

Instituto Superior de Ciências do Trabalho e da Empresa



DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE
FOR MONEY TO THE PUBLIC SECTOR? A FINANCIAL
ANALYSIS USING THE PORTUGUESE EXPERIENCE

Joaquim Miranda Sarmiento

Dissertação
Mestrado em Finanças

Orientador:
Prof. Doutor Pedro Inácio, Prof.Auxiliar, ISCTE Business School, Departamento de Gestão

Setembro 2009

Does Public-Private Partnerships create Value for Money to the Public Sector? A financial analyze
using the Portuguese experience

Joaquim Miranda Sarmento

RESUMO (EM PORTUGUÊS)

Nas últimas décadas tem-se assistido a um aumento da utilização de parcerias público – privadas em todo o mundo, permitindo aos governos financiar e gerir projectos complexos com o apoio do sector privado. Contudo, tem sido bastante discutido se este tipo de acordos gera eficiência para o sector público. Críticos tendem a referir que as parcerias públicas – privadas são usadas com o intuito exclusivo de desorçamentação, não havendo qualquer preocupação se geram valor acrescentado para o sector público. Como medir o Value for Money tornou-se crucial para os gestores públicos. Consideramos que a melhor forma de o fazer é utilizar um comparador do sector público anterior à negociação. Assim, é necessário apurar todos os custos da alternativa pelo sector público versus os pagamentos à parceria público – privada. Estes valores devem ser apurados em termos de valor actual líquido, a taxas de desconto apropriadas. Um dos custos mais importante a incluir será o dos riscos alocados ao sector privado, que é a principal motivação para maiores níveis de eficiência por parte dos privados. Se o contrato for feito sem uma alocação óptima desses riscos, a probabilidade de os gestores públicos terem tomado a melhor decisão é bastante reduzida. Contudo, é importante compreender que o objectivo deste trabalho não é se aquele é o melhor investimento público face às alternativas, mas sim qual a melhor opção para a sua implementação. A análise custo -benefício desta opção de utilização dos dinheiros públicos versus outras opções deve ser realizada *a priori*.

EXECUTIVE SUMMARY:

Over the last few decades, public-private partnerships have been increasingly used by governments all around the world to finance and manage complex operations. However, doubts about if their efficiency have been raised. Criticism over public-private partnerships reflects the fact that governments tend to use it just as an “off-budget” operation, to avoid fiscal constraints. Literature is less than unanimous if they generate Value for Money to the public sector. How to assess Value for Money in this type of arrangements has become extremely important for public managers. We believe that the best way to evaluate that is by doing a public sector comparator prior to the bid. Therefore, it is necessary to account for the

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

costs if the decision is to make it by a public procurement versus the public-private partnerships payments, and what discount rates to use in order to find the net present value of the two options, in order to compare and decide which the best decision for taxpayers is. One of the most important costs to include in a public sector comparator is the risk transfer to the private sector, which is the ultimate motive for a greater level of efficiency. Having a not-optimal risk allocation will reduce the probability of a good decision from public managers. However, the scope of this work is not if the public investment should or should not be realized. The cost-benefit analysis of the investment vs. other options should be made prior to the analysis we describe here.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Key words: Public private partnerships; value for money; public sector comparator; discount rate.

JEL Classification System: G38 - Government Policy and Regulation; H54 - Infrastructures; Other Public Investment and Capital Stock;

TABLE OF CONTENTS

1. SUMÁRIO EXECUTIVO EM PORTUGUÊS	9
2. INTRODUCTION	11
3. A BRIEF SURVEY OF LITERATURE.....	13
4. VALUATING VALUE FOR MONEY IN THE PUBLIC SECTOR: THE THEORETICAL MODEL PROPOSED.....	27
5. THE PORTUGUESE EXPERIENCE	36
6. DATA.....	40
7. RESULTS.....	43
8. CONCLUSION.....	48
9. REFERENCES	51
10. APPENDIX.....	53

INDEX OF TABLES & FIGURES

Exhibit 1 –Incremental Out-Flows public-private partnerships vs PSC	33
Exhibit 2– Discount Rates	35
Figure 1 – Investment values in public-private partnership’s	36
Exhibit 3 – Annual payments to the public-private partnerships SCUT, with a 4, 5% discount rate (in thousands of €).....	43
Exhibit 4 – Annual payments to the public-private partnerships SCUT, with a 6% discount rate (in thousands of €).....	44
Exhibit 5 – NPV of the two scenarios of the PSC (Rf=4.5 and Rf=6%)(in thousands of €) ..	45
Exhibit 6 – NPV of the two base scenario of PPP and PSC(in thousands of €).....	46
Exhibit 7– NPV sensitivity analyze, with a Rf= 4, 5% (in thousands of €).....	47
Exhibit 8 – NPV sensitivity analyze, with a Rf= 6%	47
Exhibit 9 – Financial indicators of BRISA in 2001	53
Exhibit 10 – Financial indicators of BRISA 2003-2007	53
Exhibit 11– Capital Expenditures of the public-private partnerships SCUT	54
Exhibit 12 – Financial indicators of the private operators of SCUTS	54
Exhibit 13– NPV of the risk-free costs of the PSC, using a 4,5% discount rate	55
Exhibit 14 – NPV of the risk-free costs of the PSC, using a 6% discount rate	56
Exhibit 15 – NPV of the operational costs and risk transfer to the private of the PSC, using 6.75% discount rate.....	57
Exhibit 16 – Calculating the corporate taxes.....	58
Exhibit 17 – Calculating the interest costs	59
Exhibit 18 – NPV of Corporate taxes, using 25, 8% discount rate.....	60

ACKONWLEDEGEMENTS

The author wishes to thank Professor Pedro Inácio for his helpful comments, appreciations and contributes, which substantially improved the quality of this thesis.

The author also wishes to thank to their colleagues in ISEG, for the incentive and help in it experience as a lecturer.

To my parents, my wife and my recently born daughter.

1. SUMÁRIO EXECUTIVO EM PORTUGUÊS

Nas últimas décadas, os governos a nível mundial tem recorrido cada vez mais à utilização de Parcerias Público - Privadas, como forma alternativa de financiamento e de gestão de investimentos em infra-estruturas. Contudo, esta nova solução tem levantado algumas questões. Na nossa opinião, a questão mais relevante não é como registar em contabilidade pública este tipo de operações, mas sim se as parcerias público-privadas tornam o sector público mais eficiente.

Assim, a questão central deste trabalho é se as parcerias público-privadas geram Value For Money para o sector público e em que condições provam ser mais eficientes que o procurement tradicional.

Apesar de não existir uma definição unânime de parceria público-privada, neste trabalho socorremo-nos da definição da OCDE: “ Parcerias público-privadas são um acordo entre uma entidade pública e um ou mais parceiros privados (que pode incluir os operadores e os financiadores), em que o sector privado garante a prestação de um serviço ou a construção de uma infra-estrutura, de forma a alcançar os objectivos propostos pelo sector público, sem contudo deixar de garantir o retorno do capital investido pelos privados, o que apenas pode ser alcançado se o risco alocado ao sector privado for optimizado”.

O envolvimento de empresas privadas em parcerias público-privadas pode variar desde a concepção e construção de hospitais, estradas, escolas ou prisões, até ao seu financiamento e operação e manutenção.

O Value for Money não se resume a uma questão de custo - eficiência, mas deve procurar também valorizar a qualidade do serviço. De facto, o Value for Money é o menor custo para o mesmo output e a mesma qualidade do serviço.

A decisão de realizar um projecto sobre a forma de parceria público-privada ou através de procurement público, é uma decisão que deve ser sempre baseada numa análise financeira das diferentes alternativas.

O objectivo deste trabalho é estabelecer uma metodologia de avaliação se um determinado investimento público deve ser realizado sobre a forma pública tradicional ou se deve ser realizado através de uma parceria público-privada.

No entanto, é importante compreender que o âmbito deste trabalho não comporta a análise se o investimento em questão deve ou não ser realizado. Essa análise e decisão devem já ter sido

realizadas, uma vez que se encontram a montante do processo que descrevemos. A análise custo-benefício do investimento, a comparação com outras opções e o enquadramento dentro da recta de restrição orçamental são elementos que deverão ser equacionados a montante da elaboração da comparação procurement público versus parceria público-privada.

Este trabalho foi motivado pela utilização crescente deste tipo de parcerias por parte de diversos países, mas sobretudo, pelas dúvidas que tem sido levantadas sobre a eficiência e a criação de valor para o sector público por parte destes acordos.

Na realidade, as parcerias público-privadas permitem aos governos responder às necessidades de investimento em obras públicas e em infra-estruturas, sobretudo devido às restrições que a situação das Finanças Públicas na maioria dos países impõe.

Para além disso, existe a noção, e muitas vezes correcta, que o sector privado pode trazer inovação e eficiência a estes projectos, poupando dinheiro aos contribuintes.

Uma possível forma de avaliar essa realidade é aquilo que pretendemos obter com este trabalho.

2. INTRODUCTION

Over the past few decades, public-private partnerships have been increasingly more used by the public sector as an alternative way to finance and manage complex infrastructure projects. This new type of public procurement has raised some questions. In our opinion the most important one is not how to account for these operations, but whether public-private partnerships generate to the public sector more efficiency and value.

Therefore, the main issue of this work is whether public-private partnerships create value for money to the Public Sector. In which conditions they prove to be more efficient than traditional procurement. The question to the public managers is when to choose to develop a project under a public-private partnership or a more traditional form of procurement.

Although there is no unanimous definition of public-private partnerships, we decided to use the OECD definition: *“public-private partnership 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 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”*.

The involvement of private companies in public-private partnerships can vary from designing roads, hospitals, schools or prisons to their finance and maintenance.

Value for Money should not be about cost-effectiveness alone, without regarding the quality of the service. In fact, Value for Money is the less cost opportunity for the same output and quality of the service.

To decide whether to develop a project under a traditional public procurement, or public-private partnerships, it is always a decision that should be based on a financial valuation of the alternatives.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

This paper intention is to determine a methodology to evaluate if a certain public investment should be conducted by traditional procurement or whether it should be done under public-private partnerships.

It is important however to realize that the scope of this work is not if the public investment should or should not be realized. The cost-benefit analysis of the investment vs. other options should be made prior to the analysis we describe here.

This work is motivated by the fact that countries have been using increasable public private partnerships, and in many cases, doubts about their efficiency have been raised. Truth is that public-private partnerships help to fill the so-called “infrastructure gap”, considering that many governments cannot afford in their public accounts such high levels of investments. Besides, governments tend to believe that they can save money by bringing private sector efficiency into these projects.

A way to analyze if that presumption is correct and if in fact private sector adds value and efficiency in this public project is what we aim to achieve with this work.

3. A BRIEF SURVEY OF LITERATURE

Introduction and main concepts

Over the years, the main discussion in literature about public-private partnerships has been whether the arrangement is on or off balance sheet, but not whether it represents good value for money (Grimsey, 2004).

The author also defines Value for Money as “best price for a given quantity and standard of output, measured in terms of relative financial benefit”. What is necessary here is a comparative analysis of the costs of the different solutions for the same outputs, in order to make comparisons with the bidder’s cash flows.

Moralos & Amekudzi (2008) argued that Value for Money aides public agencies to determine whether to pursue a project as a public-private partnerships rather than through traditional procurement procedures, as long as they make sure they can account for the costs and savings throughout the lifetime of the project. Value for Money should also ensure that the public sector is focused on the quality and competence of the private sector work and not on the lowest bid. It is referred that Value for Money is one of the leading tools available for public managers to assess the value for pursuing a project through a public-private partnerships vs traditional procurement, because it provides the public sector with a simple methodology and an easy tool for accounting costs, benefits and risks involved in the project, and it can be applied to different countries and different realities.

According to Shaoul (2005), Value for Money is also associated with the three Es: economy, efficiency and effectiveness.

Value for Money in a public-private partnerships scheme is related to the idea that public-private partnerships 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 (taking everything into account, particularly the allocation of risk).

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

According to Fitzgerald (2004) Value for Money can be delivered through risk transfer, innovation, greater asset utilization and integrated whole-of-life management.

There are usually two components of Value for Money: a quantitative one (including all factors that can be measured by the Public Sector Comparator), and a qualitative one (considering aspects that cannot be quantified).

Grimsey, D., Lewis, M.K (2007) pointed that on one side, the public-private partnerships scheme appears to work well. But the difference lies in levels of responsibility and accountability, because the public sector is not exposed to the economic drivers that private companies are. The cost for the public sector to raise the necessary funds for the project has no relation with project risks. A wide variety of performance outcomes can be swept under the administrative mat, and the principals involved are often insulated from the consequences of their actions and decisions.

Well structured public-private partnerships can introduce clear lines of accountability, transparency of outcomes and performance. In fact, one of the benefits of public-private partnerships is the ability to resolve the large cost overruns and delays in traditional public procurement (“optimism bias”). Grimsey, D., Lewis, M.K (2007) enumerated several studies where public-private partnerships construction performance was evaluated and where the overall gains of public-private partnerships are demonstrated. For this purpose Value for Money tests based on comparisons of the public-private partnerships application with the benchmark cost of providing the specified service using conventional public procurement methods.

Spackman (2002) argued that private financing of public services has produced clearer objectives, new ideas, better planning, and the incentives of wider competitive tendering, but also higher top management attention, consultancy and legal fees and risk premium. The text refers to the Arthur Andersen study (2000), which concludes that public-private partnerships offer excellent Value for Money.

Economic theory suggests that the performance differences may lie in the characteristics of public-private partnerships that differentiate them from conventional procurement. Literature has identified three reasons for this: ownership, bundling and risk transfer.

Blanc-Brude, Goldsmith and Valila (2006) argued that ownership rights are a good starting point for considering the economic consequences of public-private partnerships, under

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

incomplete contracting arrangements (Macniel, 1974; Grossman & Hart, 1986; Hart & Moore, 1990). Under a public-private partnerships, the public sector transfers land, property or facilities controlled by it to the private sector, which is given ownership or control rights for the term of the concession or lease. This assignment of the residual control rights provides an incentive for the private sector entity to undertake relation-specific cost-saving investment (for example, in road maintenance technology) that increases productive efficiency. In the absence of this assignment the private firm would not be sure that the investment would pay off and there would be under-investment in the new technology. Turning over the control rights for the infrastructure can alleviate this problem.

Another defining characteristic of public-private partnerships is 'bundling', whereby the infrastructure assets construction and operation are combined in a single contractual framework (Hart, 2003). The issue has been framed in terms of transactions costs, with the choice between bundled or unbundled structures governed by whether it is easier to write contracts on service provision than on the quality of the building.

The transfer of risk to the private sector can also make a public-private partnerships more cost efficient than traditional procurement. Grout (1997; 2003; 2005) emphasized information costs and the incentive structure created by the public-private partnerships service payment mechanism. An effective transfer of risk from the public to the private sector can lead to a more explicit treatment of risk, since it is the acceptance of risk that gives the private entity the motivation to price and produce efficiently. Private finance (debt and equity) is central to this process, although its role has been overlooked so far in the theoretical public-private partnerships literature. That is the only way, not possible in the public sector, to use risk management techniques. In the public sector, risk is transferred to taxpayers or end user, and therefore, the cost of capital is lower than in the private sector.

Moralos & Amekudzi (2008) identified four phases in a public-private partnerships procurement process:

- (1) An initial feasibility assessment, in which is determined whether the project is economically viable and whether it should be run under public-private partnerships;
- (2) The procurement phase, that is the bidding process;
- (3) The construction phase; and

(4) The operation phase.

Typically Value for Money is conducted during Phase 1. It may also be used in phase 2, but just to assure that the bids from the private sector are below the costs under traditional procurement.

Public Sector Comparator

There are four alternative approaches in valuating Value for Money for public-private partnerships: a full cost-benefit analysis, a public sector comparator (PSC) public-private partnerships comparison before bids are invited, a UK-Style public sector comparator Value for Money tests after bids, and reliance on a competitive bidding process.

The public sector comparator is based on estimates of full costs, revenues and risks, set out in cash flow terms, discounted at the public sector rate to determine NPV, and after that compared with the discounted value of payments (along with risks and costs retained by the public sector) to the private supplier. This could be done before the bid, using a hypothetical public sector comparator and a “shadow” public-private partnerships, or prior to the final approval of the deal.

The public sector comparator is therefore the financial differences from the two procurement options for the same project. Grimsey defend that the public sector comparator is much more simple and easier to compile than any of the alternative presented. It is presented as a cost-effective trade-off between a full cost-benefit analyze of all project options, like it is done in Germany, and simply selecting the best private bid, like in France. Also ensures that all options are subject to the same analyze and tests.

Grimsey also referrers that a calculation of a public sector comparator should be done prior to the bids mainly for two reasons: one, to let the public sector comparator be a “pure” public sector option; second, it allows the public decider to know what the private bid should have to improve Value for Money when compared to the public sector comparator. Therefore, it is much important to keep the public sector comparator up to date. The public sector comparator becomes a negotiating tool for the public sector, contributing to achieve the best possible deal.

A raw public sector comparator should provide a base costing including capital and operating costs, and represent a full and fair estimate of all costs of delivering publicly the same

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

volume and level of performance, service and residual asset value that is required from the private sector under the public-private partnerships alternative.

Once the NPVs of both public sector comparator and public-private partnerships have been prepared and adjusted to a comparable basis, then a simple comparison of the two can be carried out. *Ceteris Paribus* (i.e., quality and risk allocation), value for money is demonstrated when the total present value cost of private sector supply is less than the net present value of the base cost of the service, adjusted for the cost of the risks to be retained by the government, cost adjustments for transferable risk, and competitive neutrality effects

Grimsey (2004) defended that there are alternatives to the public sector comparator and also that calculating it involves many complexities and ambiguities that must be a relevant factor on the decision of which type of procurement to choose. Nevertheless, developing a public sector comparator framework will be an important tool for public sector managers, because it will help them to understand the project, the risks involved and how to deal with them contractually. In fact, the risk analysis required for the public sector comparator must be seen as part of a broader process of risk identification, allocation and management. In many cases, the difference between the public sector comparator and the private sector proposal will be relatively narrow and the procurer has to make professional judgments as to the value for money to be derived from contracting with the private sector and the risks which that route involves, while not ignoring that there are also large risks in the public procurement route, as indicated by the 'optimism bias'.

Risk allocation

To achieve Value for Money by using public-private partnerships, transfer risks are an essential part of the process. Not just the construction risks (and as Grimsey refers there is a long history of publicly procured contracts being delayed and turning out to be more expensive than budget), but also another type of risks. Therefore, much of the risk of public-private partnerships comes from the complexity of the project itself.

Grimsey, D., Lewis, M.K (2000) referred that Value for Money requires equitable allocation of risks between public and private sector. It is fundamental not to create a conflict between public sector need to demonstrate Value for Money and private sector need for robust revenue that supports the project finance. Risk evaluation is complex, requiring the analysis

of risk from different perspectives of the public and private sector. The definition of risk and uncertainty made by Knight, F (1921), is the one used in these analyses.

Heald (2007), in the empirical study of a high school project the author found that indeed value for money depended entirely on an assessment of the transfer of risk. The author also refers that risk transfer (estimated as over £2 million) is crucial to the economic viability of this project. Two factors greatly contribute to the risk transfer, the costs rates applying in the construction phase and design quality. Taken together these two factors constitute around two-thirds of the value of the entire risk transfer. Any inaccuracies in these areas could have major implications in terms of value for money. It is mentioned a study carried out by the Audit Commission (2003), where it was found that in nine of the eleven schemes, economic viability is entirely down to risk transfer. In fact, without risk transfer five of the projects would have negative Value for Money percentages of more than 10 per cent.

Regardless uncertainty, the measurement and methodology of risk transfer is rendered problematical because all possible outcomes cannot be predicted and weighted, and the complete array of results covering all eventualities compiled, when the issue is uncertainty not risk.

After valuating risks, the public sector must find the optimal risk allocation to determine which part would be the best to manage each risk. Risk transfer is a very important driver for Value for Money. Transferring too little risks to the private sector would make the project inefficient, but transferring too much will result in higher payments and reduce also Value for Money: Moralos & Amekudzi (2008).

In practice, it is referred that governments do not usually budget for systematic risks or uncertainty, and therefore, public sector comparator only contain project specific risks that are identified and quantified with no adjustment for systematic risk or uncertainty. This because public sector as a whole can be able to ignore uncertainty across their whole portfolio and privates cannot.

Discount Rate

The rate at what the future cash-flows are discounted is another important issue in the literature about public-private partnerships and public sector comparator. The public sector comparator is assessed over the life of the public-private partnerships in NPV terms, which means that the rate used to discount cash flows has a big impact.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

There are five main approaches:

One is based on the fact that the discount rate should reflect government policy preferences, using a “social rate of time preferences”. Grimsey (2005), consider that the discount rate have two elements: first, the basic ‘Social Time Preference Rate’ (STPR). This represents the rate that society is willing to pay for receiving something now rather than in the future. Calculations (e.g., HM Treasury, 2003a) suggest that in most developed countries this is around 3.5–4.0 percent in real terms (i.e., before allowing for price inflation). Second, some allowance for other factors, mainly to ensure that the public sector does not assess the benefit of projects without taking account of the risk to which it exposes taxpayers in the process (for example, the potential to incur additional costs if things go wrong).

As far as for ‘Social Time Preference Rate, Spackman (2002) argues that it will be unmanageable for any government to administer different general rates for these two quantities. It would be computationally complicated, and generate endless confusion. However, the distinction between them is essential to understanding the economics of public sector costing.

The second approach, that derivates from the first one, argues that the discount rate should reflect the “social opportunity cost of capital”. This will depend on the level of non-diversifiable risk in a project. It is in effect the pre-tax IRR that can be expected from private sector investments with the same risk. This calculation uses a deviation of CAPM, and is used by New Zealand and Canada.

The third approach is a hybrid of the “social rate of time preferences” and the “social opportunity cost of capital”. This approach defends that the appropriate public cost of capital for most practical purposes is the sum of the tax-exclusive real interest cost of government debt, the typical quantum of tax paid on marginal returns to private sector capital, and a factor for ‘systematic risk.’ The tax component is conceptually clear, but estimation is complex. Current UK Treasury guidance, originally drafted when real interest rates were much higher than today’s, suggests that this cost of capital falls within the same range of plausibility (4–6%) as social time preference. However the adjustment for UK tax, combined with the adjustment for risk, cannot easily justify adding more than about 1 percentage point to the cost of indexed gilts, which in early 2002 was 2–2.5%.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

The fourth approach is the “equity premium”, i.e., the cost of capital for the public sector is much below the CAPM values, and therefore, the discount rate should be the pre-tax government borrowing rates.

The fifth, and last, approach is the one that uses the risk-free interest rate of the country, i.e., the interest rate of the public debt, according to the maturity of the project.

Many authors referred, like Brealey and Myers, following the “perfect capital markets”, that the idea that public sector has a lower cost of finance is an illusion. If that would be true, it will simplify the public-private partnerships policy, but is not clear. Grout (2003), argues that despite this lack of unanimity there is a tendency for economists to favor the use of similar discount rates in the idealized situation of complete markets. However, he defends that the reason for the divergence between private sector and public sector discount rates is not related to the normal arguments given in the literature. Even in a world of complete capital markets and no distorted taxation it may still be appropriate to use a higher discount rate for the public-private partnerships than the public sector equivalent.

In some countries it is used the long-term borrowing rate as a proxy for the discount rate. In countries with AAA credit rating this rate tends to be close to the “social rate of time preferences” and below a risk-adjusted discount rate. On the contrary, UK has defined for many years a 6% discount rate, adopting recently a 3,5% “social rate of time preferences” rate, with instructions to the public authorities to account separately the other factors, like risk, that were previously reflected in the discount rates.

Spackman (2002) states that the cost of senior debt to public-private partnerships projects is now typically 2 or 3 percentage points above the cost of government debt (including the cost of insurance to achieve AAA rating). The premium is much higher than the cost of systematic risk to publicly financed projects. This is often described as the “equity premium puzzle”, although simple expected utility theory should not be expected to capture people’s aversion to fluctuations in equity markets. HM Treasury (2000) suggests that private capital costs add an extra 1–3 percentage points. The main text of that report says that, while senior debt finance will be not more than between 1 and 3 percentage points above the public sector borrowing rate, higher returns will be demanded for junior debt and equity finance. It is also referred that the study did not look closely at financing rates and that this should be the subject of further study. There is, however, very little data on returns to PFI (Private Finance

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Initiative – equivalent in the UK to the public-private partnerships) equity, and it appears that no such study has taken place.

It's also referred the example from Australia, where new guidance material on discount rates was disclose, that recommends the use of a specific discount rate to each project, according to the risk associated with that project. There is an application of the CAPM model to the public-private partnerships project evaluation, recognizing in the model that the cost of capital/discount rate is specific to each project and is a function of the risks. In a perfect market, this would lead to the conclusion that, as long as there is sufficient competition to drive every component of the deal to maximum efficiency, the appropriate discount rate would be the rate of return implicit in the winning bid, and therefore one would not need to develop a specific discount rate for analysis.

Grimsey, D., Lewis, M.K (2007) referred a PriceWaterhouseCoopers study. This study takes a starting point that, with competition, project internal rates should reflect exactly the returns required by the various investors, as in the weighted average cost of capital (wacc). In the sample of the study, the IRR was on a 7.7% average. The weighted average cost of capital is estimated using CAPM to be 5.3%. Thus the 'spread', the amount by which the average project internal rate of return is higher than the cost of capital, is 2.4 per cent per annum. Of this amount, 1.7 per cent is thought to be accounted for by two factors: unrecovered bid costs on other projects (about 1 per cent); and the higher cost of private sector borrowing compared with public sector borrowing (about 0.7 per cent). Consequently, the 'excess' project return to project investors is estimated as being at most about 0,7 per cent. It's said 'at most' because some part of this margin, attributed in the report to 'structural issues' that have limited competition in the bid market, could be a margin built in for uncertainty, which is not allowed for in the analysis (Grimsey & Lewis, 2004c).

Grimsey opposes two methods: one is to adjust risk by adding a risk margin to a risk-free discount rate (reflecting systematic risk rather than idiosyncratic risk). This will mean the use of a risk adjusted discount rate added to a risk-free discount rate to account for “risky” cash flows, while uses a risk-free rate for “nonrisky” cash flows. It is a discount rate that reflects the government's time value of money plus a systematic risk premium for the inherent risks involved in the project. They categorize risk in bands, as very low, low and medium (e.g: a project that falls into the very low risk band will have a risk premium of 1.8%, to be add to the 3% risk-free rate in real terms). The reward for bearing risk depends only on the

systematic risk of an investment, because other risks can be diversified. Other option is to value risk in the cash flows so that a risk-free discount rate is applied to cash flows forecasts that have been adjusted to risk. Although the two processes are in theory alike, in practice they might lead to different results.

The classic paper on variability risk in the public sector is Arrow & Lind (1970), which concluded that the cost is generally negligible, because it is spread so widely and hence thinly across the population. Currie (2000), using the arguments discussed below, criticizes the application of the Arrow & Lind conclusion to the public sector. Grout (1997) sees it as equally applicable to private sector costs, but also argues that public sector benefits should be discounted at the same risky rate as in the private sector. The three most common criticisms of Arrow & Lind relate to correlation with income, risk spreading, and implications for public ownership.

Grout (2003), uses a financial test for public-private partnerships, in each case the project delivers a flow of benefits, $v_t(g)$ and $v_t(p)$, and costs, $C_t(g)$ and $C_t(p)$, where p , g and t denote public-private partnerships, public sector and time respectively. A cost benefit test would opt for public provision if:

$$\int_0^{\infty} v_t(g) e^{-r_t(g)t} dt - \int_0^{\infty} c_t(g) e^{-r_t(g)t} dt > \int_0^{\infty} v_t(p) e^{-r_t(p)t} dt - \int_0^{\infty} c_t(p) e^{-r_t(p)t} dt \quad (\text{I})$$

In contrast, a pure finance base test compares the cost to the government of public provision with the cost to the public sector of conducting the project as public-private partnerships. The financial cost to the government of public provision is the cost stream that the public sector has to fund:

$$\int_0^{\infty} c_t(g) e^{-rt} dt \quad (\text{II})$$

Where r is the discount rate used by the government in the pure finance test. Within public-private partnerships, the government has to fund the present value of the service specified in the contract. That is, service quantity, q_t , is measured and the private sector is funded according to the agreed price, p_t , per unit. The financial cost to the government of the public-private partnerships is:

$$\int_0^{\infty} p_t q_t e^{-rt} dt \quad (\text{III})$$

Using this pure finance test, public provision is preferred if:

$$\int_0^{\infty} c_t(g) e^{-rt} dt < \int_0^{\infty} p_t q_t e^{-rt} dt \quad (\text{IV})$$

Risks have also implication for the discount rate. Broadbent & Laughlin (2003) noted the argument of Grout (1997), later developed further in Grout (2003), to the effect that the Value for Money test is biased against the public sector. His argument runs as follows. When public sector provision is being valued a discount rate is applied to a cost cash flow. This cash flow represents the cost of building the facility if it is done in the public sector. In contrast, for valuing the private sector provision a discount rate is applied to a stream that constitutes an outlay for the public sector but is a revenue item to the private entity and is being valued from the revenue side. With public-private partnerships, this revenue stream is not the equivalent cost of building the facility. It is the cash flow associated with the flow of benefits valued at the price in the contract. There is no reason to suppose that the risk characteristics are equivalent for these two cash flows. Indeed, Grout argues that there is every reason to suppose that they are not, because in general costs are less risky than revenues (particularly when the revenues depend on services of a suitable quality being provided). Therefore, he contends that a higher discount rate should be used for the public-private partnerships than for the public sector equivalent. If not, that will suggest that the private sector is less efficient than public.

Using the Gorman polar form and a linear payment schedule, Grout explicitly calculates the risk characteristics of these cash flows as measured by their beta (the weighted covariance between the cash flow and aggregate income). It is easy to show that the β for the revenue cash flow is:

$$\beta_r = \frac{\text{cov}(R,m)}{\text{var}(m)} = \frac{rR}{\sigma_m} = p \sum_i b(p) \quad (\text{V})$$

And the β for the cost stream is:

$$\beta_c = \frac{\text{cov}(C,m)}{\text{var}(m)} = \frac{cC}{\sigma_m} = c \sum_i b(p) \quad (\text{VI})$$

Where

$$m = \sum_i m_i$$

And

$$\rho_{r,m} \frac{\sigma_r \sigma_m}{\sigma_m^2} - \frac{\sigma_r}{\sigma_m} \text{ with } \rho_{r,m} = 1$$

Thus the ratio of the betas is equal to the ratio of price to marginal cost:

$$\frac{\beta_r}{\beta_c} = \frac{\text{price}}{\text{marginal cost}} \quad (\text{VII})$$

In general, the public sector cost in the comparison should not be discounted at the same rate as the private sector. Failure to do so will suggest that private provision is less efficient than public since the PV of private will be overestimated relative to public. That is, the relevant beta for the public sector component of a pure finance test should be that given by VI and the relevant beta for the public-private partnerships should be that given by V.

Conclusions

According to Kintoye et al. (2002), as quoted in Ball (2007), the lack of transparency in public-private partnerships risk evaluation constitutes an area of serious concern and it is claimed that the public sector comparator inevitably focuses on factors that can be easily quantified and expressed in monetary terms.

Heald expresses concern to the extent that value for money assessments may be carried out by consulting firms who ‘are not neutral referees but interested players’ (2003: 361).

As Moralos argues, a public sector comparator is a hypothetical scenario; it relies on the estimations made by the agencies and the experience of the staff, which may lead to significant errors, due to the complex financial models used and the less experience from the public sector to handle it. The authors refer a study, made by Corner (2006 The United Kingdom Private Finance Initiative: The challenge of allocating risk. OECD Journal on Budgeting, 5(3), 37-55.), where he studied the use of the public sector comparator of PFIs in the United Kingdom using the House of Commons Committee of Public Account’s findings and discovered some of the major weaknesses in the applications of the Value for Money analysis. The fact that a NPV of a public-private partnerships turned to be more costly than a public sector comparator, doesn’t mean that the traditional procurement should be chosen,

because the calculations may be biased. The authors define that: “The main purpose of the public sector comparator and public-private partnerships comparison is to aid agencies in determining whether to pursue the project as public-private partnerships or not pursue the project at all”.

Although the Value for Money assessment can be used to determine whether to pursue public-private partnerships, public agencies must be aware of the complexities of the overall public-private partnerships process and the limitations of the Value for Money methodology. It is important for agencies to realize that Value for Money cannot be the only factor in the decision to pursue a project as a public-private partnerships; they must evaluate their own capacity to manage such large, complex, and long-term projects aside from what the final value might say.

Criticisms over public-private partnerships argue that there is no substantive risk transfer under public-private partnerships. Grimsey & Lewis (2007) claimed that this is not correct. Under a public-private partnerships approach the contractor is forced to think longer term and also cannot just 'walk away' having completed the construction. The contractor has ongoing, long-term responsibility for the facility's performance, which is reflected in performance-based monthly payments. Even if the contractor is unable to fulfill its obligations, and terminates the partnership, it cannot take the facility away and, in most cases, the assets revert to the public sector.

The main reason for using public-private partnerships is that they have showed to be a way for resolving the large costs overruns and delays in traditional public procurement, the “optimism bias”. Grimsey (2005) refers two studies in 2002(Flyvbjerg, Holm & Buhl and MacDonald) that confirmed the results of earlier research by Pickrell (1990) and Fouracre, Allport, and Thomson (1990). In the first study, Flyvbjerg, Holm & Buhl examined 258 large transport infrastructure projects covering 20 countries, the overwhelming majority of which were developed using conventional approaches to public procurement. Costs were found to be underestimated in 90 percent of the projects, in most cases by substantial amounts. In the other major study, the UK Treasury commissioned MacDonald to review 50 large public procurement projects in the UK over the last 20 years, 11 of which were undertaken under public-private partnerships/PFI. On average, the public-private partnerships/PFI projects came in under-time (compared to 17 percent over-time for the others), and capital

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

expenditure resulted in a 1 percent cost overrun on average (relative to an average cost overrun of 47 percent for traditional procurement projects).

Studies for some particular sectors in the UK report broadly consistent results. Parker and Hartley (2003) record claims that public-private partnerships contracts for UK defense services have resulted in cost savings between 5 and 40 percent compared with conventional public procurement, although the authors are concerned as to whether these apparent cost savings will be realized over the projects' whole-of-life due to the inherent uncertainties of long-term contracting.

The theory of public-private partnerships suggested that incentives that produce efficiencies can be introduced into infrastructure procurement by vesting control rights with the private sector, bundling into one contract the design, construction, operation and maintenance of the facility, and by transferring the risk of cost and time overruns to the private partner

4. VALUATING VALUE FOR MONEY IN THE PUBLIC SECTOR: THE THEORETICAL MODEL PROPOSED

When defining a methodology for evaluating Value for Money in public-private partnerships, a first question must be answered: what is the best approach?

A simple answer does not exist, and countries, as we have seen, use several different approaches. Nevertheless we believe that the best choice is a public sector comparator prior to the bid. Mainly for three reasons:

First, it is the best way to know with detail what would be the cost of the project if developed by the public sector. Only with that information it is possible to assure a well-informed decision from the public managers. The public sector choice can not be simply the lower bid. It has to be the lower bid, with the same outputs, but below the public sector comparator cost. Otherwise, if the lower bid is still above the public sector comparator, choosing to develop the project by a public-private partnerships scheme will be a bad decision. In fact, the core concept of doing a public-private partnership is that private sector can achieve greater level of service with lower costs than the public sector. But that is a condition that is necessary to prove and the public sector comparator is the best alternative for that. However, that does not mean that after the public sector comparator, there is no need for a negotiation. On the contrary, a negotiation with the participation of several private bidders is crucial, because that competition among the bidders will enable the public sector to negotiate the best value at the lower cost.

Second because we don't believe that the public administration of most of the countries will have the necessary resources and skills for more detail and complex analyses, as is required by a complete cost-benefit analysis of all the alternatives. However, developing a public sector comparator methodology will certainly improve accountability and public management competences.

Third is that doing a public sector comparator after the bid, although it might show if Value for Money was achieved, if the result is negative, it will have to lead to a renegotiation of the

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

public-private partnerships, process that tends to be more complex and difficult than the public-private partnerships process itself. This does not mean that the public sector comparator shouldn't be revised, but only with a few years of operation.

In order to use the public sector comparator methodology that we suggest, three pre-conditions are needed. First, the government's decision to use a public-private partnerships scheme is not already determined by the need of putting the investment off the balance sheet. This is particularly important in countries with strong fiscal rules, like European Union members, and especially in countries with large budget deficit and higher public debt. As bigger the fiscal constraint is, the more important this precondition becomes. If the government's decision to accept the project is depending only in putting off the annual budget deficit, then Value for Money will have no matter in the process. The fact that the project is done by a private consortium does not give any guarantee that it will be more efficient than if run by public sector. The second pre-condition is that the project must be affordable. That is, affordability being one of the public-private partnerships benchmarks, it is necessary that the cost of the project is included within the constraints of the budget in a long-term fiscal sustainability. It is necessary that the public authorities demonstrate that the service fees are affordable in the budget constraints. This means not to manipulate the service fees, in order to have low levels of payments in the first years of contract and high level in the long term, which will make the public-private partnerships only affordable in the first years. It is also important to understand that if the choice is between a public-private partnerships and no project, there will be a strong pressure for using data and assumptions that misguided the real cost of the two options, in order to lead to a decision to choose the public-private partnerships. The last pre-condition is that the investment is needed and that there is no better alternative to the tax-payers money (the opportunity cost test). This last pre-condition is almost every time subject to discussion and controversy. Nevertheless, and considering that this is not the subject of this work, we must say, that on the contrary of the private sector investments valuation, the simple fact of the investment does not achieve the minimum hurdle rate required do not exclude the project by itself. Being a public sector project, other issues matter, besides maximizing value, like defense, social assistance, etc.

We regard public sector comparator as the estimation of the full cost of a project totally funded and operated by the public sector. We also believe that the public sector comparator should be detailed, and should incorporate some of the "project finance best practices", especially regarding costs, revenues, risk assessment, finance and discount rates.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Then, how should a public sector comparator be build? The first step is to collect as much useful and valid information as possible. This could be the first obstacle for the public managers. Information will be vital in order to estimate project revenues and expenses. If the operation is already running, and what the government is considering is only a change of management (from public to private), as an example of an hospital already in function, the exercise is quite more simple, especially if there are already good levels of accountability. Measuring costs and revenues in this exercise can, and it should be simple, if the public entity has already sound financial statements. The exercise is then to estimate what are the realistic savings and efficiency improvements still possible by the public managers? Having found that value, the public sector comparator, in annual terms, will be:

$$PSC = \text{Retained risks} + [\text{public entity costs} * (1-C) - \text{public entity revenues} * (1+R)] + \text{estimate cost of risks transfer. (VIII)}$$

With *C*: efficiency gains as a percentage of public entity costs; *R* – Efficiency gains as a percentage of public entity Revenues.

Note: Usually Revenues < Costs

Therefore, the decision for public-private partnerships in an already operating project is when:

$$[\text{Retained risks} + \text{Annual payment for public-private partnerships} - \text{Corporate Tax}] < PSC \text{ (IX)}$$

$$\Leftrightarrow \text{Annual payment for public-private partnerships} - \text{Corporate Tax} < [\text{public entity costs} * (1-C) - \text{public entity revenues} * (1+R)] + \text{estimate cost of risks transfer (X)}$$

Note that efficiency gains play the major role in this particular case. Therefore, it is vital not to have optimist assumptions on that gains, otherwise, the public sector comparator will be unrealistic, and will drive private bidders away. Using benchmarks from the private sector, and having independent consultants evaluating those hypothetical gains should be considered.

When regarding a new project, estimating future revenues and expenses is a more difficult task, but yet, a fundamental one. If the new project is in a sector where there is already experience, it is easier. Experience from similar projects helps to estimate future data. Yet, managers should not rely completely on that historical background. Estimations of future changes and tendencies are still fundamental.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

However, if the new project is in a sector where there is no past experience, or that experience is limited, a set of tools should be used by managers in order to help making the best possible assumptions. Market testing and scenario analysis are two of the best options.

Setting up the future out-flows of the project is the essential part of this analysis. As it is a public project, the annual out-flow is:

$$OF = \text{Base costing of the project (XI)}$$

Note that there is a large difference to the cash-flow to the firm, used in corporate finance:

$$FCFF = EBIT(1-t) + \text{Depreciations/Amortizations} - \text{Change in NWC} - \text{Capex (XII)}$$

But, in public sector, there is no EBIT, once there are no taxes, and there is no interest rate in the project (the public debt is in government, not allocated to any specific project or agency), therefore, amortizations and depreciations do not have a fiscal impact, and for that there is no reason to consider it.

Three important issues are related to the base costing of the projects (BCP): First, if there are revenues, the base cost will be (*costs – revenues*), assuming that, usually in this type of projects, revenues are not enough to cover expenses. The second issue, is that besides the direct costs of the project (e.g.: the cost of building a road, and the maintenance costs during the life-time of the project), it is also necessary to include the indirect costs, such as administrative, hidden costs, costs with eminent domain, opportunity costs and third part revenues shares if applied. The third and last issue is related to inflation: A nominal out-flow should be used in the analyses.

Therefore, the annual base costing of the project is:

$$BCP = [(\text{direct Costs} + \text{indirect costs}) - \text{Revenues}] \text{ (XIII)}$$

Having calculated the long-term base costing of the project, it is necessary to find the public sector comparator. However, the risk costs and the tax revenues are not yet included in the calculations.

$$PSC = \text{Capex} + \text{Retained risks} + BCP + \text{public-private partnerships transfer risks estimation costs} + \\ \text{Corporate tax from public-private partnerships (XIV)}$$

There is no “one rule fits all” for transfer risks, but literature and experience tell us that for the transfer of risk to be most effective, risks must be transferred to the party best able to

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

manage them. Risk can be defined as the probability that the actual outcome (e.g: sales, costs, profits, etc) will deviate from the expected one, and should be distinguished by endogenous and exogenous risks

The transfer risks estimation costs is probably the most important step in these analyses, mainly because this is where the private sector efficiency is more likely to be assured. A public sector comparator that is not risk adjusted will not give a clear and realistic image of the total cost of the project, once the NPV of the payments of a public-private partnerships is likely to be higher than the NPV of the project costs, because of the higher cost of finance. In order to estimate the risk transfer to the private sector, it is necessary to identify all the relevant risks to be transferred, assigning a cost for each one, if they were retained by the public sector and then measure the probability of the event occur and the cost impact of that. Then, it is also necessary to determine the probable timing for that event occur and calculate the NPV of those risks, and adding that NPV to the public sector comparator. However, it should be used a variety of outcomes instead of a single risk transfer NPV.

If sufficient data is available, the probability of the deviation of those outcomes can be estimated statistically. Some statistics tests must be used, regarding simulations, and considering the risks allocation as a probability distribution. However, if that is not possible, by insufficient data, then subjective, but realist, probabilities might be used, recurring to benchmarking with other sector projects (for instead, the Australian Government uses a 8% of the project value for estimate transferable risks¹). Unlikely private sector, the public sector is not profit driven, and therefore, the risk of deviations in costs or revenues is much higher. Delivering a service or good under public-private partnerships must be used to reduce those risks. It is then necessary to find the optimal allocation of risk between the two parts, private and public. But it is also important to ensure that no highly subjective judgments about the value of risks transferred are made, in order to make public private partnerships less cost than the public sector comparator. It is necessary that this risk calculation is not made to overrun costs in the public sector, in order to choose the private solution.

It is important to realize that public private partnerships are one of the best ways to transfer risks from the public to the private sector. Public private partnerships became a risk-sharing agreement with the private bidder. Therefore, the risk allocation process is vital for success. Projects must have an optimal risk-allocation, and if insufficient risks where allocated to the

¹ OECD, *Public Private Partnerships: In Pursuit of Risk Sharing and Value for Money*, pg 74.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

private sector, it will be very difficult for a public private partnership to generate Value for Money. This is because risk transfer became much more effective if there is a “whole of cycle” contract with a single private entity, which allows the public entity to know exactly the cost of providing that service on the long-term, having a predictable budget. The “whole of cycle” means that the risk associated with changes during the long-term contract and the complexity in this type of large-scale projects is being considered.

For last, it is also important to realize if the risks transferred to the private sector were really and definitely transfer, and that they will not revert again to the public sector. If there is a probability that during the life of the contract the risk could revert to the public sector that has to be evaluated and considered in the calculations of the risk transfer estimated costs. A fundamental analyze is the renegotiation and the financial rebalancing agreement

An important issue which literature and practice tends to forget in the calculation of the public sector comparator is the corporate taxes. Once there are corporate taxes in most of the countries, and usually public-private partnerships consortiums do not have a tax-free benefit, the tax revenues from that private initiative have to be accounted in the public sector comparator. It is simple to understand why: If the decision is to realize the project by the public sector, those revenues will not exist, and therefore, there is an opportunity cost in the decision that must be taken into account.

$$T = EBT * \text{marginal corporate tax} - \text{Tax Benefits} \quad (\text{XV})$$

The cost of the public-private partnerships, which is the NPV of the payments agreed with the private bidder, plus the cost of the risk retained.

$$\text{public-private partnerships cost} = \text{Retained Risks} + \text{Cost of Service Payments} - \text{Corporate Tax} \quad (\text{XVI})$$

$$\text{public-private partnerships cost} < \text{PSC cost} \quad (\text{XVII})$$

$$\text{Cost of Service Payments} - \text{Corporate Tax} < - \text{Capex} + \text{BCP} + \text{public-private partnerships transfer risks estimation costs} + \text{Corporate tax from public-private partnerships} \quad (\text{XVIII})$$

As the retained risks are equal in both sides of the equations, and are discounted at the same discount rate, we can eliminate both in the equation. However, in practical analyze, that costs should be measured, in order to find the real impact of those risks.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Another way of analyzing the public sector comparator vs public-private partnerships is to use incremental out-flows.

*Exhibit 1 –Incremental Out-Flows public-private partnerships vs PSC
Incremental OF = public-private partnerships - PSC*

GAINS (in NPV)	LOSSES (in NPV)
Capex	Payments to the private bidder
+ Reinvestments or major reparations	- Corporate Tax
+ <i>BCP = [(direct Costs + indirect costs) - Revenues]</i>	
+ Corporate Taxes	
+ Transferred Risks	

If NPV > 0 – Chose public-private partnerships.

If NPV < 0 – Chose PSC

At this point, one aspect must be stressed: As the public sector tends to be less efficient than the private sector, it is necessary to ensure that this analysis is realistic, and therefore, a sensitive analysis of the numbers is fundamental. It is necessary to analyze the impact of deviation in each one of the public sector comparator components, specially the initial capital expenditure (although the risk of cost deviation can be mitigated by a construction contract with a private company), and specially the operational costs in the long term.

What discount rate should be used? As we have seen, the literature is everything less than unanimous about this question.

We do not think that public sector should use exclusively the private sector rate, mainly because two reasons: First, that will undermine the private sector need for efficiency. Second, the exogenous risks from the public sector perspective are always lower than the private sector. But, we also do not agree with the simple use of the public debt interest rate. Although

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

there is an argument for the use of a generic discount rate, that is that the public sector is spreading risks over so many projects, that it should be used the average risk rather than the project risk. We do not agree with this proposition, mainly because that would mean to treat the same way high-risk and low-risk projects. Besides, there is a substantial difference in the cash-flows that are being discounted. In the public sector comparator, costs consist mainly in a high level of initial capital expenditure and low level of long-term operational costs, whereas the costs of public-private partnerships consist in a long-term payment to the private bidder.

We think that there should be three discount rates applied to the public sector comparator and two discount rates for the public-private partnerships.

For the public sector comparator, a riskless discount rate should be used to discount the capital expenditure and the retained risks. The rate should be the interest rate of Bonds for the maturity of the project (should be the R_f). There is a simple reason for that: The capital expenditure is in the first years of operating, which means that the impact of the discount rate is small. But besides that, a fixed price contract can be made to the private sector for the construction of the infra-structured, reducing the risk of cost deviation to a very low level. Also retained risks in public-private partnerships tend to be risks that the public sector is more likely to manage, and if they occur, the cost can be financed by public debt.

A default risk interest rate should be used for discounting the cost of service and maintenance, and also for the transferred risks. The reason for that is that two future cash-flows are subject to the same risk, whether they are managed by public or private sector. The risks transferred in a public-private partnerships, are risks that the private sector is more likely to manage, and so they should be discounted at that risk rate. The CAPM model should be used for calculating that risk.

$$CAPM: E(R_i) = R_f + \beta_i [E(R_m) - R_f] \quad (XIX)$$

As for the $E(R_m)$ and the β_i , if the public-private partnerships is in a sector where privates are already present, like roads or health, the benchmark with the market is possible and it is the best solution. If the public-private partnerships are in a sector where there is no private initiative, there should be an attempt for measuring the risk associated with the project.

As for the public-private partnerships, the future payments to the private consortium should be treated as public debt, because that is what they really are (future payment obligations due

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

to today's decisions). As that, the public debt interest rate for the maturity of the project should be used to discount those future payments. Although each public-private partnerships should be discounted with this rate, the intensive use of public-private partnerships, and the budget consequences in the long term, may affect the rating of the Public sector, leading to a higher interest rate, and therefore, affecting the future evaluation of the public-private partnerships.

Exhibit 2– Discount Rates

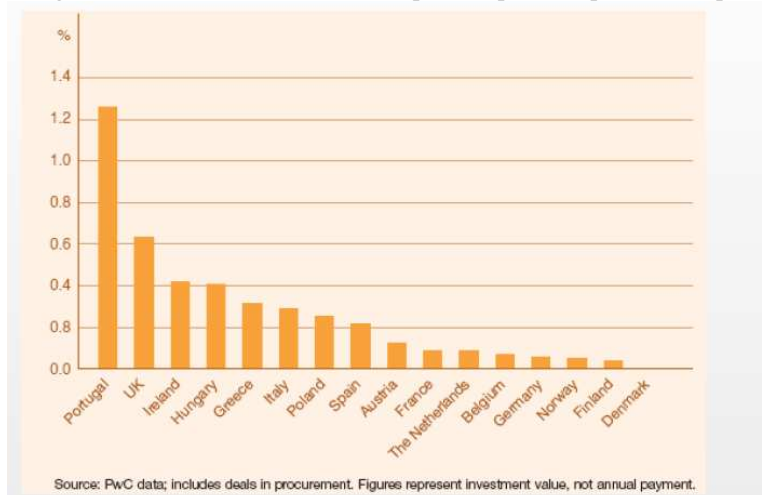
DISCOUNT RATES	public-private partnerships	PSC
Rf: risk-free rate	Payments Retained risks	Capital expenditures Retained risks
$R_u = R_f + \beta_u [R_m - R_f]$	N/A	Operational Costs Transferred Risks
$R_e = R_f + \beta_l [R_m - R_f]$	Corporate Tax	Corporate Tax

5. THE PORTUGUESE EXPERIENCE

For the practical analyses, we will use the Portuguese experience on public-private partnerships. Portugal set up the first public-private partnerships in 1993 (Vasco da Gama Bridge in Lisbon), and since then, it had promoted 14 public-private partnerships until 2008. Mainly, the public-private partnerships projects were in transports, basically roads. Recently, the Portuguese government has announced the launch of public-private partnerships in health, roads and also for the new Lisbon international airport and the TGV.

For 15 years, the 14 public-private partnerships contracted represented a 10 Billion € private investment, and around 20 Billion € of public payments for the next 30 years, according to a Court of Audit Report. Portugal is the largest country when considering the value of the public-private partnerships per capita, even above the UK.

Figure 1 – Investment values in public-private partnership's



Parpublica, a task-force under the Ministry of Finance, was created to advise and evaluate public-private partnerships, with the mission of promoting the use of public-private partnerships in the development of public services, in conditions of better quality and efficiency. Parpublica is also the entity responsible for technical support of the Ministry of Finance in the public-private partnerships procedures.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Until 2006, Portugal never has done a public sector comparator when setting up public-private partnerships. The first public-private partnerships with a public sector comparator prior to the bid were the new hospital in Braga and the new hospital in Cascais. Until there, the Portuguese decisions on public-private partnerships were based on the best bid. Since 2003, a discount rate of 6,08 % was decided, when evaluating public-private partnerships. However, even that discount rate was only applied in the 2006 public-private partnerships for the new Braga and the new Cascais hospital.

The example that we will use, is the most controversial public-private partnerships in Portugal, the SCUT² highway project. This was divided in seven procedures, during 1999 and 2001. Since it was setup, there has been a strong discussion and controversy whether this was the best option, and if these public-private partnerships have, in fact, delivered Value for Money to the public sector.

The SCUT public-private partnerships were designed for a total of construction of 930 km of highways, with a shadow toll payment, where the state budget, rather than the users, pays to the private consortium. The State has arranged with the private bidders an annual year payment for the utilization of the roads, using therefore the taxpayer's money instead of charging directly to the users. These payments were structured in three bands:

Band A: a payment of x per vehicle per km for the first $(a \cdot 1,000)$ vpd/km³.

Band B: a payment of y per vehicle per km for the next $(b \cdot 1,000)$ vpd/km.

Band C: All higher levels of vpd/vkm – no payment.

The main argument for that arrangement was that most of the highways were in poor regions, and that the construction of these facilities would help to develop those regions. However, only 55% of the total km was in regions with these characteristics, what suggest that somehow this public benefit was unfair. Criticism over the SCUT agreement have also rely on affordability, mainly because the state payments were delayed to start on 2006, and there was no accommodation on the fiscal sustainability of the budget, considering that since 2001 that Portugal has been facing fiscal constraint regarding deficit. In fact, to pay for the annual SCUT fee from 2006 to 2020, is necessary to allocate every year, 20% of VAT revenues, or 27% of income tax, or the total annual budget of the ministry of transports.

² SCUT: Sem Custos para o Utilizador (Without Costs to the User)

³ Vpd: Veículos por dia (vehicles per day)

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

When setting up the SCUT public-private partnerships, there was no public sector comparator from the government. That was, in our opinion, one of the major reasons for the discussion on whether this decision created Value for Money or not. The decision to use public-private partnerships was not based on any financial analysis, and there was no idea of what would be the cost of doing it by the public sector. This was also a conclusion of the 2003 audit on public-private partnerships, from the Court of Audits of Portugal. In fact, there was no study on the economy, efficiency and effectiveness of these public-private partnerships.

A risk analysis was also misguided in this negotiation. The audit referred that for instance, in the SCUT Beira Litoral, the bidder that won has transferred less risks than other proposal. As an example, that the bidder didn't take the risks of tunnel construction, making the public sector pay an extra cost of 1 km of tunnels, making the proposal more expensive than the initially negotiated.

In the public-private partnerships SCUT, the public sector has accepted some risks that should have been under the private sector (like the risk of widen the roads due to more traffic, or the costs of eminent domain), and other where set up to the private sector, when they should have remained in the public side (e.g: the environmental studies and projects). Other aspects related with risk assessment, is that the risks retained by the public sector where not calculated.

The fact is that Portugal has set up a large number of public-private partnerships in a short period of time, without assuring that the public sector was capable of managing that. The new experience, add to the fact that the Portuguese administrations was not prepared for such a level of complexity and technique, was one of the factors that lead to some bad decisions in this area. Additional to that, was also the fact that there was no legal framework until 2003, and until that date, the participation of the Ministry of Finance was very reduced, if not say it, almost none. Instead of launching a high number of public-private partnerships, a pilot experience should have been made. This is particularly true in the Health sector, where from 2002 to 2009 10 public-private partnerships where launched, without any experience, and in a very complex model, with no parallel in any other country.

In the health sector, some reasons where appointed to the failure of the public-private partnerships concessions: the complexity of the model, which make the analyses very technical, and therefore, more likely for errors, the absence of similar international experiences, the lack of experience and qualified human resources in public-private

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

partnerships in the health ministry, the red tape costs, the high number of public-private partnerships and the investment associated, the failure to comply with the deadlines for the several procedures and the inflexibility of the bidder procedures.

6. DATA

In the SCUT project, the payments agreed by the state, in 2000, were according to Exhibit 3.

They were programmed to start in 2006, and finished by 2031.

The Portuguese Republic interest rate debt in 2003, for a 10 year maturity, was 4.5%.

Therefore, the NPV of the payments is around 7.98 billion € (in 2002):

In 2003, the Portuguese government decides to use a 6% discount rate for public-private partnerships project. Using that rate, the NPV of the payments is around 6.65 billion € (in 2002):

Assuming that this 930 km could have been built and maintained by the public sector, what would have been the cost?

Although the cost of a highway depends on the localization, due to the field constraint, most of these roads were built in the north and center of Portugal, with a more difficult terrain. Data provided by BRISA (the larger operator on highways in Portugal, which nowadays has more than 1,500 km of concessions, and in 2001 was mainly public-owned and had around 1,000 km) in 2001 (Exhibit 8).

The total cost for the private sector was around 3 billion €, as according to Exhibit 10.

To this value we must add the cost of larger reparations of the highways. We estimate a need for such reparations every 10 years, with a cost of 10% of the construction cost per km, as so, 290 million € 10 years after the operation started (in 2013), and that value adjusted to the inflation another 10 years after (in 2023, with the value of 350 million €). The discount factor for the capital expenditure will be the same used to discount the future payments to the public-private partnerships: 4.5% or 6%

There is no widely accepted process for determining the costs associated with performing highway maintenance if done by the transportation agency itself.

The annual cost of maintenance and operating highways for Brisa represents around 30% of sales, and that was in 2001 around 150 million € (30%*500 million € - Exhibit 9). That represents a cost of maintenance and operating of 190,000 € by km. During the next years,

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

from 2003 to 2009 the annual cost of operating and maintenance by km was around 150,000 €. Having the SCUT 930 km, that would mean an operating cost of 140 million a year. However Brisa has some operational costs that SCUT does not have, mainly regarding the charging of tolls. A large part of the Brisa operational costs are regarding tolls and those costs do not exist in SCUT. Although data is not available, we will use the data provided by the Portuguese Public Road Institute (Estradas de Portugal) to the new “AETransmontana”⁴, a SCUT launched in 2007, was of 65,000 € per km in maintenance and operational costs.

So, the annual cost of maintenance and operating of the SCUT would be of 50, 6 million € in the first year. We use 3% estimation for the annual growth of these costs.

For calculating the corporate tax, we have estimated the financial statements of the private operators (Exhibit 11). We used the agreed payments, the operational costs and a debt with a maturity over 20 years and an average cost of debt of 6, 75% (Exhibit 12).

The major risks to be transferred to private sector in public-private partnerships can be enumerated as the following ones: construction risks, demand risks, operation and maintenance risks.

For the construction risks, the fact that the private bidders where all construction firms, had significantly reduce that risk. This is a risk, usually aligned with environmental projects, archaeology discoveries or costs with eminent domain. We do not think that this level of risk was higher.

In the Scuts, the actual demand risk transfer to the private sector has been limited: Band A has been setup for traffic level that was ensured that the lenders are taking little real traffic risk. Once there is only a limit in revenues for a high level of traffic, the level of demand risk is reduce. The fact is that this model of payment ensures the future cash-flows, which made the project much less riskier. This fact was disclosed by the financial institutions, once the average Debt is 90% of the capital expenditure.

Once there is no data available for this part of the public sector comparator (mainly because studies are not available, once they were considered confidential), we will use an estimation

⁴ Source: Banco Efisa – Análise da viabilidade económica

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

of 10% of the total value of the project for the construction risks, and 10% of the operational costs for the maintenance risk.

For the risk transfer to the private sector, literature tends to consider the risk level on transport as low or medium low. As an example, Australia (Victoria Partnerships), use a low level band for roads with no tolls, giving a $\beta_i = 0,5$, with a market risk premium of 6%, a real risk free rate of 3%, for a discount rate of 6,5%.

The discount factor for the tax income is calculated by using the CAPM:

$$CAPM: E(R_i) = R_f + \beta_i [E(R_m) - R_f]$$

Where $R_f = 4.5\%$; $\beta_i = 3.875$; $E(R_m) = 5.5\% + 4.5 = 10\%$

Having $\beta_L = \beta_u [1 + D/E (1-t)] = 0.5 * [1 + 9 * (1-0.25)] = 3.875$

Where $E(R_i) = 4.5\% + 3.875 * (10\% - 4.5\%) = 25.8\%$

The discount factor for the operational costs and the risks transferred to public-private partnerships is:

$$RU = RF + \beta_u *(Rm-RF) = 4.5\% + 0,5 * 5.5\% = 4.5\% + 2.25\% = 6.75\%$$

7. RESULTS

Exhibit 3 – Annual payments to the public-private partnerships SCUT, with a 4, 5% discount rate (in thousands of €)

YEAR	ANNUAL PAYMENT - m€	Discount factor	NPV Payments	Taxes	Discount factor	NPV Taxes	NPV PPP
2003	22,032	1.045	21,083	0	1.258	0	21,083
2004	51,471	1.092	47,134	0	1.583	0	47,134
2005	253,729	1.141	222,342	0	1.991	0	222,342
2006	329,272	1.193	276,115	0	2.505	0	276,115
2007	588,523	1.246	472,261	0	3.151	0	472,261
2008	658,658	1.302	505,781	12,964	3.964	3,271	502,510
2009	668,124	1.361	490,957	90,519	4.986	18,154	472,802
2010	678,644	1.422	477,212	94,872	6.273	15,125	462,087
2011	704,005	1.486	473,728	102,922	7.891	13,043	460,685
2012	695,867	1.553	448,088	102,581	9.927	10,334	437,754
2013	650,085	1.623	400,582	92,815	12.488	7,432	393,149
2014	667,784	1.696	393,768	98,903	15.710	6,296	387,472
2015	682,721	1.772	385,240	104,284	19.763	5,277	379,963
2016	662,584	1.852	357,777	100,880	24.862	4,058	353,720
2017	686,006	1.935	354,473	108,348	31.276	3,464	351,009
2018	645,482	2.022	319,171	99,813	39.345	2,537	316,634
2019	666,629	2.113	315,433	106,676	49.496	2,155	313,278
2020	661,835	2.208	299,679	107,036	62.266	1,719	297,960
2021	610,931	2.308	264,717	95,849	78.331	1,224	263,494
2022	618,968	2.412	256,651	99,377	98.540	1,008	255,642
2023	609,800	2.520	241,961	98,583	123.963	795	241,166
2024	575,704	2.634	218,595	91,536	155.946	587	218,008
2025	530,530	2.752	192,768	81,698	196.180	416	192,352
2026	424,213	2.876	147,500	54,346	246.794	220	147,280
2027	393,297	3.005	130,862	45,822	310.467	148	130,714
2028	393,755	3.141	125,373	45,118	390.568	116	125,257
2029	370,162	3.282	112,785	38,376	491.335	78	112,707
2030	281,947	3.430	82,207	15,454	618.099	25	82,182
2031	171,118	3.584	47,744	0	777.568	0	47,744
TOTAL	14,953,876		8,081,988			97,482	7,984,506

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Exhibit 4 – Annual payments to the public-private partnerships SCUT, with a 6% discount rate (in thousands of €)

YEAR	ANNUAL PAYMENT - m€	Discount factor	NPV Payments	Taxes	Discount factor	NPV Taxes	NPV PPP
2003	22,032	1.060	20,785	0	1.258	0	20,785
2004	51,471	1.124	45,809	0	1.583	0	45,809
2005	253,729	1.191	213,036	0	1.991	0	213,036
2006	329,272	1.262	260,814	0	2.505	0	260,814
2007	588,523	1.338	439,779	0	3.151	0	439,779
2008	658,658	1.419	464,328	12,964	3.964	3,271	461,057
2009	668,124	1.504	444,341	90,519	4.986	18,154	426,187
2010	678,644	1.594	425,790	94,872	6.273	15,125	410,665
2011	704,005	1.689	416,699	102,922	7.891	13,043	403,656
2012	695,867	1.791	388,568	102,581	9.927	10,334	378,235
2013	650,085	1.898	342,457	92,815	12.488	7,432	335,024
2014	667,784	2.012	331,868	98,903	15.710	6,296	325,573
2015	682,721	2.133	320,086	104,284	19.763	5,277	314,809
2016	662,584	2.261	293,062	100,880	24.862	4,058	289,004
2017	686,006	2.397	286,246	108,348	31.276	3,464	282,782
2018	645,482	2.540	254,092	99,813	39.345	2,537	251,555
2019	666,629	2.693	247,562	106,676	49.496	2,155	245,407
2020	661,835	2.854	231,870	107,036	62.266	1,719	230,151
2021	610,931	3.026	201,921	95,849	78.331	1,224	200,697
2022	618,968	3.207	192,997	99,377	98.540	1,008	191,989
2023	609,800	3.400	179,376	98,583	123.963	795	178,581
2024	575,704	3.604	159,761	91,536	155.946	587	159,174
2025	530,530	3.820	138,891	81,698	196.180	416	138,475
2026	424,213	4.049	104,772	54,346	246.794	220	104,551
2027	393,297	4.292	91,638	45,822	310.467	148	91,490
2028	393,755	4.549	86,551	45,118	390.568	116	86,436
2029	370,162	4.822	76,760	38,376	491.335	78	76,682
2030	281,947	5.112	55,157	15,454	618.099	25	55,132
2031	171,118	5.418	31,581	0	777.568	0	31,581
TOTAL	14,953,876		6,746,596			97,482	6,649,114

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Exhibit 5 – NPV of the two scenarios of the PSC (Rf=4.5 and Rf=6%)(in thousands of €)

YEAR	NPV case 1, Rf= 4,5%				NPV case 1, Rf= 6%			
	Capex	Op costs and risks transfer	Taxes	TOTAL NPV	Capex	Op costs and risks transfer	Taxes	TOTAL NPV
1999	574,163	53,786	0	627,948	566,038	53,786	0	619,823
2000	549,438	48,215	0	597,653	533,998	48,215	0	582,213
2001	525,778	89,000	0	614,778	503,772	89,000	0	592,772
2002	503,137	82,915	0	586,052	475,256	82,915	0	558,171
2003	481,471	77,351	0	558,821	448,355	77,351	0	525,706
2004	0	41,122	0	41,122	0	41,122	0	41,122
2005	0	39,677	0	39,677	0	39,677	0	39,677
2006	0	38,283	0	38,283	0	38,283	0	38,283
2007	0	36,938	0	36,938	0	36,938	0	36,938
2008	0	35,641	1,306	36,947	0	35,641	1,306	36,947
2009	0	34,389	7,249	41,637	0	34,389	7,249	41,637
2010	0	33,181	6,039	39,220	0	33,181	6,039	39,220
2011	0	32,015	5,208	37,223	0	32,015	5,208	37,223
2012	0	30,890	4,126	35,017	0	30,890	4,126	35,017
2013	149,849	35,431	2,968	188,247	121,007	35,431	2,968	159,405
2014	0	28,758	2,514	31,272	0	28,758	2,514	31,272
2015	0	27,748	2,107	29,855	0	27,748	2,107	29,855
2016	0	26,773	1,620	28,393	0	26,773	1,620	28,393
2017	0	25,833	1,383	27,216	0	25,833	1,383	27,216
2018	0	24,925	1,013	25,938	0	24,925	1,013	25,938
2019	0	24,050	861	24,910	0	24,050	861	24,910
2020	0	23,205	686	23,891	0	23,205	686	23,891
2021	0	22,390	489	22,878	0	22,390	489	22,878
2022	0	21,603	403	22,006	0	21,603	403	22,006
2023	0	20,844	318	21,162	0	20,844	318	21,162
2024	111,441	22,151	234	133,827	76,934	22,151	234	99,319
2025	0	19,406	166	19,572	0	19,406	166	19,572
2026	0	18,724	88	18,812	0	18,724	88	18,812
2027	0	18,066	59	18,125	0	18,066	59	18,125
2028	0	17,431	46	17,478	0	17,431	46	17,478
2029	0	16,819	31	16,850	0	16,819	31	16,850
2030	0	16,228	10	16,238	0	16,228	10	16,238
2031	0	15,658	0	15,658	0	15,658	0	15,658
	2,895,276	1,099,447	38,923	4,033,646	2,725,359	1,099,447	38,923	3,863,729

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Exhibit 6 – NPV of the two base scenario of PPP and PSC(in thousands of €)

	Rf= 4.5%		Rf= 6%	
	PSC	PPP	PSC	PPP
NPV of cost of public-sector procurement (including capital and operational expenditure)	3,688,988		3,519,071	
NPV of Service Fees - NPV of tax		7,984,506		6,649,114
NPV of risk adjustments	305,735		305,735	
NPV of additional tax	38,923		38,923	
Risk-Adjusted NPV cost	4,033,646	7,984,506	3,863,729	6,649,114

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Exhibit 7– NPV sensitivity analyze, with a Rf= 4, 5% (in thousands of €)

Operational costs	Capital Expenditures									
	Case based	Δ with PPP	Δ = 10%	Δ with PPP	Δ = 20%	Δ with PPP	Δ = 50%	Δ with PPP	Δ = 100%	Δ with PPP
Base-Case	4,033,646	-3,950,861	4,347,481	-3,637,025	4,639,219	-3,345,287	5,514,431	-2,470,075	6,973,118	-1,011,388
Δ = 10%	4,113,017	-3,871,489	4,457,980	-3,526,526	4,772,404	-3,212,102	5,715,677	-2,268,829	7,287,798	-696,709
Δ = 20%	4,192,388	-3,792,118	4,545,289	-3,439,218	4,859,713	-3,124,793	5,802,985	-2,181,521	7,375,106	-609,400
Δ = 50%	4,430,502	-3,554,004	4,807,214	-3,177,293	5,121,638	-2,862,868	6,064,910	-1,919,596	7,637,031	-347,475
Δ = 100%	4,827,358	-3,157,148	5,243,756	-2,740,751	5,558,180	-2,426,327	6,501,452	-1,483,054	8,073,573	89,067

Exhibit 8 – NPV sensitivity analyze, with a Rf= 6%

Operational costs	Capital Expenditures									
	Case based	Δ with PPP	Δ = 10%	Δ with PPP	Δ = 20%	Δ with PPP	Δ = 50%	Δ with PPP	Δ = 100%	Δ with PPP
Base-Case	3,863,729	-2,785,385	4,140,318	-2,508,796	4,427,834	-2,221,280	5,250,199	-1,398,914	6,620,809	-28,304
Δ = 10%	3,943,100	-2,706,014	3,943,100	-2,706,014	4,507,205	-2,141,909	5,329,571	-1,319,543	6,700,180	51,067
Δ = 20%	4,022,471	-2,626,643	4,299,061	-2,350,053	4,586,576	-2,062,538	5,408,942	-1,240,172	6,779,552	130,438
Δ = 50%	4,260,585	-2,388,529	4,537,174	-2,111,939	4,824,690	-1,824,424	5,647,056	-1,002,058	7,017,665	368,552
Δ = 100%	4,657,441	-1,991,673	4,934,030	-1,715,083	5,221,546	-1,427,568	6,043,912	-605,202	7,414,522	765,408

8. CONCLUSION

In this work we intend to provide an overview of how public-private partnerships are evaluated in terms of creating Value for Money to the public sector. We have realized that literature is less than unanimous about whether public-private partnerships create Value for Money or not. We have proposed a financial analysis, using the public sector comparator prior to the bid as the best option to do this type of valuation. This analysis is based on the NPV of the public-private partnerships payments and corporate taxes revenues versus the cost of doing it by public sector procurement, using the NPV of the cost of investment, operation and maintenance, risk transfer and corporate tax revenues lost. We also have established some guidelines to assess what discount rate should be used for each type of future out-flow.

For a credible and independent analysis, there are three conditions: First, there must be no pre-decision of doing it by public-private partnerships in order to put the investment off-budget, due to fiscal constraints; second, there has to be affordability when deciding the investment, and third, the investment should be the best allocation for the public resources. This final condition is essential to understand the scope of this work. We are not discussing if the investment must or must not be done. That must have been already analyzed and decided. The point in this paper is whether to do it by a traditional procurement or public-private partnerships. That is, which is the one that brings more Value for Money to the public sector?

We have used the SCUT experience in Portugal for analysis. The results confirm that the decision of using public-private partnerships in the conditions setup in those contracts did not add Value for Money to the public sector. Having made it by a traditional procurement would have resulted in much less costs, even when considering that public sector tends to be less efficient. We find that doing it with the same costs (our base scenario), would cost less two or three billion €, when considering 4.5% or 6% as the R_f . Even with a 50% extra cost of capital expenditure and operating costs would still had a better solution to do it in a public procurement instead of this public-private partnerships.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

The level of risk transfer to the privates in the SCUTS was very low, and that has undermined the performance of the public-private partnerships. We question whether a shadow-toll system is the most appropriated one.

We concluded that the negotiation of the SCUTS public-private partnerships was not correctly driven, mainly because no studies were made prior to the negotiation. Having done a public sector comparator would show that the bidders offer was unrealistic, and that taxpayer's money could have been saved.

It is important to refer that the result here obtained does not necessarily mean that public-private partnerships should not be considered as a valid option for the public sector. They are indeed. When considering the level of public debt and the needs for investments in replacing or creating new infra-structures, private sector efficiency and capability of raising debt is crucial for these efforts. However, it is important to understand that this work has been limited in analyses that have been produced. One of the open questions is the externalities impact of building these roads, when considering that the option might have been not build it at all. It is necessary to calculate the economic impact of this investment, using the Social Time Preference Rate.

What we have clearly claimed is that there should be no prejudiced belief in public-private partnerships, and those should be looked without no ideological or other type of already held idea. This is valid for those who believe that the simple fact that being made by private sector is guarantee of better efficiency, and for those that don't believe in private sector virtues.

International experience and results on whether public-private partnerships create value for money are not entirely consensual. Some studies refer that public-private partnerships have created Value for Money, by reducing costs, deadlines or improving services. In some cases, criticism over those studies has been made, and the argument that a comparison between the performance of a public-private partnerships and traditional procurement might be biased in favour of public-private partnerships. But many projects all over the world have failed, with the public-private partnerships returning to public management.

According to a United Kingdom National Audit Office report, public-private partnerships in that country have been delivered on time and on budget more often than traditional

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

procurement. Traditional procurement has been on time and on budget only 30% of the times, while public-private partnerships have been on time and on budget around 70% of the times⁵.

We argue that public-private partnerships are a good solution, but only when the public sector is capable of negotiating with the private bidders, knowing exactly what are the limits of that negotiations, and what is the point where there are no more advantages to go to a private solution.

In fact, public-private partnerships have the potential to promote greater levels of efficiency by involving the private sector. However, that will only happen if the efficiency earnings became larger than the higher cost of finance that private sector has, due to higher interest rates. This can be achieved by having private sector invest in reducing lifecycle costs, by using higher standards in construction, more frequency in maintenance and investing in new technology, or simply by having a better management and a simpler process..

⁵ PFI Delivering better value for money from the Private Finance Initiative

9. REFERENCES

Monografias(livros):

OECD (2008), *Public Private Partnerships: in pursuit of risk sharing and value for money*.

Contribuições para trabalho colectivo

Arrow, L & Lind, R. C, (1970). Uncertainty and the evaluation of public investment decisions, *American Economic Review*, vol. 60, pp 364-378.

Ball, Rob, Heafey, Maryanne and King, Dave (2007) The Private Finance Initiative in the UK', *Public Management Review*, 9:2, 289-310.

Broadbent, J & Laughlin, R. (2003), Public private partnerships: An introduction. Accounting, *Auditing and Accountability Journal*, 16(3), 332-511.

Currie, D. (2000), Funding the London Underground Regulation Initiative, Discussion Paper 35, London Business School.

Grout, P. (1997), The economics of the private finance initiative, *Oxford Review of Economics Policy*, 13(4), 53-66.

Grout, P (2003). Public and private sector discount rates in public-private partnerships, *The Economic Journal*, 113 (486). C62-C68.

Grout, P & Sonderegger, S (2006), Simple money-based tests for choosing between private and public delivery: a discussion of the issues. *Review of Industrial Organization* (2006) 29: 93-126.

Grimsey, D., Lewis, M.K (2000). "Evaluating the risks of public-private partnerships for infrastructure projects", *International Journal of Project Management* 20 (2002), 107-118.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Grimsey, D., Lewis, M.K (2005). “Are Public Private Partnerships Value for Money? Evaluating alternative approaches and comparing academic and practitioner views”. *Accounting Forum*, 29 (2005), 345-348.

Grimsey, D., Lewis, M.K (2007). “Public Private Partnerships and Public Procurement”, *Agenda*, Volume 14, Number 2, 2007, pages 171-188.

Hart, O. (2003), Incomplete Contracts and Public Ownership: Remarks and an Application to Public-Private Partnerships, *Economic Journal* 113 (486): C69-C76

Heald, D. (2003), Value for money tests and accounting treatment in PFI schemes. *Accounting, Auditing and Accountability Journal*, 16(3), 342-371.

Morallos, D., Amekudzi, A (2008). “The State of the Practice of Value for Money Analyses in comparing Public Private Partnerships to traditional Procurement”. *Public Works Management and Policy*, Vol. 13, number 2, 114-125.

Parker, D. Hartlhey, K. (2003), Transaction costs, relational contracting and public-private partnerships: A case study of UK defense. *Journal of Purchasing and Supply Management*.

Shaoul, J. (2005), A critical financial analysis of the Private Finance Initiative: Selecting a financing method or allocating economic wealth? *Critical Perspectives in Accounting*, 16(4), 441-471.

Spackman, M. (2002). “Public– Private Partnerships: lessons from the British approach”; *Economic Systems*, 26 (2002) 283–301.

Working papers

Arthur Andersen (2000), Value for money drivers in the private finance initiative, London: Arthur Andersen and Enterprise LSE.

Fitzgerald, P. (2004), Review of Partnerships Victoria Provided Infrastructure: Final Report to the Treasurer, Growth Solutions Group, Melbourne, Australia.

10.APPENDIX

Exhibit 9 – Financial indicators of BRISA in 2001

N° of km of highways	789.5
Assets valuation - highways	2 865 784 212
Total Operational Revenues	476 998 882
Total Operational Costs	63 930 654
Depreciations and amortizations	91 875 292

In € - Source: Brisa 2001 Financial Statements

Exhibit 10 – Financial indicators of BRISA 2003-2007

YEAR	2003	2004	2005	2006	2007
SALES - Million €	560	574	577	586	646
EBITDA - Million €	403	424	418	418	460
EBITDA - %	72%	74%	72%	71%	71%
Operational Costs - m€	157,000	163,000	159,000	168,000	187,000
ROE	16%	12%	18%	11%	15%
N° km	1,000	1106	1,106	1106	1346
Operational Costs by km (m €)	157	147	144	152	139

Source: Brisa Annual Financial Reports.

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Exhibit 11– Capital Expenditures of the public-private partnerships SCUT

PPP	Nº KM	Capex - M€
SCUT Beira Interior	178	438
SCUT Interior Norte	155	499
SCUT Algarve	129	243
SCUT Costa de Prata	105	298
SCUT Grande Porto	72	465
SCUT Beiras litoral e alta	176	753
SCUT do Norte Litoral	115	228
TOTAL	930	2,924

Source: Portuguese Public Road Institute (Estradas de Portugal).

Exhibit 12 – Financial indicators of the private operators of SCUTS

	Beira Interior	Interior Norte	Algarve	Costa de Prata	Beiras litoral e alta	Norte Litoral	TOTAL
Capex	438,000	499,000	243,000	298,000	753,000	228,000	2,459,000
Debt - %	90.60%	98.00%	83.10%	91.30%	91.20%	76.00%	90.28%
Debt	396,828	489,020	201,933	272,074	686,736	173,280	2,219,871
Equity - %	9.40%	2.00%	16.90%	8.70%	8.80%	24.00%	9.72%
Equity	41,172	9,980	41,067	25,926	66,264	54,720	239,129
Debt/Equity	10	49	5	10	10	3	9
Cost of Debt	8.83%	6.09%	6.30%	5.92%	6.33%	7.38%	6.75%
Cost of Equity	13.00%	13.18%	7.72%	11.89%	13.10%	6.41%	10.50%
tax	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
WACC	7.22%	4.74%	5.23%	5.09%	5.48%	5.75%	5.59%
IRR (before tax)	7.35%	9.59%	6.67%	8.43%	9.24%	6.68%	N/A
Source: IEP - Portuguese Public Road Institute							

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Exhibit 13– NPV of the risk-free costs of the PSC, using a 4,5% discount rate

YEAR	CAPEX	Great reparations	CSP risk-free	Discount factor	NPV risk-free costs
1999	600,000	0	600,000	1.045	574,163
2000	600,000	0	600,000	1.092	549,438
2001	600,000	0	600,000	1.141	525,778
2002	600,000	0	600,000	1.193	503,137
2003	600,000	0	600,000	1.246	481,471
2004	0	0	0	1.302	0
2005	0	0	0	1.361	0
2006	0	0	0	1.422	0
2007	0	0	0	1.486	0
2008	0	0	0	1.553	0
2009	0	0	0	1.623	0
2010	0	0	0	1.696	0
2011	0	0	0	1.772	0
2012	0	0	0	1.852	0
2013	0	290,000	290,000	1.935	149,849
2014	0	0	0	2.022	0
2015	0	0	0	2.113	0
2016	0	0	0	2.208	0
2017	0	0	0	2.308	0
2018	0	0	0	2.412	0
2019	0	0	0	2.520	0
2020	0	0	0	2.634	0
2021	0	0	0	2.752	0
2022	0	0	0	2.876	0
2023	0	0	0	3.005	0
2024	0	350,000	350,000	3.141	111,441
2025	0	0	0	3.282	0
2026	0	0	0	3.430	0
2027	0	0	0	3.584	0
2028	0	0	0	3.745	0
2029	0	0	0	3.914	0
2030	0	0	0	4.090	0
2031	0	0	0	4.274	0

2,895,276

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Exhibit 14 – NPV of the risk-free costs of the PSC, using a 6% discount rate

YEAR	CAPEX	Great reparations	CSP risk-free	Discount factor	NPV risk-free costs
1999	660,000	0	660,000	1.060	622,642
2000	660,000	0	660,000	1.124	587,398
2001	660,000	0	660,000	1.191	554,149
2002	660,000	0	660,000	1.262	522,782
2003	660,000	0	660,000	1.338	493,190
2004	0	0	0	1.419	0
2005	0	0	0	1.504	0
2006	0	0	0	1.594	0
2007	0	0	0	1.689	0
2008	0	0	0	1.791	0
2009	0	0	0	1.898	0
2010	0	0	0	2.012	0
2011	0	0	0	2.133	0
2012	0	0	0	2.261	0
2013	0	330,000	330,000	2.397	137,697
2014	0	0	0	2.540	0
2015	0	0	0	2.693	0
2016	0	0	0	2.854	0
2017	0	0	0	3.026	0
2018	0	0	0	3.207	0
2019	0	0	0	3.400	0
2020	0	0	0	3.604	0
2021	0	0	0	3.820	0
2022	0	0	0	4.049	0
2023	0	0	0	4.292	0
2024	0	382,560	382,560	4.549	84,091
2025	0	0	0	4.822	0
2026	0	0	0	5.112	0
2027	0	0	0	5.418	0
2028	0	0	0	5.743	0
2029	0	0	0	6.088	0
2030	0	0	0	6.453	0
2031	0	0	0	6.841	0
					3,001,948

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Exhibit 15 – NPV of the operational costs and risk transfer to the private of the PSC, using 6.75% discount rate

YEAR	Operating costs	Risk transfer to PPP	CSP op costs + risk costs	Discount factor	NVP Op costs + risk costs
1999	0	57,416	57,416	1.068	53,786
2000	0	54,944	54,944	1.140	48,215
2001	50,626	57,640	108,266	1.216	89,000
2002	52,145	55,528	107,673	1.299	82,915
2003	53,709	53,518	107,227	1.386	77,351
2004	55,320	5,532	60,852	1.480	41,122
2005	56,980	5,698	62,678	1.580	39,677
2006	58,689	5,869	64,558	1.686	38,283
2007	60,450	6,045	66,495	1.800	36,938
2008	62,264	6,226	68,490	1.922	35,641
2009	64,131	6,413	70,545	2.051	34,389
2010	66,055	6,606	72,661	2.190	33,181
2011	68,037	6,804	74,841	2.338	32,015
2012	70,078	7,008	77,086	2.495	30,890
2013	72,180	22,203	94,383	2.664	35,431
2014	74,346	7,435	81,780	2.844	28,758
2015	76,576	7,658	84,234	3.036	27,748
2016	78,874	7,887	86,761	3.241	26,773
2017	81,240	8,124	89,364	3.459	25,833
2018	83,677	8,368	92,045	3.693	24,925
2019	86,187	8,619	94,806	3.942	24,050
2020	88,773	8,877	97,650	4.208	23,205
2021	91,436	9,144	100,580	4.492	22,390
2022	94,179	9,418	103,597	4.795	21,603
2023	97,005	9,700	106,705	5.119	20,844
2024	99,915	21,136	121,050	5.465	22,151
2025	102,912	10,291	113,203	5.834	19,406
2026	105,999	10,600	116,599	6.227	18,724
2027	109,179	10,918	120,097	6.648	18,066
2028	112,455	11,245	123,700	7.096	17,431
2029	115,828	11,583	127,411	7.575	16,819
2030	119,303	11,930	131,234	8.087	16,228
2031	122,882	12,288	135,171	8.633	15,658
					1,099,447

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Exhibit 16 – Calculating the corporate taxes

YEARS	Revenues	Operating Costs	EBITDA	Amortizations	EBIT	Interests	EBT	Tax benefit	Tax rate	Taxes
2003	22,032	53,709	-31,677	100,828	-132,505	149,908	-282,413	-282,413	0.25	0
2004	51,471	55,320	-3,849	100,828	-104,677	149,908	-254,585	-536,998	0.25	0
2005	253,729	56,980	196,749	100,828	95,921	149,908	-53,987	-590,985	0.25	0
2006	329,272	58,689	270,583	100,828	169,755	149,908	19,847	-571,138	0.25	0
2007	588,523	60,450	528,073	100,828	427,245	149,908	277,337	-293,801	0.25	0
2008	658,658	62,264	596,395	100,828	495,567	149,908	345,659	51,858	0.25	12,964
2009	668,124	64,131	603,993	100,828	503,165	141,090	362,075	0	0.25	90,519
2010	678,644	66,055	612,589	100,828	511,761	132,272	379,489	0	0.25	94,872
2011	704,005	68,037	635,968	100,828	535,140	123,454	411,687	0	0.25	102,922
2012	695,867	70,078	625,789	100,828	524,961	114,636	410,326	0	0.25	102,581
2013	650,085	72,180	577,905	100,828	477,077	105,818	371,259	0	0.25	92,815
2014	667,784	74,346	593,438	100,828	492,611	96,999	395,611	0	0.25	98,903
2015	682,721	76,576	606,145	100,828	505,317	88,181	417,136	0	0.25	104,284
2016	662,584	78,874	583,710	100,828	482,883	79,363	403,520	0	0.25	100,880
2017	686,006	81,240	604,766	100,828	503,939	70,545	433,394	0	0.25	108,348
2018	645,482	83,677	561,805	100,828	460,977	61,727	399,251	0	0.25	99,813
2019	666,629	86,187	580,442	100,828	479,614	52,909	426,705	0	0.25	106,676
2020	661,835	88,773	573,062	100,828	472,235	44,091	428,144	0	0.25	107,036
2021	610,931	91,436	519,495	100,828	418,667	35,273	383,395	0	0.25	95,849
2022	618,968	94,179	524,789	100,828	423,961	26,454	397,507	0	0.25	99,377
2023	609,800	97,005	512,795	100,828	411,968	17,636	394,332	0	0.25	98,583
2024	575,704	99,915	475,789	100,828	374,962	8,818	366,144	0	0.25	91,536
2025	530,530	102,912	427,618	100,828	326,790	0	326,790	0	0.25	81,698
2026	424,213	105,999	318,214	100,828	217,386	0	217,386	0	0.25	54,346
2027	393,297	109,179	284,118	100,828	183,290	0	183,290	0	0.25	45,822
2028	393,755	112,455	281,300	100,828	180,473	0	180,473	0	0.25	45,118
2029	370,162	115,828	254,334	100,828	153,506	0	153,506	0	0.25	38,376
2030	281,947	119,303	162,644	100,828	61,816	0	61,816	0	0.25	15,454
2031	171,118	122,882	48,236	100,828	-52,592	0	-52,592	0	0.25	0

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Exhibit 17 – Calculating the interest costs

YEARS	DEBT	Interest rate	Repaiements	Interest costs	Debt Remained
2003	2,219,871	6.75%	0	149,908	2,219,871
2004	2,219,871	6.75%	0	149,908	2,219,871
2005	2,219,871	6.75%	0	149,908	2,219,871
2006	2,219,871	6.75%	0	149,908	2,219,871
2007	2,219,871	6.75%	0	149,908	2,219,871
2008	2,219,871	6.75%	130,581	149,908	2,089,290
2009	2,089,290	6.75%	130,581	141,090	1,958,710
2010	1,958,710	6.75%	130,581	132,272	1,828,129
2011	1,828,129	6.75%	130,581	123,454	1,697,548
2012	1,697,548	6.75%	130,581	114,636	1,566,968
2013	1,566,968	6.75%	130,581	105,818	1,436,387
2014	1,436,387	6.75%	130,581	96,999	1,305,806
2015	1,305,806	6.75%	130,581	88,181	1,175,226
2016	1,175,226	6.75%	130,581	79,363	1,044,645
2017	1,044,645	6.75%	130,581	70,545	914,065
2018	914,065	6.75%	130,581	61,727	783,484
2019	783,484	6.75%	130,581	52,909	652,903
2020	652,903	6.75%	130,581	44,091	522,323
2021	522,323	6.75%	130,581	35,273	391,742
2022	391,742	6.75%	130,581	26,454	261,161
2023	261,161	6.75%	130,581	17,636	130,581
2024	130,581	6.75%	130,581	8,818	0
2025	0	6.75%	0	0	0
2026	0	6.75%	0	0	0
2027	0	6.75%	0	0	0
2028	0	6.75%	0	0	0
2029	0	6.75%	0	0	0
2030	0	6.75%	0	0	0
2031	0	6.75%	0	0	0

DOES PUBLIC PRIVATE PARTNERSHIPS CREATE VALUE FOR MONEY TO THE PUBLIC SECTOR?

Exhibit 18 – NPV of Corporate taxes, using 25, 8% discount rate

YEAR	Corporate Taxes	Discount factor	NPV Taxes
1999	0	1.258	0
2000	0	1.583	0
2001	0	1.991	0
2002	0	2.505	0
2003	0	3.151	0
2004	0	3.964	0
2005	0	4.986	0
2006	0	6.273	0
2007	0	7.891	0
2008	12,964	9.927	1,306
2009	90,519	12.488	7,249
2010	94,872	15.710	6,039
2011	102,922	19.763	5,208
2012	102,581	24.862	4,126
2013	92,815	31.276	2,968
2014	98,903	39.345	2,514
2015	104,284	49.496	2,107
2016	100,880	62.266	1,620
2017	108,348	78.331	1,383
2018	99,813	98.540	1,013
2019	106,676	123.963	861
2020	107,036	155.946	686
2021	95,849	196.180	489
2022	99,377	246.794	403
2023	98,583	310.467	318
2024	91,536	390.568	234
2025	81,698	491.335	166
2026	54,346	618.099	88
2027	45,822	777.568	59
2028	45,118	978.181	46
2029	38,376	1230.552	31
2030	15,454	1548.034	10
2031	0	1947.427	0
			38,923