

We looked to each firm that exchanges in the Euronext Lisbon and Bolsa de Madrid and collected the daily stock prices in order to compute the abnormal returns. For these computations, we also used the PSI 20 Index for the Portuguese firms and IBEX 35 Index for the Spanish firms. *Shareholderpt* is a dummy variable that takes the value 1 if the analyzed firm is Portuguese and the value 0 if it is a Spanish firm. *Roads* is 1 if the PPP concession is from the road sector and 0 if it is from one of the remaining sectors (health care and railways). In column 1, we model the relation between the *shareholderpt* variable and the abnormal stock returns. In column 2 we model the relation between the *Roads* variable and the abnormal stock returns. In column 3, we model the relationship between the two explanatory variables and the abnormal stock returns. The 1995.year time variable was drop out of the regressions to avoid collinearity problems. Standard errors in parentheses *** p<0.01, **p<0.05, * p<0.1.

VARIABLES	(1) CAR	(2) CAR	(3) CAR
Shareholderpt	-0.0402***		-0.0409***
	(0.0091)		(0.0089)
Roads		-0.0288***	-0.0299***
		(0.0108)	(0.0104)
1998.year	0.0288	0.0288	0.0288
	(0.0221)	(0.0227)	(0.0218)
1999.year	0.0032	0.0132	0.0030
	(0.0193)	(0.0196)	(0.0190)
2000.year	0.0154	0.0211	0.0153
	(0.0178)	(0.0182)	(0.0175)
2001.year	0.0326	0.0527**	0.0323
	(0.0226)	(0.0227)	(0.0223)
2002.year	0.0022	-0.0093	-0.0098
	(0.0185)	(0.0195)	(0.0187)
2004.year	0.0285	0.0285	0.0285
	(0.0221)	(0.0227)	(0.0218)
2007.year	0.0355*	0.0355*	0.0355*
	(0.0192)	(0.0196)	(0.0189)
2008.year	-0.0487***	-0.0333*	-0.0540***
	(0.0186)	(0.0186)	(0.0185)
2009.year	-0.0001	0.0042	-0.0116
	(0.0178)	(0.0184)	(0.0180)
2010.year	-0.0521**	-0.0463**	-0.0673***
	(0.0226)	(0.0233)	(0.0229)
Roads		-0.0288***	-0.0299***
		(0.0108)	(0.0104)
Constant	0.0155	0.0040	0.0461**
	(0.0181)	(0.0193)	(0.0207)
Observations	264	264	264
R-squared	0.2025	0.1635	0.2280

Source: Own Table.

Table VIII: Regressions of CAR series on our set of explanatory variables, *Shareholderpt* and *Roads*. Regressions include firm effects.

The 1.firm, Mota & Companhia, variable was drop out of the regressions to avoid collinearity problems. Standard errors in parentheses *** p<0.01, **p<0.05, * p<0.1. Source: Own Table.

VARIABLES	(1) CAR	(2) CAR	(3) CAR
Shareholderpt	-0.0196		-0.0196
	(0.0236)		(0.0236)
Roads		-0.0087	-0.0087
		(0.0119)	(0.0119)
2.firm	-0.0082	-0.0082	-0.0082
	(0.0236)	(0.0236)	(0.0236)
3.firm	0.0389	0.0389	0.0389
	(0.0289)	(0.0289)	(0.0289)
4.firm	-0.0225	-0.0239	-0.0239
	(0.0193)	(0.0194)	(0.0194)
5.firm	0.0049	0.0049	0.0049
	(0.0236)	(0.0236)	(0.0236)
6.firm	0.0243	0.0243	0.0243
	(0.0289)	(0.0289)	(0.0289)
7.firm	-0.0561*	-0.0366	-0.0561*
	(0.0289)	(0.0289)	(0.0289)
8.firm	0.0172	0.0368	0.0172
	(0.0236)	(0.0236)	(0.0236)
9.firm	-0.0011	-0.0036	-0.0036
	(0.0189)	(0.0192)	(0.0192)
10.firm	-0.0050	-0.0050	-0.0050
	(0.0204)	(0.0205)	(0.0205)
11.firm	-0.0101	-0.0101	-0.0101
	(0.0289)	(0.0289)	(0.0289)
12.firm	-0.0067	-0.0067	-0.0067
	(0.0204)	(0.0205)	(0.0205)
13.firm	-0.0243	-0.0286	-0.0286
	(0.0204)	(0.0213)	(0.0213)
14.firm	0.0122	0.0260	0.0064
	(0.0215)	(0.0230)	(0.0230)
15.firm	-0.0252	-0.0056	-0.0252
	(0.0289)	(0.0289)	(0.0289)
16.firm	-0.0606**	-0.0411	-0.0606**
	(0.0289)	(0.0289)	(0.0289)
17.firm	0.0000	0.0196	0.0000
	(0.0000)	(0.0236)	(0.0000)
Constant	0.0079	-0.0030	0.0165
	(0.0167)	(0.0205)	(0.0205)
Observations	264	264	264
R-squared	0.1119	0.1138	0.1138

Legend: 2.Somague; 3.BPI;4.BES;5.Banco Mello;6.Banco Totta e Açores;7.Dragados;8.Ferrovial;9Mota-Engil;10.BCP;11.Soane;12.Brisa;13.Teixeira Duarte;14.Sacyr;15.Itinere;15.FCC;16.Grupo ACS.