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MSc in Economics

Analysing profitability in the SCUTs: excessive returns and renegotiations

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Dissertation submitted in partial fulfillment of requirements for the degree of MSc in Economics, at the Universidade Católica Portuguesa,
June 2012

Abstract

Analysing profitability in the SCUTs: excessive returns and renegotiations

Marine Ribeiro Santos

The aim of this thesis is to study the existence of excessive returns in the Shadow tolls Road projects (SCUTs) in Portugal, exploiting the feasibility of renegotiating the contracts providing excessive rents at the government's benefice. The study analyses evidence on excessive returns by using a profitability assessment methodology, consisting in comparing an accurate profitability measure with a suitable benchmark. For the SCUTs showing evidence on excessive returns, renegotiations scenarios where these returns are readjusted to the "fair" level are constructed and simulated. We find that four of the seven SCUTs in Portugal – Interior Norte, Algarve, Beiras Litoral e Alta and Norte Litoral – show evidence on excessive returns for the period after the new payment model implementation (in 2010). We further estimate that renegotiating the State payments for these SCUTs permits savings of €837 Million in the aggregate SCUTs payments' present value. We also find that such levels of cut in the State payments lower the debt service coverage ratio of certain projects below the security level. Imposing renegotiations where the capacity of the firms to pay the debt is not threaten reduce the value of savings to €631Million.

Acknowledgments

Foremost, I would like to thank my academic advisers Ricardo Reis and Joaquim Sarmento for their thoughtful support and warm encouragement. The superior organization of the PPPs seminar was crucial for the work developed. Their knowledge and guidance throughout these months contributed significantly for the quality achieved.

I wish also to express my gratitude to Universidade Católica Portuguesa, for having given me the opportunity to learn Economics these last five years and having contributed for my grow as a person. I thank all the professors, who have provided me invaluable teaching and knowledge and to whom I owe the achievement of this thesis.

I must also thank all my friends at Católica, who had made possible that my academic experience was also an unforgettable personal experience. I am fortunate in having them as my colleagues and friends. For all the support and help during my thesis, I specially thank Duarte Ribeiro, Catarina Silva, João Cunha, Inês Freire, Francisca Horta, Francisco Augusto, Miguel Castel-Branco and Estela Lucas. I also thank my friend Vânia Urbano for her unconditional friendship.

Finally, and most important, I wish to thank my family. My parents, Marlene and António Santos, who gave me the opportunity to graduate, and additionally my sister Laura Santos for all the love and confidence they always demonstrated.

Contents

I. Introduction

In the last decades, Public-Private Partnerships (PPPs) have gained significant importance worldwide. In several developed and emerging countries, traditional public investment has been progressively substituted by the use of PPPs. One of the main drivers of this enhancement is the fact that PPPs allow governments to engage in huge infrastructure reforms requiring massive investments, even at moments where public funding is not available. Moreover, the use of private sector skills in order to increase the efficiency of the investments has been pointed out as another reason for the PPPs' choice.

Portugal was, in 2009, the European country with the largest amount of investment in PPPs as a percentage of GDP[1]. Presently, the country has €16 024 Million invested in partnerships contracts, and €20 501 Million in concession contracts[2]. Altogether, this accounts for a total investment of €36 525 Million which is equivalent to 23% of the national GDP (2011) and 46% of Government Budget spending (2012)[3]. Nevertheless, aside from all the advantages that infrastructure development could carry on, one has to consider that the amounts invested in PPPs are always converted into future obligations for the government, and consequently for the taxpayers. Currently, the present value of these obligations in Portugal reaches €26.005 Million (gross value) which represents around 15% of the National GDP (2011)[4]. With the debt crisis the country is facing, it seems that the affordability of the financial obligations associated to PPPs can be threatened. Hence the necessity of a deep review of the PPPs contracts has become urgent. In the Memorandum of Understanding negotiated between the government and international institutions (EU/ECB/IMF), several measures related to PPPs are stipulated, namely the need to: "(…) assess the feasibility to renegotiate any PPP or concession contract to reduce the Government financial obligations"[5].

However, to renegotiate PPPs contracts in order to effectively lessen the amount of obligations for the state is a complex request. The legal agreements in place are made to prevent possible damages in terms of financial equilibrium for each of the parties involved, which can represent a barrier to renegotiations. There are three main agents involved in the PPPs' renegotiation process: the Government, the private firms allocated to the project and

[1] European Investment Bank

[2] According to GASEPC – Gabinete de Acompanhamento do Sector Empresarial do Estado, Parcerias e Concessões, 2012. *Parcerias Público Privadas e concessões Boletim Informativo 4º trimestre 2011*, Lisbon

[3] See www.imf.org for the value of Portuguese GDP 2011 and www.dgo.pt for the value of Government Budget Spending. Authors' calculations.

[4] According to GASEPC – Gabinete de Acompanhamento do Sector Empresarial do Estado, Parcerias e Concessões, 2011. *Parcerias Público Privadas e concessões Relatório 2011,* Lisbon

[5] VV.AA, 2011. *Portugal: Memorandum Of Understanding On Specific Economic Policy Conditionality* pp. 12b

the banks engaged in the project financing. Each of these actors is impacted differently by the outcome of a renegotiation. An important question is that whatever the change in the contract is, the financial equilibrium of the project must be maintained during the length of the agreement, as well as the financial conditions for the banks involved.

In an attempt to reach a better understanding of government-led renegotiations' impact on each agent's payoff and on the project's profitability, this thesis intends to analyse the possibility of renegotiations in the Shadow toll Road projects (SCUTs – *Sem Custo para o Utilizador*) in Portugal. We study the SCUTs because they are currently the main target of renegotiations in Portugal and because the PPPs road sector is the most important in terms of amount invested and state obligations[6]. In this context, we propose as starting point of our analysis that the SCUTs potentially providing excessive returns are those where there are room for renegotiations, by means of readjusting these returns to the "fair" return. Our main research questions are:

- Is there evidence, from the profitability analysis of the SCUTs projects in Portugal, that point towards the existence of excessive returns?
- In case of strong evidence on excessive returns, which are the impacts of renegotiating the state payments to the "fair" level on: 1) Government financial obligations; 2) Project profitability; 3) Project's Debt Service Coverage Ratio?

In order to conduct our study we perform a profitability analysis of each one of the SCUTs projects, both historical (before the introduction of real tolls) and forecasted (according to the current agreements of state future payments). Then, we analyse possible scenarios of renegotiation that emerge from the profitability analysis and discuss their impact on the three main agents involved. Our profitability analysis is based on financial and economic literature on general firm valuation, valuation of public utilities and competition regulation. We rely on the methodology used in studies for the UK Office of Fair Trading[7], consisting in the comparison of projects' profitability against a suitable benchmark. The understanding of accurate measures of profitability and benchmarks was mainly based on the discussions provided by Fisher and McGowan (1983), Kay (1976), Edwards *et al.* (1987) and Copeland (1978). Further discussion on differences between excess and excessive returns was found in Grout and Zalewska (2008).

[6] According to GASEPC – Gabinete de Acompanhamento do Sector Empresarial do Estado, Parcerias e Concessões, 2011. *Parcerias Público Privadas e concessões Relatório 2011,* Lisbon

[7] Relevant Study: OXERA, 2003. *Assessing profitability in competition policy analysis*, OFT Economic Discussion Paper 6, July.

This thesis demonstrates that four of the seven SCUTs projects in Portugal show currently evidence on excessive returns, according to the methodology used. These are Interior Norte, Algarve, Beiras Litoral e Alta and Norte Litoral. Hence these results point towards the possibility to renegotiate the financial obligations of the State with these projects, by readjusting the returns to the non-excessive level. Without accounting for the decrease of the debt service coverage ratio below the security level (that we assume as being 1,1) resulting from renegotiations, the proposed renegotiation strategy enable the government to save globally €837 Million in present value of future payments. When we restrict the extent of the renegotiations to a level that guarantees the security threshold of the Debt Service Coverage Ratio the amount of total savings achieve €630 Million in terms of present value of future payments.

The remainder of this thesis is organized as follows. In Section II, we present the relevant literature. Section III presents the methodology detailing the data, the profitability assessment procedure and the renegotiations scenarios construction. Further, Section IV presents the results achieved in terms of historical and forecasted profitability and on the suggested renegotiations. Finally, in Section V we present the conclusion, limits and further work.

II. Literature Review

In this chapter, we first provide a brief definition of PPPs and a discussion of their main drivers. Then, concerning our further profitability analysis we describe in detail the different approaches to calculate excessive returns, looking at the different profitability measurements and how they are used to assess for excessive rents.

2.1. Public-Private Partnerships

According Grimsey and Lewis (2002: 108) PPPs can be defined as the "…an agreement where the public sector enters into long-term contractual agreements with private sector entities for the construction or management of public sector infrastructure facilities by the private sector entity, or the provision of services (using infrastructure facilities) by the private sector entity to the community on behalf of a public sector entity."

The drivers of the use of PPPs as a substitute of traditional public investment were discussed by Anumba *et al*. (2000). As driver of the public partner, they point out the fact that PPPs allow governments to engage in infrastructure development even at moments of borrowing

constraints. This is possible as investment in PPPs does not require raise of public funding and does not enter in the budget as debt, but as future financial obligations (the off-balance argument). Another driver of the PPPs' use is related with its potential efficiency increase in providing utilities, comparing with traditional public investment. This gain on efficiency should result from the incentives of the private side – whose objective is the maximization of profit – properly set through a given level of risk-sharing between the public and the private side. This gain on efficiency would lead to the achievement of higher value-for-money on investment. This argument has been widely debated by several authors, as Akintoye *et al.* (2003) who suggested that higher efficiency in PPPs is only verified under specific conditions, tough to guarantee in all situations. In what concerns the private side, the main drivers presented by Anumba *et al*. (2000) are essentially high returns on investments and profitability of the project. This usually results from the risk-sharing agreement behind the PPP contract. On one hand, it is related to the fact part of the investment is funded by debt that can be borrowed at low rates as payments by the public sector are of low risk. On the other hand, because the pattern of cash-flows itself follows a steady stream and is, at least partially, rid of demand risk.

Actually, it is worth looking at this feature of PPPs usually providing high returns for the private side. Kuehnle (1972) has discussed public utilities valuation, namely in the case of private-owned companies. The author suggested that the "fair" rate of return for this type of investment should be a rate that generates sufficient revenue to cover operating costs and additionally provides a "fair" rate that allows the recapture of the invested capital for the investors. Below this threshold, no private company will want to enter the investment, whereas above this one can assume the presence of an unfair situation. Hence, the payments to a private firm that perform public utilities might provide them a rate of return adequate in these terms.

2.2. Excessive returns assessment

In this subsection, we discuss in detail the different approaches to calculate excessive returns. It is worth mentioning that this is not a consensual matter in the literature. It is extremely hard to find a clear definition of excessive returns and the different profitability measures existent are quite controversial. As stated by Basil L. Copeland, Jr.:"you can now always find an economist somewhere who will testify that the fair return is some figure rather than another" (Copeland 1978: 348). Most of the literature dedicated to this theme was interested in measuring excessive returns associated to monopolistic behaviour. In UK, for example, many studies for the Competition Commission (CC) or the Office of Fair Trading (OFT) are indeed

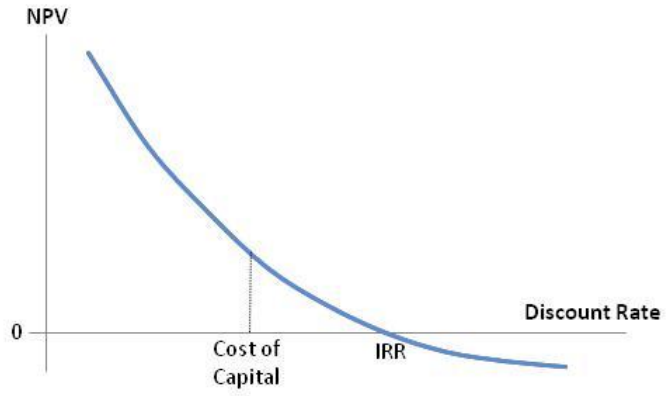
based on profitability analysis. The methodology described in one of this studies[8] for the OFT relies on the financial theory of firm valuation and might be applied to other analysis, like our study of PPPs. The idea of the study is to compare accurate profitability measures of a certain company with a suitable benchmark measure, so that if the profitability is "significantly" above the benchmark, there is indication of excessive returns.

a. Profitability Measures

In terms of profitability measures, the main debate in the literature has been centred on question of whether or not accounting data is suitable to be used as proper information of profitability. Authors as Fisher and McGowan (1983) argued that accounting rates of return are of totally misuse, whereas Kay (1976) followed by Edwards *et al.* (1987), cited in Stark (1989) proposed a close relationship between accounting and economic rates of return. Looking at the economic theory, we conclude that the rate of return should be the discount rate that equalizes to zero the *discounted future cash-flows of a firm* – the so called net present value (NPV). The rate of return that satisfies this condition is known as the economic rate of return or the internal rate of return (IRR). This rate corresponds to a hypothetical situation in which the firm is operating in a "perfectly competitive" market, thus gaining a "competitive profit" – zero. Fisher and McGowan (1983: 82) described it as the rate of return that is "equalized everywhere in a competitive economy in long-run equilibrium".

The IRR *per se* does not provide clear information about profitability. To obtain this information, it should be compared against the respective cost of capital, which is the rate used to discount future cash-flows and obtain the NPV. Thus if the cost of capital is smaller than the IRR, the NPV is higher than zero. The figure below shows graphically the relation between the three measures.

Figure 1 – Relation between NPV, IRR and Cost of Capital



Source – Authors

[8] Relevant Study: OXERA, 2003. *Assessing profitability in competition policy analysis*, OFT Economic Discussion Paper 6, July.

Although known as the more accurate measure of profitability, some conceptual problems have been associated to the IRR. One of the main concerns is the uncertainty related to future cash-flows used to obtain the IRR. In fact, both future costs and revenues depend on estimations for demand and prices which, in the long-run, are likely to be affected by unexpected shocks. In order to limit the impact of this issue, the solution suggested by Grout and Zalewska (2008) is to bind the time horizon for the calculation of the IRR, i.e. instead of using the lifetime of the project, to use a limited timeframe that corresponds to the period we want to analyse. The IRR calculated in this way is called the "Truncated" IRR (TIRR). Another question rose by Grout and Zalewska (2008) concerning the IRR is its sensibility to the pattern of cash-flows. For example, if a huge amount of costs are paid at the end of the project (closing costs) one could end up having two IRRs for the same project. In such cases, the comparison against the cost of capital becomes ambiguous as it is not possible to know for sure what the right IRR is. It may also happen that, only due to a different structure of cash-flows (related to outsourcing agreements, rentals processes, etc.) two projects with the same NPV and same cost of capital present different IRRs. Likewise, we might have a project that, when modified on one of its parameters, result in smaller NPV but higher IRR comparing with the previous situation. Once again, the interpretation of (excessive) profitability in these cases becomes quite difficult.

On account of these problems, authors like Edwards *et al.* (1987) cited in Stark (1989) argued that the IRR is not an appropriate measure to evaluate profitability of projects or firms as it may provide information conflicting with the information given by NPV. Nonetheless, the IRR is largely considered a reliable and consistent approach to calculate profitability if we bear in mind the situations with higher risk of misleading conclusions. In order to control for possible complications, when a profitability analysis is provided for projects that employ financial arrangements affecting the cash-flows' profile, one has to test for the IRR simulating situations where these processes are not in place. Thus it is possible to extract better information and to verify whether a high IRR is obtained by the cash-flows structure or by a possible unfair situation (market power, subsidization, etc.). Moreover, in parallel of the IRR it is important to use the information provided by the NPV and, if any, to assess for the origin of inconsistencies.

In addition to the Economic Rate of Return, one can consider the Accounting Rate of Return (ARR) as measure of profitability. The ARR is a book measure of profitability widely used, corresponding to the ratio of the reported profits of a certain period (Earnings before Interest and Taxes – EBIT) on the total assets at the beginning of the period. The ARR bears the advantage of being quite easy to understand and to obtain, as both EBIT and total Assets are

reported each year (at least) by firms. However, its use as a reliable measure of economic profitability has been often contested. Fisher and McGowan (1983) are authors who criticize the use of the ARR as an accurate profitability measure. They argue that accounting returns are not in fact economic returns as they fail in accounting for some capitalizations as "research and development" (Fisher and McGowan, 1983: 82) and, going further, that "accounting rates of return, even if properly and consistently measured, provide almost no information about economic rates of return". Considering this, they claim that having an ARR above the cost of capital does not mean necessarily that we are facing a positive NPV, as it is the case with the IRR. The reasons behind this idea are essentially related to the ARR's sensitivity to conventions used to calculate either the numerator (the EBIT) or the denominator (Total Assets). The fact that both depend much on, for example, the methodology used to calculate depreciations and assets value (could be historic value, replacement cost, deprival value, etc.) represents a failure of consistency of the ARR in providing reliable information about economic profits.

In spite of this, some authors argue in favour of the ARR as a suitable profitability measure. Actually, J. A. Kay (1976) proved that when the ARR is calculated using the deprival value of the assets (the value of the firm if it is deprived of its assets) the present value of assets is greater than the replacement cost (positive NPV), providing that the ARR is larger than the cost of capital. This fact indicates a close relationship between IRR and ARR, since their link to the NPV and cost of capital is the same providing that both are computed using the deprival value of assets. As the ARR will normally not be constant, whereas the IRR is, we know that the ARR and the IRR will not be equal, even calculated in this suitable way. However, J. A. Kay (1976) proposes that IRR is a weighted average of the ARRs through time, so that the ARR, with some cautions, can actually be used as a reliable measure of profitability.

Likewise the ARR, the Return on Equity (ROE) is a broadly used measure which captures the profitability of the project under the equity owners' point of view. It is also an accounting measure as it is the ratio of the Net Income of a period to the Equity at the beginning of this period. The questions before addressed to compute the EBIT for the ARR are also present in this case, to compute the Net Income, and therefore when the IRR or ARR are difficult to obtain, the ROE can also bear inaccuracy. Thus the ROE should only be seen as a complementary measure which provides information on equity owners' profitability, when good accounting information is provided. Finally, when assets are difficult to assess, the Return on Sales or Turnover has been refer as a possible alternative. It is defined as the ratio of EBIT on the sales of the period. However this measure is considered by several authors as being

quite far from theoretical principle of economic rate of return and therefore is only used as complement or in extreme cases where no other information is available.

b. Benchmarks

In order to assess for excessive returns when the profitability measures described above are available, one has to compare them against a suitable benchmark. The benchmark represents the value of what should be the expected return of a specific project. It is also known as the opportunity cost. The cost of capital is the most commonly used. It is the minimum required return that investors can entail from the level of risk they are taking. In other words, it is the level of return that makes investors indifferent between entering the project and placing their money in the bank at a risk-free rate. Although some debate around its use to valuate public utilities, authors as Copeland (1978) defends the appropriation of cost of capital as standard fair return. This fair return is different, for the same project, depending on the type of investors – equity or debt owner – namely because debt and equity are different in terms of seniority. Hence the cost of capital of a firm is actually a weighted cost of capital (WACC) of the cost of debt (k_d) and cost of equity (k_e). Thus, the WACC usually also takes into account the tax shields provided by the use of debt and its consequent payment of interests.

The main question at this point is how to obtain this cost of capital, i.e. how to get the values for k_d and k_e. The cost of debt will not be discussed in much detail, as this one is usually relatively easy to obtain, by adding up a default spread to the risk free rate. The default spread is provided by agency rates or estimated and negotiated by the own bank (or another agent) that will borrow capital to the firm. On the other hand, the cost of equity comprises some complexities that have to be described in more detail (not exhaustively).

The most widely known method to obtain the cost of equity is the capital asset pricing model (CAPM). The theoretical basis of this model developed by Sharpe (1964) and Lintner (1965a, b), is the idea that equity investors are able to fully diversify their portfolio of assets. Thereby they are only exposed to the un-diversifiable risk – the market risk – and the expected risk premium of a certain investment only depends on its degree of systematic risk i.e. the risk of the asset relative to the market risk[9]. The discussion around the validity of the CAPM, although broadly investigated, will not be addressed in this work for lack of pertinence. However, in what concerns using this measure to compute the cost of equity for PPPs projects, although CAPM

[9] CAPM Model: $k_e = r_f + \beta_l[E(r_m) - r_f]$
Where: r_f – risk free rate
$[E(r_m) - r_f]$ – expected market risk premium
β_l – Levered degree of Systematic risk

remains a useful tool, it is worth considering some drawbacks, pointed out by Grout and Zalewska (2008). One of the most relevant is the fact that the cost of capital computed using CAPM is a measure derived from the stock market, which does not apply to our projects. Actually, PPPs are investments in physical assets and not in financial ones, and physical assets' investors are, sometimes, less likely to be well diversified than the investors in market shares. So the basic assumption behind CAPM might not hold in some cases. Moreover, as most of the companies that operate PPPs are not public companies, it is not possible to estimate the degree of systematic risk for such companies[10]. Therefore we have to use a comparable listed company, which could be difficult to find out as the PPPs' line of business is usually not present in the stock market (due to its specific risk structure).

In acknowledge of the problems related to the cost of capital, an alternative manner of benchmarking the profitability often applied in profitability analysis is the use of returns observed in comparable firms or industries. The advantage of this methodology is that it allows capturing the economic cycles and how they are affecting the industry returns. Copeland (1978) has provided a discussion of the differences between using cost of capital or comparable earnings for valuation of public utilities' fair return. Copeland defends that although theoretically measuring comparable firms' earnings indeed represent the opportunity cost of capital (assuming that investors are able to invest in comparable investment opportunities) this measure "violates a marginal condition necessary to achieve efficiency in the allocation of capital" (Copeland, 1978: 350) in public utilities. This because when seeking for a fair return in public utilities, one is implicitly defending that these public utilities should provide the returns observed in unregulated competitive markets. However Copeland (1978) argued that using the average returns of comparable firms does not provide the information about the marginal return that a new firm entering the market would earn, which is the accurate return to seek for. Furthermore, the choice of the most appropriate comparators is a tough task. The most difficult is to be sure that the comparator used has the same cost structure, and faces the same risks. Actually, when analysing PPPs it could turn out to be quasi impossible to find a suitable comparator as the specificity of risk-sharing with the public sector is not found in other industries. The alternative, in this case, could be to use an international firm also operating as PPP, but then we can lose the advantage of capturing economic cycles of

[10] Estimation of β by regressing: $r_j = \alpha + \beta r_m$
Where r_j- Excess return of the stock j
r_m- Market excess return
α and β- Parameters to estimate

a specific country. Additionally, according to Copeland (1978) using as benchmark comparable firms' returns instead of the cost of capital gives usually a higher estimation of fair return. Therefore, the use of this methodology in PPPs' studies should be undertaken with reasonable cautions and never applied as unique solution, but as complement to other ones.

c. How to assess for excessive returns?

In addition to the conceptual problems that we have addressed concerning both profitability and benchmark measures, the comparison between both in order to assess for excessive returns is not straightforward as well. The first question which has to be considered is that, when we talk about "fair" return – the return that a firm should provide given its level of risk (the benchmark) – the truth is that we are speaking about a return only obtained under the assumption of perfect competition. The criteria to define a "perfectly competitive" market are the following:

- Large number of buyers and sellers
- Homogenous product
- Perfect information about the product, prices and market conditions
- Free allocation of resources
- No barriers to entry and exit
- No restrictions on capital markets

Thus, the closer we are to these conditions in the real markets the closer should the profitability measure (for example IRR) be to the cost of capital. However, one can easily verify that such conditions are very difficult to be met in the real world. Besides, actual firms usually have different performances, which also affect their profitability. For these reasons, most of the literature (for example Grout and Zalewska, 2008) defends that having returns above the fair return is perfectly usual, and often they are only a result either of higher performance or of the non-existence of perfectly competitive market. Consequently, the profits observed in real economies will usually not be the economic ones – zero – but reasonably positive ones. This is the situation where there is what is called "excess" returns, even in well-functioning markets.

The question is to know when these "excess" returns become large enough to be considered "excessive", indicating unfair situations. Defining in a broad sense, one can assume that excessive returns exist when the profitability of a firm is substantially and consistently above the cost of capital for a reasonable period of time. Nonetheless, the perfect distinction between "excess" and "excessive" returns remains indeterminate. Lacking of a theoretical

basis, a possible alternative to solve this question is to use empirical evidence. The UK Competition Commission, for example, uses data on firms' returns where it has been proven the existence of an unfair condition in order to measure how much the profitability was pushed up in such cases. Hence, data provided by Grout and Zalewska (2008) comparing companies where irregular situations were found and others where there were not, show that differences in ARRs are about 20%. In cases where these irregular situations were linked to monopolistic abuses, the difference on ARRs reaches 70%. Thus one can see that empirical evidence points towards significant differences in ARRs for these to be considered "excessive".

The main lesson to take from the general literature on profitability analysis is that it is very difficult to set up general rules that fit all cases. In practical situations, the important is to have a clear knowledge of the situation we are analysing and to use more than one measure and methodology, in order to prevent misleading measurement and analysis.

III. Methodology

3.1. Portuguese SCUTs Background

Since the beginnings of the 2000s until 2010, there were in Portugal seven roads concessions functioning under The Shadow Toll Road model of PPPs (SCUTs). This model consisted in a system where roads were available to users freely. Compensation to concessioners was paid by the state according to the actual traffic, through a scheme of ranges that establishes different prices for each range of traffic. In principle, the minimum threshold was low enough to guarantee the concessioner to always receive a minimum compensation for the operation.

In 2007, the Portuguese Government decided to change the management and financing model of the road infrastructure sector and initiated a process of introduction of real tolls in the SCUTs to happen in 2010. This led to the implementation of a new model of compensation that we call the availability revenue system. It consists of a scheme where the tolls' revenue collected by the concessioner is totally delivered to the state (or, in this case, to "Estradas de Portugal", a state-owned enterprise). On the other hand, the state commits to pay the concessioner revenue for the road availability and for the tolls' collection service. The obligations of the concessioner are to maintain roads available at any moment (temporary unavailability due to accidents, maintenance works, etc. can be deducted from the payment) and to supply the tolls' charge service. The payment for the tolls' charge service is intended to

compensate for the initial fixed investment on the tolls' porticoes and also for the operation and maintenance variable costs (O&M) of this service (which depend on the number of transactions). Other O&M costs with the roads are also intended to be covered by the payments from the state. The following figures illustrate the mechanism of this model.

Figure 2 – Payment Model when tolls revenue are lower than fixed "availability" revenue

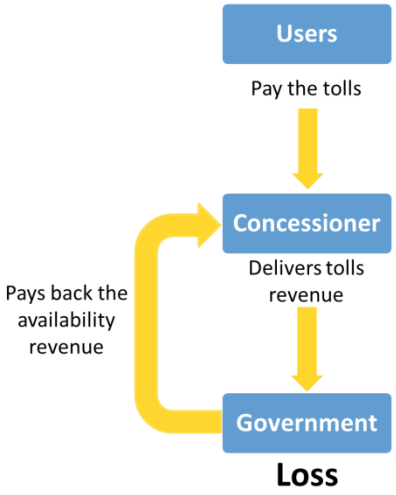
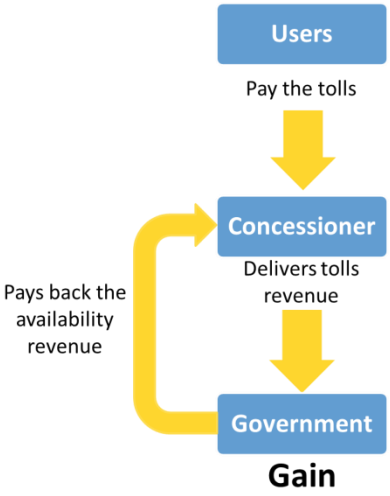


Figure 3 – Payment Model when tolls revenue are higher than fixed "availability" revenue



Source – Authors

One of the main features of this new mechanism is the fact that all the demand risk is now allocated to the public sector. In fact, as seen in figure 2, if the tolls revenue falls below the fixed "availability" payment, the government has a loss as it receives less than what it has to pay. The demand risk is thus transferred from the private to the public side. On the other hand, it is now possible for the state to actually have a gain with the SCUTs operation (figure 3 case) whereas with the previous model the state was paying the concessioner the compensation without ever collecting any revenue.

Nevertheless, it is expected that the situation of the tolls revenue being larger than the "availability" payment will only happen in the long-run. The reasons for these are, firstly, that in the short-run the country is facing a tough economic conjuncture that is likely to reduce the traffic in the ex-SCUTs and therefore lower the tolls' revenue. Secondly, the fact that the availability payments planned to be made by the state are much higher in the early years than in the final years of the concessions (see appendix B – figure 1 for the evolution of payments

until 2031). Therefore it is unexpected that the state will be able to have gains in the next years.

The introduction of real tolls in the SCUTs started in October 2010 (with Costa de Prata, Grande Porto and Norte Litoral) and was finalized in December 2011 with the remainder concessions. However, now that all the negotiations around the new model of compensation are concluded, concerns about the amounts to be paid as availability revenue are raised. In order to meet targets defined in the Memorandum of Understanding, the current agreements are under the possibility of suffering some changes that can reduce the weight of obligations the government had committed to pay. The main question that we attempt to answer is whether or not the payments agreed are in fact "excessive" and, if so, whether there is opportunity to renegotiate them without harming both the (financial) performance of the concession and its capability to pay the debt contracted.

3.2. Profitability measures and benchmarks used

a. Profitability Measures

INTERNAL RATE OF RETURN (IRR) and NET PRESENT VALUE (NPV)

Following the related literature let us first look at the data we have available to perform our profitability analysis, as well as at the type of firm we are studying. Related to the firm's type, we notice that the road sector is an established industry, which provides a traditional product or service, with well-known accounting rules. Moreover, these are firms with few intangible assets, therefore with less problems of assets valuation. In terms of data, we have historical data over seven years, for all the firms, in the same life cycle – the beginning of operation.

Thus we choose to compute the Internal Rate of Return as main measure of profitability, according to:

$$-Assets_0 + \sum_{t=1}^{T} \frac{E(FCFF_t)}{(1+IRR)^t} = 0 \quad (1)$$

Where: $FCFF_t$ – Revenue for the period t minus any outflow (investments or costs) for the same period with exception of costs with the debt service, calculated as follows:

$$FCFF_t = Net\ Income_t + Non\ Cash\ Expenses_t + Interests(1-T)_t - CAPEX_t - Inv.Net\ Working\ Capital_t \quad (2)$$

Where: $Non\ Cash\ Expenses_t$ – Any depreciation, amortization or provision of the period.

T – The tax rate

$CAPEX_t$ – The investment in fixed assets

$Inv.Net\ Working\ Capital_t$ – The investment in net working capital, defined as $Current\ Assets_t - Current\ Liabilities_t$

We complete the information given by the IRR with the calculation of the Net Present Value:

$$NPV = \sum_{t=1}^{T} \frac{E(FCFF_t)}{(1 + Cost\ of\ Capital)^t} \tag{3}$$

TRUNCATED INTERNAL RATE OF RETURN (TIRR)

For our historical profitability assessment, the IRR computed is slightly different as it is an IRR for a limited period of time. This is called the Truncated IRR (TIRR) already mentioned in the literature review and obtained by:

$$A_0 = \sum_{t=1}^{T} \frac{FCFF_t}{(1 + TIRR)^t} + \frac{A_t}{(1 + TIRR)^t} \tag{4}$$

Where: A_0 – Initial Assets Value

A_t – Assets Value at the end of the chosen period

RETURN ON EQUITY (ROE)

Another measure of profitability also used in this work is the return on equity, as a complement to the evidence provided by the IRR or TIRR and for the purpose of obtaining information about the equity owners' profitability with the projects. It is calculated as:

$$ROE = \sum_{t=1}^{T} \frac{E(Net\ Income_t)}{Average(Equity_{t-1}; Equity_t)} \tag{5}$$

b. <u>Benchmarks</u>

WEIGHTED AVERAGE COST OF CAPITAL (WACC)

As main benchmark against the IRR we use the weighted average cost of capital (WACC). Like seen in Section 2.2., the extent at which the IRR exceeds the cost of capital gives us indication on how much will be the NPV greater than zero. The WACC post-tax is usually computed as:

$$WACC = k_e \frac{E}{D+E} + (1-T)k_d \frac{D}{D+E} \quad (6)$$

Where: E – Equity

D – Debt (before taxes)

T – Tax rate

k_e – Cost of Debt

k_d – Cost of Equity

It is important to mention that the WACC that should be used to compare against the IRR is at all times the *ex-ante* one, i.e. the WACC that was took into account when making the investment decision, and which is the actual rate of return the firm should be providing. In our SCUTs' case, as we do not have data available to compute this WACC, we use the base case WACC (BC WACC) that corresponds to the agreements stipulated in the SCUTs contracts. To compare against the ROE, we use also the *ex-ante* cost of equity (Re) that is reported in the SCUTs' contracts.

INDUSTRY AND FIRM COMPARATORS

Finally, we also seek to a comparable firm or industry in order to complete our approach. Our comparable industry is simulated by the average IRR and ROE amongst SCUTs. For the comparable firm we choose a similar company operating in the road sector in Portugal, BRISA, S.A for which we also estimate the IRR and the ROE.

Following these steps, the profitability assessment is then conducted in two phases. The first is the assessment of each SCUT's historical profitability, which corresponds to the period before the real tolls implementation. The second is focused on future profitability, based on the data of future payments, and has a forecasted nature. The next subsection describes the methodology used in each phase.

3.3. Data & Excessive Returns Assessment

a. Historical Profitability Assessment

For the purpose of calculating historical TIRR and ROE we use data of the SCUTs collected from their respective annual reports. We provide this analysis for two assessment periods; one that is equal for all SCUTs and another that takes into account the fact that the concessions entered into operation in different years. Thus the first period is comprised between 2004 and 2010 for all SCUTs (except Norte Litoral, which due to lack of available data, is only assessed between

2006 and 2010) and the second starts from the year of entrance into operation (different for each SCUT)[11] and goes until 2010. The objective is always to capture how the SCUTs had performed before the renegotiations of 2010.

In what concerns the profitability assessment of BRISA, S.A – the comparable firm – we use the period between 2001 and 2007, which coincides with the consolidation of the highways network of this firm and therefore is closer to the life cycle studied for the SCUTs. Data for BRISA was also extracted from its annual reports.

All the elements used to estimate the profitability measures of both SCUTs and BRISA are actual values provided by their annual reports, except for the tax rate, that we considered to be 25% for all firms.

In order to obtain the benchmarks to compare against the TIRR and ROE, we use the base case values of WACC and Re provided by the Court of Audits (Tribunal de Contas). These values are compiled from all the SCUTs contracts, where they were agreed between the parties. Table I describes in detail the base case of each SCUT.

Table I – Data of the SCUTs Base Case

The following table presents the data of each SCUT's base case. All the values and information corresponds to the original agreements that were accorded between the parties in the original SCUTs contracts. Looking at the IRR estimations we observe that, in some cases, these are already well above the base case WACC.

SCUTS	Beira Interior	Beiras Litoral e Alta	Interior Norte	Algarve	Norte Litoral	Costa de Prata	Grande Porto
Year	1999	2001	2000	2000	2001	2000	2002
Capex (€ Thousands)	590 000	693 000	493 000	218 000	305 000	293 000	465 000
Kilometers	178	155	129	105	72	176	115
Capex/Km (€ Thousands)	3 315	3 181	1 690	2 790	6 458	3 938	2 652
Debt (€ Thousands)	534 540	632 016	483 140	181 158	231 800	267 509	372 000
Equity - %	9,4	8,8	2,0	16,9	24,0	8,7	20,0
Equity (€ Thousands)	55 460	60 984	9 860	36 842	73 200	25 491	93 000
Cost of Debt (Rd) - %	8,8	6,3	6,1	6,3	7,4	5,9	5,7
Cost of Equity (Re) - %	13,0	13,1	13,2	7,7	6,4	11,9	12,2
Tax - %	25,0	25,0	25,0	25,0	25,0	25,0	25,0
WACC - %	7,2	5,5	4,7	5,2	5,8	5,1	5,9
IRR - %	7,4	9,6	6,7	8,4	9,5	9,2	6,7
Main Shareholders	S.COSTA; T.DUARTE; DRAGADOS; ALVES RIBEIRO	ASCENDI	EIFAGGE; SONAE	FERROVIAL	FERROVIAL	ASCENDI	ASCENDI
National (N)/ Foreign (F)	**N**	**N**	**F/N**	**F**	**F**	**N**	**N**

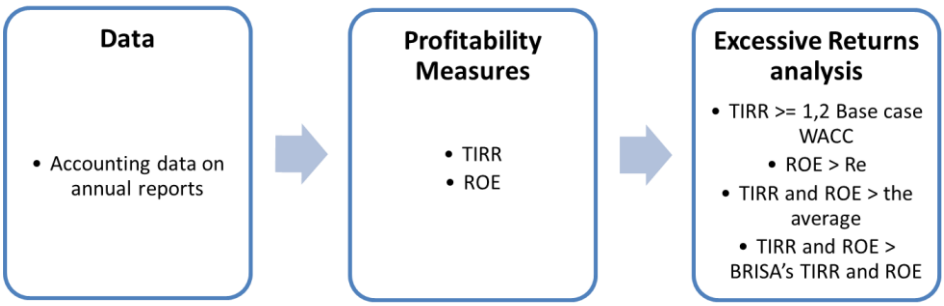
Source – Court of Audits, 2003 Report

[11] Beira Interior: 2005; Interior Norte: 2007; Algarve: 2004; Costa de Prata: 2005; Grande Porto: 2007; Beiras litoral e altas: 2007; Norte Litoral: 2006.

After obtaining the TIRR and the ROE and comparing them against the respective benchmarks we need to define how to assess for excessive returns. As found in the literature, we know that the simple fact that the two compared values are different does not necessarily mean that we are in the presence of excessive returns. Hence the relative difference between the two pairs of measures is computed for the purpose of quantifying the excess level of the TIRR, if any. At this point we have to impose a certain threshold that might indeed give clear evidence of excessive returns. Following the numbers presented by Grout and Zalewska (2008), the criterion to consider indication of excessive returns used in this study is an excess of 20% of the TIRR on the base case WACC. We also choose this value accounting for the fact that the SCUTs are facing nowadays lower risk with the new payment system. Therefore, following the financial theory that returns should compensate for the risk, we assume that the SCUTs the TIRR should not exceed in more than 20% the base case WACC. Additionally to the TIRR, we also compare the ROE and the base case Re and verify the consistency of the results with those obtained in the TIRR analysis.

Furthermore we estimate the profitability of our chosen comparators. For this purpose we first match the results of the several SCUTs, ranking them in terms of TIRR and ROE. For each of these measures we then compute a weighted average among SCUTs and thus assess for the SCUTs that fall above or below the average. Finally, we compute the TIRR and ROE for the comparable firm – BRISA, S.A – and also rank them among the individual SCUTs and the respective weighted average. The following figure synthetizes our methodology:

Figure 4 – Historical Profitability Assessment Methodology



Source – Authors

b. Forecasted Profitability Assessment

The forecasted profitability assessment is performed for the period between 2011 and the concession's final year (which corresponds to 30 years after the beginning of the concession, see table I). For this period, which is under the scope of the new payment system (availability

revenue) we build a scenario for cash flows estimates, in order to further compute the IRR, NPV and ROE.

In our analysis, revenues are the unique non-forecasted indicator, as we assume that they correspond to the fixed payments to be delivered by the state. The data on these payments is available in the 2010 PPPs report of the GASEPC - *Gabinete de Acompanhamento do Sector Empresarial do Estado, Parcerias e Concessões*, and are detailed in appendix A – Table II.

For the remaining items of the FCFF calculation (see section 3.2.a.), we need to set assumptions based on historical data, business knowledge and macroeconomic information. Having the revenues, the additional elements we ought to forecast are the annual O&M costs, the depreciations, the CAPEX in big repairs, the investment in net working capital, the interests and debt amortization and the tax rate. Table II describes carefully all the assumptions used to forecast the annual FCFF.

Table II – Assumptions used to estimate the future SCUTs cash flows

Item	Assumption
Revenue	Availability payments from the State according to latest agreements
Starting point of O&M costs	Last four years average (2007 – 2010) – corresponds to the consolidation of operation
O&M costs Growth Rate	Increasing 3% per year – assumed future inflation
CAPEX in Big Repairs	10% of the Initial Capex every ten years since 2003 (2013 and 2023)
Investment in Net Working Capital	According to the rules regarding the new payment mechanism: • State payments – accounts receivable. Assuming quarterly payments • Tolls revenue delivery – accounts payable. Assuming monthly delivery
Depreciation	Constant, assets being totally depreciated at the end of the concession
Amortization of Debt	Constant, with 15 years of maturity from 2010
Interests	Constant – historical average cost of debt of the period before 2011[12]
Taxes	25% of tax rate when Earnings Before Taxes are positive, zero otherwise
Equity	Equity = Assets - Debt

Source – Authors

Table II is aimed at acknowledging all the assumptions taken for our forecast of future FCFFs. The item we call "starting point of O&M costs" is the assumption we use to forecast the 2011 (the first year of FCFF estimation) value of costs. We choose to use the last four years average (2007 – 2010) and to actualize it at the expected inflation (3%). For the years following we

[12] The period of calculation of the Average Cost of Capital starts when interests began being paid for each SCUT. This period differ among SCUTs.

assume always annual growth rate of 3%, assuming that the inflation will remain at this constant level. We assume for the CAPEX in big repairs that it is 10% of the initial CAPEX in two points in time: 2013 and 2023. For all the remaining years, this item is equal to zero. For the investment in net working capital (NWC), we follow the rules explained in the annual reports of the concession that, in 2010, was already under the availability payment mechanism (Costa de Prata, Grande Porto and Norte Litoral). These rules specify that the payments the State is committed to provide to the SCUTs are registered in the balance sheet as accounts receivable, in the rubric of current assets (CA). On the other hand, the tolls revenue that the SCUTs are obliged to deliver to the State are registered as accounts payable, in the rubric of current liabilities (CL). Knowing that the NWC is equal to CA – CL, we assume that the CA are only the accounts receivable corresponding to the payments from the State and that these payments are made quarterly. For the CL, we assume they are composed the accounts payable corresponding to the tolls' revenue[13], which are delivered monthly (assuming a conservative perspective) plus the value due to suppliers, who are paid quarterly. Concerning the debt, the maturity assumed leads this one to be zero from 2025 onwards.

Having constructed the forecasted balance sheet that allows obtaining the annual FCFF, it is then possible to compute each SCUT's IRR, NPV and ROE for the period that we are analysing. At this point, the methodology becomes similar to that of the historical assessment. It consists of opposing the obtained results with the benchmarks already used in the previous assessment (see figure 4). Having both the historical and the forecasted assessments completed we also look at differences between the results obtained in each one, in order to capture the effect of the new payment system's introduction. Due to lack of suitable information about future revenues for BRISA, S.A, we do not use it as benchmark in the forecasted assessment.

c. Renegotiation scenarios

After concluding about evidence on the existence of excessive returns within the forecasted period (after 2010), the results obtained are then used to study a possible scenario of renegotiation. As we decide to accept evidence about excessive returns whenever the IRR is greater than 120% of the base case WACC, we thus use this condition for our renegotiation scenario. Hence, uniquely for the SCUTs that have shown evidence of excessive returns, we impose a decrease on the annual revenues paid by the state that adjusts the IRR to the "fair" level here considered. The reduction proposed is defined as a percentage discount, equally

[13] The expected values of tolls'revenue between 2011 and 2032 were extracted from According to GASEPC – Gabinete de Acompanhamento do Sector Empresarial do Estado, Parcerias e Concessões, 2011. *Parcerias Público Privadas e concessões Relatório 2011,* Lisbon

applied to each year payment. Thereby, in absolute terms each year has a different discount, having the higher payments a higher absolute reduction than the lower payments. Therefore the shape of payments is smoothed by this scenario of renegotiation. Once applied the respective deduction on payments, we study, for each SCUT individually, the impacts of the renegotiation on:

1- The Present Value of state payments
2- The profitability measures – IRR, NPV, WACC and ROE of the period
3- The Debt Service Coverage Ratio (DSCR)

In order to take into account the fact that a significant decrease in the DSCR can be an important barrier to the concretization of the renegotiations proposed, we study a second scenario of renegotiation. Hence for the renegotiations that, in the first scenario, led the DSCR to a value lower than 1,1 – which we assume as "security threshold" – we study a renegotiation that brings the IRR to the lowest possible value having the DSCR restricted at the minimum of 1,1. Then we compare the impacts of this renegotiation on all the variables before defined against the results of the previous scenario.

Finally, we look at the impacts of the all the SCUTs renegotiations proposed as a whole (in the two scenarios), both in terms of present value of all the SCUTs payments and in terms of annual reduction for the period between 2012 and 2018.

IV. Results

In this section the results and main findings of the profitability assessment are presented. They reflect the application of the methodology presented above both for the historical and forecasted profitability assessment. We also present the results of our renegotiation strategy in terms of the main agents' outcome.

4.1. Historical Profitability Assessment

We start presenting the results of the historical assessment, for two periods of estimation; one going from 2004 to 2010 for all SCUTs, and the other going from their entrance into operation's year (which differs among them) to 2010. Table III presents the results of the TIRR estimations for each SCUT against several benchmarks; base case WACC, average SCUTs' TIRR and BRISA's TIRR.

Table III

Truncated Internal Rate of Return estimations from the Historical Assessment Profitability, (%)

This table provides the results of the historical TIRR estimations. We obtain these results by finding the rate of return that, discounting the annual FCFFs for the period under analysis, would equalize the value of opening assets to that of the closing assets. * The period of estimation of BRISA, S.A: 2001 – 2007 ** N – national; F – Foreign; F/N – both foreign and national. *n.a.* – not applicable

	TIRR Entrance into operation[14] until 2010	TIRR 2004 – 2010[15]	Base case WACC	N/F**
BRISA, S.A.*	*10,6*	*10,6*	*n.a.*	*n.a.*
Beira Interior	8,0	7,9	7,2	**N**
Costa de Prata	7,8	3,6	5,1	**N**
Beiras Litoral e Alta	6,9	13,8	5,5	**N**
Grande Porto	6,1	4,8	5,9	**N**
Algarve	5,5	5,5	5,2	**F**
SCUTs Average[16]	4,3	5,3	5,7	*n.a.*
Norte Litoral	1,6	1,6	5,8	**F**
Interior Norte	-4,9	-3,3	4,7	**F/N**

Source – Authors

While looking at the results, it is possible to notice substantial differences among the performances of the SCUTs. Considering the period between 2004 and 2010, it is possible to see that the different timings of entrance into operation affected the profitability of these projects in the period between 2004 and 2010. Through the analysis of the SCUTs' balance sheets we observe that the early years of this period provided for the generality negative net incomes. Costa de Prata's TIRR, for example, is clearly being negatively affected by the timeframe of estimation since 2003 and 2004 were still years of construction. On the other hand, Beiras Litoral e Alta is being privileged as it presents a substantial variance between its opening and closing assets value for the period chosen, which enhance the value of the TIRR (see equation 4). This occurs because this concession only entered into operation in 2007 hence its assets' value in the beginning of 2004 was relatively low.

Looking at the period between the entrance into operation and 2010 we observe that the results among SCUTs are more consistent. We see also that Beira Interior, which is the largest SCUT in kilometres, shows the best performance (in absolute terms). Its size, which allows for the existence of economies of scale, and the fact that this concession was among the first entering into operation affected positively its performance.

[14] Beira Interior: 2005; Interior Norte: 2007; Algarve: 2004; Costa de Prata: 2005; Grande Porto: 2007; Beiras litoral e altas: 2007; Norte Litoral: 2006.

[15] Except for Interior Norte whose period of analysis is 2005 – 2010

[16] Assets Weighted Average

Costa de Prata is another concession showing high results. Even considering the fact that this concession has also entered into operation relatively soon, its results may look unexpected, partly because it is a relatively small concession. When comparing with Algarve, that is similar to Costa de Prata (see table I) and started its operation even sooner, we see that this one obtained comparatively low results. Looking at the balance sheets of these two concessions for this period one can indeed observe values of net income much lower for Algarve than for Costa de Prata, which explains the differences in profitability. The higher net income of Costa de Prata in comparison with Algarve cannot, however, be related neither to higher operational revenues nor to lower operational costs. The main difference seems provide from the financial results, which, until 2010, contained the payments made by the state. Looking at the shape of these payments we see that the agreement with Costa de Prata stipulated high payments at the early years of the concession, while the payments to Algarve are ascending through time see appendix A – Table I).

Interior Norte, contrarly to Costa de Prata, presents a lower performance showing a negative TIRR, which is even reinforced when we look only at the period after the starting of operation. The profitability of this concession at its early years was affected by delays in the road construction, which led to negative results until 2008. Indeed in 2008 Interior Norte was even forced to intend with the Portuguese government the necessity of a financial rebalance. Other SCUTs that faced delays on construction, as Norte Litoral, also saw their profitability affected and requested financial rebalances.

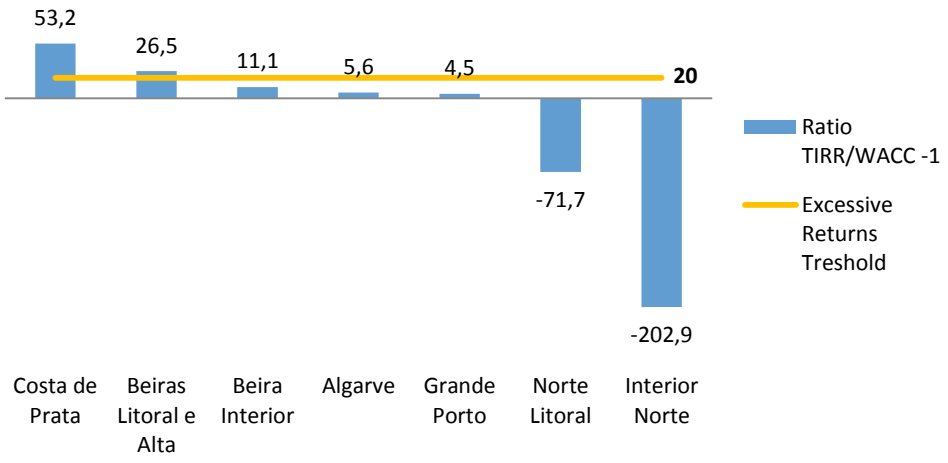
When looking at the comparisons against the SCUTs average and BRISA, S.A we verify that only Norte Litoral and Interior Norte are below the average when considering the timeframe from the entrance into operation until 2010. However, within this period we observe that any SCUT performed better in terms of TIRR than their main comparator, BRISA, S.A.

Figure 5 completes the information of Table III by providing the results of the ratio of TIRR on the base case WACC for each SCUT. For this purpose we use the estimation for the period between the entrance into operation and 2010. We also show in the figure the threshold that indicates evidence of excessive returns (TIRR 20% above the BC WACC). We conclude that the two concessions showing evidence on the existence of excessive returns are Costa de Prata and Beiras Litoral e Alta. The former presents a relative difference between TIRR and base case WACC of around 53% whereas the latter presents a ratio of 27%. Other concessions obtain values of TIRR above the base case WACC, but this difference does not attain 20%. The weak

performance revealed by Norte litoral and Interior Norte is confirmed by the comparison against their respective benchmarks.

Figure 5 – Comparison of historical TIRR against Base Case WACC

Entrance into operation[17] until 2010, (%)



Source - Authors

Following the methodology, historical ROE is also estimated for the purpose of capturing the equity profitability of the SCUTs. The results are presented in table IV and in figure 7 below. The conclusions that we are able to infer from the ROE analysis are in line with the information provided by both the TIRR and the NPV.

Table IV – Return on Equity estimations from the Historical Assessment Profitability, (%)

This table provides the results of the historical ROE estimations. As the ROE is a non-constant measure calculated annually, the results presented in the table are those of the weighted average return on equity of the respective period for each SCUT. This weighted average is calculated for each firm as: $\frac{\sum_t^T ROE}{\sum_{t-1}^T Equity}$, where t is the first year of the period considered and T the last year. * The period of estimation of BRISA, S.A: 2001 – 2007 ** N – national; F – Foreign; F/N – both foreign and national. *n.a.* – not applicable

	ROE Entrance into operation[18] – 2010	**ROE** 2004 – 2010[19]	**Base case Re**	**ROE – Base case Re** (p.p.)	**N/F****
Costa de Prata	23,6	21,4	11,9	9,6	**N**
Beira Interior	21,7	19,5	13,0	6,5	**N**
BRISA, S.A.*	*15,1*	*15,1*	*n.a*	*n.a*	*n.a*
SCUTs Average[20]	12,5	11,1	10,7	0,4	*n.a*
Beiras Litoral e Alta	15,8	13,2	13,1	0,1	**N**
Algarve	7,9	7,9	7,7	0,2	**F**
Grande Porto	10,2	8,7	12,2	-3,5	**N**
Norte Litoral	3,2	3,2	6,4	-3,3	**F**
Interior Norte	0,1	0,1	13,2	-13,1	**F/N**

Source - Authors

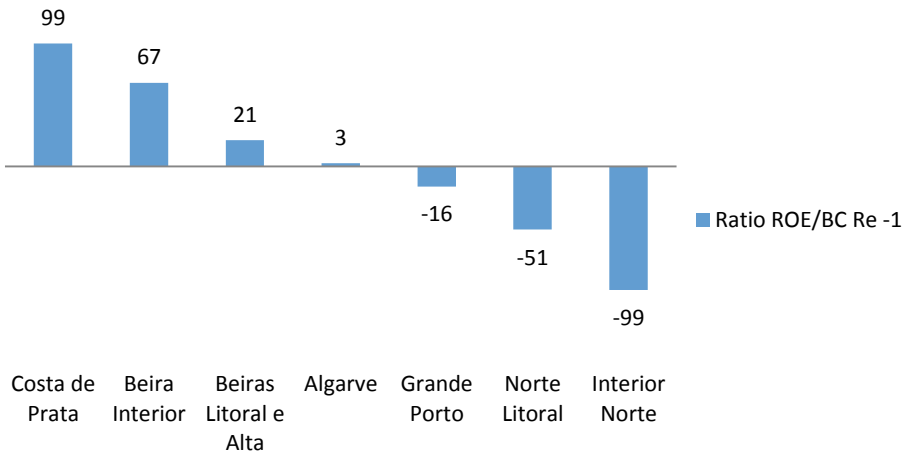
[17,18] Beira Interior: 2005; Interior Norte: 2007; Algarve: 2004; Costa de Prata: 2005; Grande Porto: 2007; Beiras litoral e altas: 2007; Norte Litoral: 2006.

[19] Except for Interior Norte whose period of analysis is 2005 – 2010

[20] Equity Weighted Average

Figure 7 - Comparison of historical ROE against Base Case Re

Entrance into operation[21] until 2010, (%)



Source - Authors

We see in table IV that Costa de Prata continue to confirm evidence of excessive returns, being well above the average ROE and even above BRISA's ROE, in the two periods of analysis. We also obtain a value of ROE for Beira Interior that is clearly outperforming the base case Re, while Beiras Litoral e Alta presents a value more in line with its base case. It is also to notice that the weak performance of Interior Norte is even more evident when analysing the ROE. In fact, this SCUT presents the higher value of base case Re among all the others. Nevertheless, as seen in figure 7, the return for equity investors verified until 2010 falls quite below the expected return.

Main findings

The historical profitability assessment concludes some remarks about the financial performance of the SCUTs for the period before the introduction of the new payment mechanism. Thus we are able to verify that Costa de Prata is the concession showing stronger evidence on excessive returns, as the analysis of both the TIRR and ROE demonstrate outperformance of its base case. Costa de Prata profitability measures do not outperform the benchmark only for BRISA, S.A, which can have several explanations. Not only BRISA's road network is considerably higher than Costa de Prata, as also benefits from providing the connection between Lisbon and Oporto. Moreover, BRISA, S.A is a much mature firm than Costa de Prata. The concessions Beira Interior and Beiras Litoral e Alta also demonstrate some evidence on excessive returns as they are outperforming their base case measures in terms of

[21] Beira Interior: 2005; Interior Norte: 2007; Algarve: 2004; Costa de Prata: 2005; Grande Porto: 2007; Beiras litoral e altas: 2007; Norte Litoral: 2006.

ROE and TIRR, respectively. Besides, they are both above BRISA, S.A in terms of ROE. On the other hand, two concessions – Norte Litoral and Interior Norte – are clearly revealing a lower financial performance within the timeframe under analysis.

4.2. Forecasted Profitability Assessment

Similarly to the historical assessment, in this subsection we provide the results obtained in the forecasted assessment for the IRR, NPV and the ROE, complementing with the NPV. The estimations of IRR are provided in Table V. When looking at the table one can see that the divergences of profitability among SCUTs that were already observed in the historical assessment remain visible. However, the SCUTs that demonstrated before poor performances are now exhibiting substantially improved results. This is the case of Algarve and Norte Litoral, which obtain IRRs above their benchmarks. It also to notice that Interior Norte, whose historical profitability was always below its benchmarks, is now presenting the best performance amongst SCUTs. On the opposite, one can see a complete reversion of the Costa de Prata concession's situation whose estimation is the worst among the others SCUTs.

Table V - Internal rate of return estimations from the forecasted assessment profitability (%)
This table provides the results of the forecasted IRR estimations. We obtain these results by finding the rate of return that, discounting the annual FCFFs for the period under analysis, would provide a net present value of zero. * Assets weighted average. ** N – national; F – Foreign; F/N – both foreign and national. *n.a.* – not applicable

	Forecasted IRR 2011 until end of concession[22]	**Base Case WACC**	**N/F****
Interior Norte	12,5	4,7	**F/N**
Algarve	10,8	5,2	**F**
Norte Litoral	9,3	5,7	**F**
SCUTs average*	7,5	5,7	n.a.
Beiras Litoral e Alta	7,2	5,5	**N**
Grande Porto	7,0	5,9	**N**
Beira Interior	4,8	7,2	**N**
Costa de Prata	3,1	5,1	**N**

Source – Authors

The change on the forecasted situation when compared to the historical can be related with the changes in the payments agreements that occurred in 2010. In appendix A – Table III we show that these changes in general benefit the concessions that obtain high performance in our estimations, mainly in the next years. Interior Norte, for example, is the most benefited in 2011 (although not in present value). Furthermore, it is worth looking at the pattern of costs that the concessions were revealing before 2011 in order to understand the results obtained.

[22] Beira Interior: 2029; Interior Norte/Algarve/Costa de Prata: 2030; Grande Porto/Beiras litoral e alta/Norte Litoral: 2031

In table VI we present the average O&M per kilometre for each SCUT calculated for the period between 2007 and 2010 (four years before our analysis).

Table VI – Comparison between the Average O&M costs/km and the IRR estimations

This table provides information of the SCUTs' pasts costs and relates it with our IRR estimations. The O&M costs/km is thus calculated for the period between 2007 and 2010, which corresponds to the period in which all the SCUTs are already operating. The IRR is calculated for the period between 2011 and the end of concession[23].

	Pasts O&M cots/Km (€ Thousands)	Future IRR (%)
Algarve	39,5	10,8
Interior Norte	47,5	9,0
Norte Litoral	55,8	8,5
Beiras Litoral e Alta	57,2	8,8
Grande Porto	95,0	4,5
Beira Interior	102,0	4,5
Costa de Prata	139,0	3,9

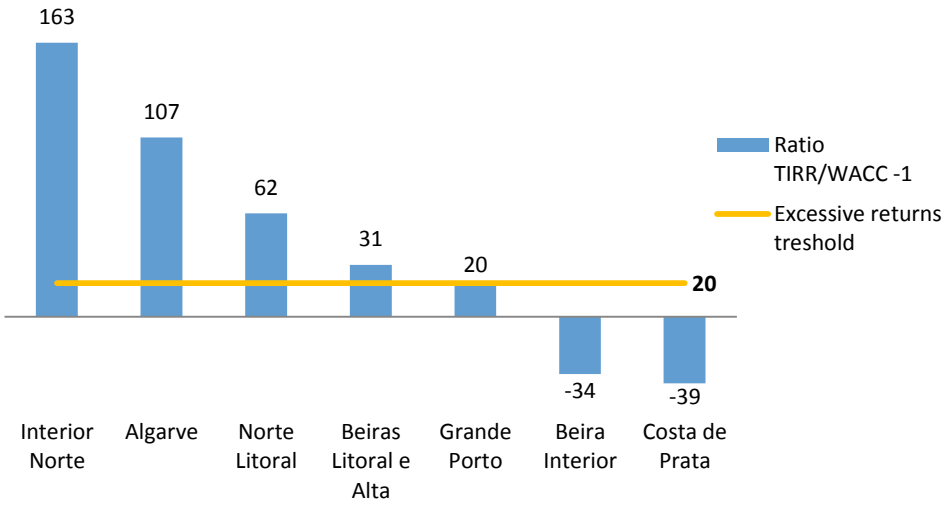
Source - Authors

It is interesting to see that, generally, lower costs per kilometre are leading to higher IRR. This is the result of one of our main assumptions that defines as starting point for the costs the average of the last four years (see Table II). Thereby we are assuming that the future pattern of costs for each SCUT is being affected by their past costs and that the SCUTs not able to be efficient in the past will maintain the same behaviour. Thus, when looking at table VI we conclude that one of the reasons for the poor forecasted performance of Costa de Prata and Beira Interior can be their inefficiency in terms of costs per kilometre in the past four years. On the other hand it is clear that Algarve, who has demonstrated superior cost efficiency in the past, benefit from this in our analysis.

When analysing the comparison between the estimations of IRR against the base case WACC, we conclude that four concessions – Interior Norte, Algarve, Norte Litoral and Beiras Litoral e Alta – are showing evidence on excessive returns. This is possible to observe in Figure 8, which shows the results of the ratio of the IRR estimations on the Base Case WACC, when comparing with the 20% threshold. Indeed, the top performance of IRR in absolute terms is verified for the same SCUTs when these are compared with their benchmarks. When looking at Beira Interior, on contrary, one can deduce that this SCUT is even less profitable when analysed in relative terms. This happens because this concession, being the largest, is also facing the highest base case WACC among the others. Nevertheless, our estimations point towards a significantly lower performance.

[23] Beira Interior: 2029; Interior Norte/Algarve/Costa de Prata: 2030; Grande Porto/Beiras litoral e alta/Norte Litoral: 2031

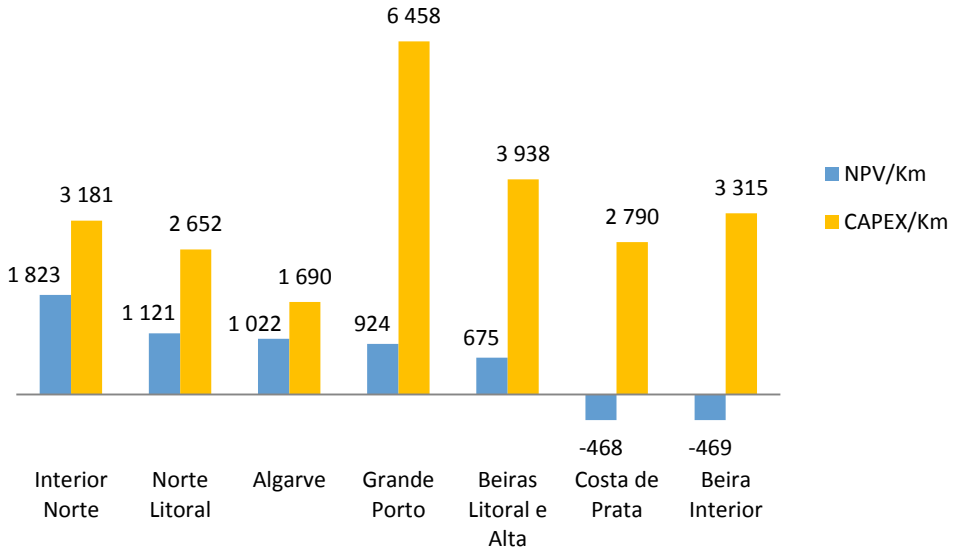
Figure 8 – Comparison of forecasted IRR against Base Case WACC
2011 until End of concession[24], (%)



Source - Authors

In order to reinforce the results demonstrated by the analysis of the IRR we now provide information about the net present value per kilometre in figure 9. It is then possible to notice that the same conclusions can be deduced from these results in terms of strong and lower performance of SCUTs. However we are now aware of the fact that, although not presenting the highest IRR, Beiras Litoral e Alta is the concession which presents the highest NPV per kilometre. This situation occurs due to a question of scale, as Beiras Litoral e Alta is the largest SCUT among the best performing ones, and therefore presents largest values of annual FCFFs.

Figure 9 – Comparison between NPV estimations from the forecasted assessment profitability and Initial CAPEX - *2011 until End of Operation[25], (€ Thousands)*



Source – Authors

[24], [25] Beira Interior: 2029; Interior Norte/Algarve/Costa de Prata: 2030; Grande Porto/Beiras litoral e alta/Norte Litoral: 2031

It is also interesting to look at the comparison between the estimations of NPV/Km and the initial CAPEX/Km. We see that some concessions, as Grande Porto, are showing a much lower NPV/Km than CAPEX/Km which is being reflected in the profitability. On the other hand, we can verify that Algarve is the SCUT with the lowest value of CAPEX/Km which can have contributed to its good performance, if not in the early years at least in the long term, according to our analysis. Likewise, it is possible to deduce that Beiras Litoral e Alta, which is roughly smaller than Beira Interior, has invested more in initial CAPEX and that this is reflected in a higher performance, both verified in early years and in the long run.

In a complementary approach, the estimations of ROE and its comparison against the base case Re are presented in following Table VII and figure 10.

Table VII – Return on equity estimations from the forecasted assessment profitability, (%)

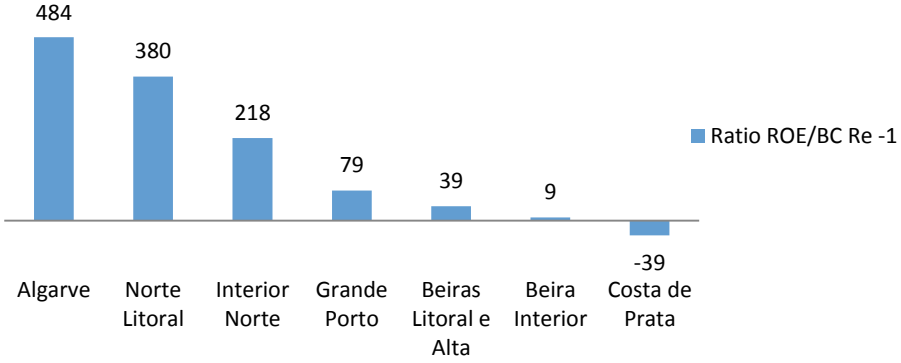
This table provides the results of the forecasted ROE estimations. As the ROE is a non-constant measure calculated annually, the results presented in the table are those of the weighted average return of the period on equity for each SCUT. This weighted average is calculated for each firm as: $\frac{\sum_{t}^{T} ROE}{\sum_{t-1}^{T} Equity}$, where t is the first year of the period considered and T the last year. * Equity weighted average. *n.a.* – not applicable

	ROE 2011 until end of concession[26]	**Base case Re**	**ROE – Base case Re** (p.p)	**N/F**
Algarve	45,1	7,7	37,4	**F**
Interior Norte	42,0	13,2	28,8	**F/N**
Norte Litoral	30,8	6,4	24,4	**F**
SCUTs Average*	23,0	11,7	11,3	n.a
Grande Porto	21,9	12,2	9,7	**N**
Beiras Litoral e Alta	18,2	13,1	5,1	**N**
Beira Interior	14,2	13,0	1,2	**N**
Costa de Prata	7,3	11,9	-4,6	**N**

Source – Authors

Figure 10 - Comparison of forecasted return on equity [27] against base case Re

2011 – End of concession[28], (%)



Source - Authors

[26], [28] Beira Interior: 2029; Interior Norte/Algarve/Costa de Prata: 2030; Grande Porto/Beiras litoral e alta/Norte Litoral: 2031

[27] The results presented in the figure are those of the weighted average return on equity of the period for each SCUT, calculated as described in Table VII

The results are consistent with the above illustrated. However, it is to notice the quite important values of ROE for the three concessions that are above the SCUTs average. Algarve is once more on the top of the ranking, both in absolute terms as relatively to its benchmark.

We relate these results of ROE with high forecasted net income obtained by efficient cost structures which, with the current payment values, lead to high margins. In Table VIII we present information on the SCUTs' margins, both historical and forecasted. We see that our forecasts point to slightly lower margins while maintaining the same pattern for each SCUT. The results, which demonstrate quite important values of margins for all SCUTs, can be closely related to the estimations of ROE as the SCUTs with higher margins are those which are best performing in our forecasted scenario.

Table VIII – Historical and forecasted margins, (%)

This table shows the results of the calculation of gross margins and profit margins. The margins are non-constant annual values, therefore the values here presented are weighted averages of the periods analysed. Hence, gross margins are calculated as: $1 - \frac{\sum_t^T O\&M\ costs_t}{\sum_t^T Revenues_t}$, where t is the first year of the period and T the last year of the period. Historical gross margins are calculated for the period between the entrance into operation[29] and 2010. The forecasted gross margins are calculated for the period between 2011 and the end of concession[30]. Forecasted profit margins are calculated as: $\frac{\sum_t^T Net\ income_t}{\sum_t^T Revenues_t}$, where t is the first year of the period and T the last year of the period. Forecasted profit margins are calculated for the period between 2011 and the end of concession[31]. N – National; F – Foreign; F/N – both foreign and national.

	Historical Gross margins	Forecasted Gross margins	Forecasted Profit Margins	N/F*
Norte Litoral	92,3	87,9	40,9	**F**
Interior Norte	91,2	90,7	36,9	**F/N**
Beiras Litoral e Alta	88,3	89,2	30,8	**N**
Algarve	87,0	87,0	39,3	**F**
Beira Interior	86,8	76,2	15,6	**N**
Grande Porto	84,0	90,3	34,2	**N**
Costa de Prata	72,9	64,6	9,2	**N**

Source – Authors

It is worth mentioning that the high values of ROE verified are also related with the high leverage level of the generality of SCUTs. Interior Norte, for example, has a base case debt level of 98% (see table I). By definition of the ROE (see equation 5), low values of equity lead to higher ROE. We choose to use the information provided by the ROE only as complement of the IRR analysis, because the IRR is less sensitive to this leverage question (although not completely). This is also the reason why we do not use any criterion on the ROE to construct a renegotiation scenario. As the ROE estimated are so high in some cases, to renegotiate the

[29] Beira Interior: 2005; Interior Norte: 2007; Algarve: 2004; Costa de Prata: 2005; Grande Porto: 2007; Beiras litoral e altas: 2007; Norte Litoral: 2006.

[30], [31] Beira Interior: 2029; Interior Norte/Algarve/Costa de Prata: 2030; Grande Porto/Beiras litoral e alta/Norte Litoral: 2031

state payments in order to bring them to the "fair" level would impose a too strict reduction on the state payments that would decreases the IRR below the base case WACC and therefore lead to negative NPVs.

Main findings

The results found through the SCUTs forecasted profitability analysis give evidence of the existence of excessive returns on four of the seven concessions: Algarve, Beiras Litoral e Alta, Norte Litoral and Interior Norte. Indeed, the three main indicators evaluated (IRR, NPV and ROE) systematically points toward these four concessions as being performing above their benchmarks. Furthermore, we infer that these results are related with the value of State payments renegotiated in 2010, which benefits these concessions, and to the higher efficiency costs that these concessions showed in the past, which we assume they will continue to demonstrate in the future.

We are lead to trust on the robustness of our results as, additionally to the forecast assessment made with our final assumptions (detailed in table III), several simulations using different assumptions for costs and investment in networking capital (namely) were tested before. From these several simulations, we observed that the results in terms of excessive returns were quite recurrent, being Norte Litoral the more sensitive SCUT to changes in assumptions. Furthermore, the levels of excess returns are so important for Interior Norte, Algarve and Beiras Litoral e Alta that the conclusion on excessive returns is robust to thresholds higher than 20%.

4.3. Renegotiations Scenarios

After having concluded about the SCUTs showing evidence on excessive returns, we then perform our renegotiation scenario. Recalling the methodology, we have first applied a percentage "discount" on all the state payments, from 2011 until the end of the concession, in the SCUTs showing excessive returns. This discount was obtained by finding the maximum percentage cut that brings the IRR to the "fair return", which is 120% of the base case WACC. The results of this renegotiation scenario are detailed in Table IV, in terms of impacts on the present value of the State payments, main profitability measures for the SCUT and debt credit coverage ratio. In terms of impacts on the State payments, we verify that the renegotiations that we propose permits saving, in the most favourable case (Interior Norte) €414 Million in the present value of the payments currently agreed for this SCUT and, in the least favourable case (Norte Litoral) €151 Million. Aggregating the savings of the four SCUTs under analysis, we reach a total saving of €838 Million in the present value of the aggregate SCUTs' payment,

which corresponds to a decrease of 9% of the current payments' present value. Looking at the impacts on the profitability of the projects, we see decreases of, on average, 33% in the IRR, 69% in the NPV and 29% in the ROE. However, by definition we know that the IRR continue to be above the base case WACC (20%) and that the ROE are still high as these SCUTs were showing, before the renegotiations, high levels of ROE. In terms of impacts on the annual State's payments from 2012 to 2018, the savings reach on average €64 Million per year (9% less than the current values). In what concerns the impacts on the debt service coverage ratio, this measure is reduced in all the renegotiations. Indeed in three of them – Interior Norte, Algarve and Beiras Litoral e Alta – the new DSCR falls below the "security threshold" that we defined as 1.1. Therefore, we have to impose a new scenario of renegotiation for these SCUTs to maintain the DSCR at the security level.

The results of the second renegotiation scenario, that takes into account the security limit for the DSCR, are described in Table X. It is possible to see that the total savings achieved through this solution are considerably lower than in the previous scenario. The total amount saved in the payments' present value is now €631 Million, (25% less than in our first scenario). Looking individually at each SCUT, Algarve presents in this scenario savings of 16% of the present value of State payments, whereas Beiras Litoral e Alta is able to save merely 3% (versus 22% and 4%, respectively). Therefore the impacts on the profitability measures of each SCUT are clearly lessen under this scenario comparing with the previous one. Furthermore, the annual savings that the State is able to accomplish from 2012 to 2018 are now reduced to achieve, on average, €48 Million.

Main findings

The results of the renegotiation scenarios that are proposed in this thesis point towards the possibility of significant savings for the State in terms of the current amounts of SCUTs' payments. Indeed, in the best scenario the State is able to reduce the present value of these payments on about 9%, i.e. paying less €838 Million. However, our analysis shows that the impacts of these renegotiations on the debt service coverage ratio of certain SCUTs are extremely important and can be a barrier to practical renegotiations. In fact, the banks involved in the concessions' financing are an active agent on the renegotiations process, and that they care for their interests to be protected in all situations. Under the renegotiation scenario that maintains the debt service coverage ratio at the security level, we conclude that the savings are considerably reduced when comparing with the previous situation. Nevertheless, we consider that this scenario could be more realistic than the previous one.

Table IX – Results of the first renegotiation scenario, without restricting the DSCR

(€ Thousands, unless further indication)

This table presents summary results of the first renegotiation scenario. It presents the values for several indicators before and after the renegotiation, and the percentage variation between the two. The savings in the present value of the state payments are presenting next to the concessions' name. Present values are computed applying a discount rate of 4,5%. The WACC is computed as $\sum_t^T \frac{Equity_t}{Assets_t} \times weighted\ average\ ROE + \sum_t^T \frac{Debt_t}{Assests_t} \times Rd \times (1 - T)$. The final rows present the annual aggregate State payments to all SCUTs between 2012 and 2018 before and after this renegotiations scenario.

	Before	After	Variation
INTERIOR NORTE – PV Savings: 413 517			
Present Value of payments	1 557 804	1 144 287	**-27%**
IRR (%)	12,5	5,64	**-55%**
NPV	282 544	32 304	**-89%**
WACC (%)	15,0	8,3	**-45%**
ROE (%)	42,0	19,7	**-53%**
DSCR (x)	1,39	1,01	**-28%**
PV of payments as percentage in GDP 2011 (%)	0,9	0,7	**-0,2 p.p**
ALGARVE – PV Savings: 194 880			
Present Value of payments	707 009	512 129	**-28%**
IRR (%)	10,8	6,3	**-42%**
NPV	131 819	22 917	**-83%**
WACC (%)	19,7	11,2	**-43%**
ROE (%)	45,1	22,0	**-51%**
DSCR (x)	1,33	0,94	**-29%**
PV of payments as percentage in GDP 2011 (%)	0,4	0,3	**-0,1 p.p**
BEIRAS LITORAL E ALTA – PV Savings: 78 357			
Present Value of payments	1 862 878	1 784 520	**-4%**
IRR (%)	7,2	6,6	**-8%**
NPV	118 776	76 032	**-36%**
WACC (%)	11	10,2	**-8%**
ROE (%)	18	16,3	**-10%**
DSCR (x)	1,13	1,08	**-4%**
PV of payments as percentage in GDP 2011 (%)	1,09	1,04	**-0,1 p.p**
NORTE LITORAL – PV Savings: 151 017			
Present Value of payments	999 939	848 921	**-15%**
IRR (%)	9,3	6,9	**-26%**
NPV	128 880	37 601	**-71%**
WACC (%)	25,2	20,5	**-18%**
ROE (%)	30,8	22,5	**-27%**
DSCR (x)	1,48	1,21	**-18%**
PV of payments as percentage in GDP 2011 (%)	0,58	0,49	**-0,1 p.p**
TOTAL PV SAVINGS: 837 771			
PV total SCUTs payments	8 823 595	7 985 823	**-9%**
As % of GDP	5,1	4,7	**-0,5 p.p**
PV total PPPs payments	26 004 000	25 166 229	**-3,2%**
As % of GDP	15,1	14,7	**-0,5 p.p**

	Before	After	Absolute Variation	% Variation
2012	835 000	766 855	68 145	**-8,2%**
2013	772 000	704 460	67 540	**-8,7%**
2014	751 000	684 802	66 198	**-8,8%**
2015	746 000	680 181	65 819	**-8,8%**
2016	728 000	665 007	62 993	**-8,7%**
2017	704 000	643 994	60 006	**-8,5%**
2018	689 000	629 123	59 877	**-8,7%**

Source – Authors

Table X - Results of the second renegotiation scenario, with restriction of the DSCR to 1,10x

(€ Thousands, unless further indication)

This table presents summary results of the second renegotiation scenario. It presents the values for several indicators before and after the renegotiation, the percentage variation between the two and the percentage variation that was achieved in the first scenario. The savings in the present value of the state payments are presenting next to the concessions' name. Present values are computed applying a discount rate of 4,5% . The WACC is computed as $\sum_t^T \frac{Equity_t}{Assests_t} \times weighted\ average\ ROE + \sum_t^T \frac{Debt_t}{Assests_t} \times Rd \times (1 - T)$.

	Before	After	Variation	*First scenario's variation*
INTERIOR NORTE – PV Savings: 312 722				
Present Value of payments	1 557 804	1 245 082	**-20%**	*-27%*
IRR (%)	12,5	7,32	**-41%**	*-55%*
NPV	282 544	93 478	**-67%**	*-89%*
WACC (%)	15,0	9,9	**-34%**	*-45%*
ROE (%)	42,0	25,2	**-40%**	*-53%*
DSCR (x)	1,39	1,10	**-21%**	*-28%*
PV payments as percentage in GDP 2011 (%)	0,9	0,7	**-0,20 p.p**	*-0,23 p.p*
ALGARVE – PV Savings: 114 394				
Present Value of payments	707 009	592 615	**-16%**	*-22%*
IRR (%)	10,8	8,2	**-24%**	*-34%*
NPV	131 819	67 894	**-48%**	*-77%*
WACC (%)	19,7	14,7	**-25%**	*-36%*
ROE (%)	45,1	31,5	**-30%**	*-43%*
DSCR (x)	1,33	1,10	**-17%**	*-24%*
PV payments as percentage in GDP 2011 (%)	0,4	0,3	**-0,70 p.p**	*-0,09 p.p*
BEIRAS LITORAL E ALTA – PV Savings: 52 675				
Present Value of payments	1 862 878	1 810 203	**-3%**	*-4%*
IRR (%)	7,2	6,77	**-6%**	*-8%*
NPV	118 775,57	90 041,53	**-24%**	*-36%*
WACC (%)	11	10,5	**-5%**	*-8%*
ROE (%)	18	16,9	**-7%**	*-10%*
DSCR (x)	1,13	1,10	**-3%**	*-4%*
PV payments as percentage in GDP 2011 (%)	1,09	1,05	**-0,04 p.p**	*-0,05 p.p*
NORTE LITORAL – PV Savings: 151 017				
Present Value of payments	999 939	848 921	**-15%**	n.a
IRR (%)	9,3	6,9	**-26%**	n.a
NPV	128 880	37 601	**-71%**	n.a
WACC (%)	25,2	20,5	**-18%**	n.a
ROE (%)	30,8	22,5	**-27%**	n.a
DSCR (x)	1,48	1,21	**-18%**	n.a
PV of payments as percentage in GDP 2011 (%)	0,58	0,49	**-0,09 p.p**	n.a
TOTAL PV SAVINGS: 630 807				
PV total SCUTs payments	8 823 595	8 192 787	**-7%**	*-9%*
As % of GDP	5,1	4,8	**-0,5 p.p**	*-0,5 p.p*
PV total PPPs payments	26 004 000	25 373 193	**-2,43%**	*-3,2%*
As % of GDP	15,1	14,8	**0,5 p.p**	*-0,5 p.p*

	Before	After	Absolute Variation	% Variation
2012	835 000	783 863	51 137	**-6,1%**
2013	772 000	721 118	50 882	**-6,6%**
2014	751 000	701 124	49 876	**-6,6%**
2015	746 000	696 374	49 626	**-6,7%**
2016	728 000	680 565	47 435	**-6,5%**
2017	704 000	658 868	45 132	**-6,4%**
2018	689 000	644 023	44 977	**-6,5%**

Source – Authors

V. Conclusions

The objective of this thesis was to infer about the existence of excessive returns in the SCUTs' PPPs projects in Portugal and, thereby, exploit the possibility of renegotiations benefiting the Portuguese State by allowing for savings in the amounts it is currently committed to pay.

We used data available in the annual reports of each SCUT as well as information on the SCUTs' base case from GASEPC[32], the Portuguese Court of Audit and the Portuguese Road Infrastructure Institute. The study was conducted in three steps: SCUTs' historical profitability assessment (between 2004 and 2010, when the new payment mechanism was implemented); SCUTs' forecasted profitability assessment (between 2011 and the concessions' final year); renegotiation scenarios' construction and its application to the concessions showing evidence on excessive returns. The relevant literature on excessive returns assessment and public utilities valuation led us to consider as evidence of excessive returns the situations where the internal rate of return exceeds in more than 20% the weighted cost of capital. Positive net present values and returns on equity higher than the cost of equity were then used to corroborate the conclusions. For the forecasted assessment, several assumptions based on past indicators, macroeconomic conditions and business knowledge were formulated. Two scenarios of renegotiations by means of reducing the state payments were then designed for the SCUTs that were presenting evidence on excessive returns. The first does not restrict the renegotiation to the debt service coverage ratio "security level" maintenance. The other scenario imposes such restriction in order to capture the involvement of the banks in this process. Finally, the impacts of these two renegotiations scenario on the State payments, projects' profitability and projects' debt service coverage ratio were measured.

From the historical profitability assessment, the study concludes that Costa de Prata is the concession showing stronger evidence on excessive returns. The fact that this SCUT received in the early years of its operation higher payments by the State than others comparable in terms of size and CAPEX (Algarve and Norte Litoral) led to higher net income at the early stage and explain these results. On the other hand, the historical profitability assessment indicates that some concessions as Interior Norte and Norte Litoral were performing below the expected at first years of operations, mainly due to delays in construction.

The forecasted profitability assessment presents evidence on the existence of excessive returns in four of the seven SCUTs: Interior Norte, Algarve, Beiras Litoral e Alta and Norte

[32] GASEPC – Gabinete de Acompanhamento do Sector Empresarial do Estado, Parcerias e Concessões.

Litoral. The results, which strongly contrast with those of the historical assessment, are mainly explained by two factors: the increase in the State payments that were agreed when the new payment mechanism was implemented (2010) which particularly benefit these concessions (comparing with the base case conditions); lower pasts O&M costs and consequent higher margins observed in these concessions and that we assume are maintained throughout the length of the concession. This study also inferred high ROEs in both the historical and forecasted estimations. We relate these results, in part, to the high levels of leverage of most of the SCUTs.

We further conclude that renegotiations on the State payments that re-establish "fair" levels of return allow for the saving of €830 Million in the aggregate SCUTs payments' present value. Nonetheless, we also find that renegotiation of such extent threaten the security level of debt service coverage ratio (DSCR) of the projects. Renegotiating payments taking into account a minimum security level of 1,1 for the DSCR would permit savings of €631 Million (lowers than in the previous scenario). However we find that this solution could be more realistic as it takes into account that the banks that feel their interest threatened can block renegotiations.

The limitations of this work related to the methodology used are, at first, the use of specific ratios to assess for excessive returns – TIRR on base case WACC and ROE on base case Re – which can be a limitative approach. Similarly, the use of a specific threshold of 20% of IRR's excess on the base case WACC as main criterion for excessive returns, without comparing this value with national or international data for the specific business we are analysing. Finally, the fact that the forecasted analysis is based on several assumptions formulated through historical analysis however without guarantee that the historical pattern will maintain in the future. For example, future unexpected shocks likely to affect the SCUTs costs structure, which is significantly impacting our final results, were not taking into account for the analysis.

The contribution of this thesis could be complemented by different approaches to calculate excessive returns, as using different profitability measures, different thresholds or international comparable firms. Moreover, different scenarios of renegotiations could be constructed in order to capture not only the value of the State payments, but also the distribution of these payments along the length of the concession. Eliminating the concentration of the payments in the next years could be an option analysed. The reduction of the services for which the State is currently compensating the concessioners, comparing it with the adoption of outsourcing solutions is another possible scenario. Other aspect for complementing this work is the analysis of the risk of financial rebalancing of the SCUTs that

are performing under the base case, and at what extend this would lower the benefits brought by the renegotiations proposed. Finally, the legal assessment of the renegotiations that we propose would complement this work in terms of practical application.

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VII. Appendix A

Table I – SCUTs' State payments: Base case (before 2010 renegotiations)
(€ Thousands)

	Beira Interior	Beiras Litoral e Alta	Interior Norte	Algarve	Norte Litoral	Costa de Prata	Grande Porto	TOTAL
1999	0	0	0	0	0	0	0	**0**
2000	0	0	0	0	0	0	0	**0**
2001	0	0	0	0	0	0	0	**0**
2002	0	0	0	0	0	0	0	**0**
2003	9 985	2 410	1 651	3 631	1 864	1 315	1 204	**22 060**
2004	14 662	2 653	4 626	21 788	1 864	3 434	2 481	**51 508**
2005	150 773	3 440	9 908	32 750	2 993	47 652	6 208	**253 724**
2006	129 607	5 400	26 325	34 420	28 785	68 085	36 646	**329 268**
2007	131 489	123 520	129 849	35 620	44 239	72 185	51 616	**588 518**
2008	138 789	186 851	122 341	37 021	46 086	74 679	52 887	**658 654**
2009	141 939	180 002	123 996	38 481	47 986	70 988	64 728	**668 120**
2010	145 357	178 350	118 647	40 004	49 982	86 320	59 980	**678 640**
2011	151 683	184 697	118 634	41 593	51 724	85 525	70 148	**704 004**
2012	154 437	167 666	114 530	42 565	53 403	84 568	78 695	**695 864**
2013	160 486	142 323	119 473	43 830	55 041	54 948	73 982	**650 083**
2014	186 134	133 173	113 790	45 134	66 649	85 334	77 567	**707 781**
2015	167 457	134 622	127 130	46 479	58 238	68 055	80 737	**682 718**
2016	159 071	139 347	106 151	47 867	59 813	70 414	79 918	**662 581**
2017	163 896	144 967	105 871	49 299	61 355	72 446	88 168	**686 002**
2018	115 647	150 770	106 182	50 776	62 886	74 533	84 684	**645 478**
2019	113 862	156 761	107 470	52 300	64 412	74 346	97 475	**666 626**
2020	101 709	167 945	109 867	53 872	65 941	71 489	96 009	**666 832**
2021	94 002	167 440	107 198	55 494	67 462	75 901	43 431	**610 928**
2022	91 082	164 090	108 847	56 633	68 994	65 375	63 945	**618 966**
2023	82 603	162 566	100 042	58 007	70 509	68 707	67 364	**609 798**
2024	39 614	165 614	95 545	59 415	72 029	71 331	72 154	**575 702**
2025	40 588	154 363	92 945	60 858	73 567	34 807	73 400	**530 528**
2026	41 555	105 449	29 914	62 336	75 112	38 051	71 792	**424 209**
2027	45 518	77 810	20 442	63 852	76 667	35 584	76 442	**396 315**
2028	43 475	76 134	21 004	65 405	78 229	31 049	78 416	**393 712**
2029	31 160	74 713	21 161	66 997	79 800	31 925	64 402	**370 158**
2030	0	75 025	21 534	23 589	81 348	9 831	70 616	**281 943**
2031	0	25 547	0	0	120 302	0	25 268	**171 117**
NPV 4,5%	1 432 878	1 530 001	1 071 988	554 687	671 086	771 787	767 337	**6 799 764**
NPV 6%	1 163 940	1 195 799	851 207	431 968	509 565	616 495	592 661	**5 361 635**

Source – Court of Audits (2003 Report)

Table II - SCUTs' State payments: current agreements (after 2010 renegotiations)

(€ Thousands)

	Beira Interior	Beiras Litoral e Alta	Interior Norte	Algarve	Norte Litoral	Costa de Prata	Grande Porto	Total
2011	155 000	175 000	442 000	49 000	59 000	85 000	98 000	**106 3000**
2012	191 000	179 000	135 000	51 000	71 000	98 000	110 000	**835 000**
2013	185 000	150 000	134 000	52 000	75 000	71 000	105 000	**772 000**
2014	179 000	142 000	127 000	54 000	77 000	62 000	110 000	**751 000**
2015	174 000	142 000	125 000	54 000	78 000	70 000	103 000	**746 000**
2016	159 000	144 000	113 000	55 000	78 000	73 000	106 000	**728 000**
2017	153 000	146 000	102 000	55 000	77 000	66 000	105 000	**704 000**
2018	133 000	149 000	100 000	56 000	77 000	68 000	106 000	**689 000**
2019	95 000	152 000	100 000	56 000	77 000	68 000	110 000	**658 000**
2020	84 000	155 000	100 000	57 000	77 000	64 000	110 000	**647 000**
2021	83 000	156 000	98 000	57 000	77 000	66 000	112 000	**649 000**
2022	78 000	150 000	96 000	58 000	77 000	62 000	111 000	**632 000**
2023	73 000	147 000	90 000	58 000	77 000	61 000	109 000	**615 000**
2024	52 000	148 000	85 000	59 000	78 000	61 000	107 000	**590 000**
2025	41 000	145 000	81 000	59 000	77 000	38 000	105 000	**546 000**
2026	39 000	116 000	48 000	60 000	77 000	31 000	103 000	**474 000**
2027	39 000	101 000	27 000	60 000	77 000	32 000	96 000	**432 000**
2028	38 000	97 000	24 000	61 000	78 000	30 000	93 000	**421 000**
2029	25 000	80 000	24 000	66 000	77 000	29 000	91 000	**392 000**
2030	0	72 000	24 000	10 000	77 000	7 000	84 000	**274 000**
2031	0	16 000	0	0	51 000	0	81 000	**148 000**
2032	0	0	0	0	0	0	65 000	**65 000**
NPV 4,5%	1 474 509	1 862 878	1 557 804	707 009	999 939	804 546	1 416 910	**8 823 595**
NPV 6%	1 431 703	1 791 126	1 514 589	677 164	956 034	776 849	1 355 238	**8 502 704**

Source – GASEPC – Gabinete de Acompanhamento do Sector Empresarial do Estado, Parcerias e Concessões (2011 Report)

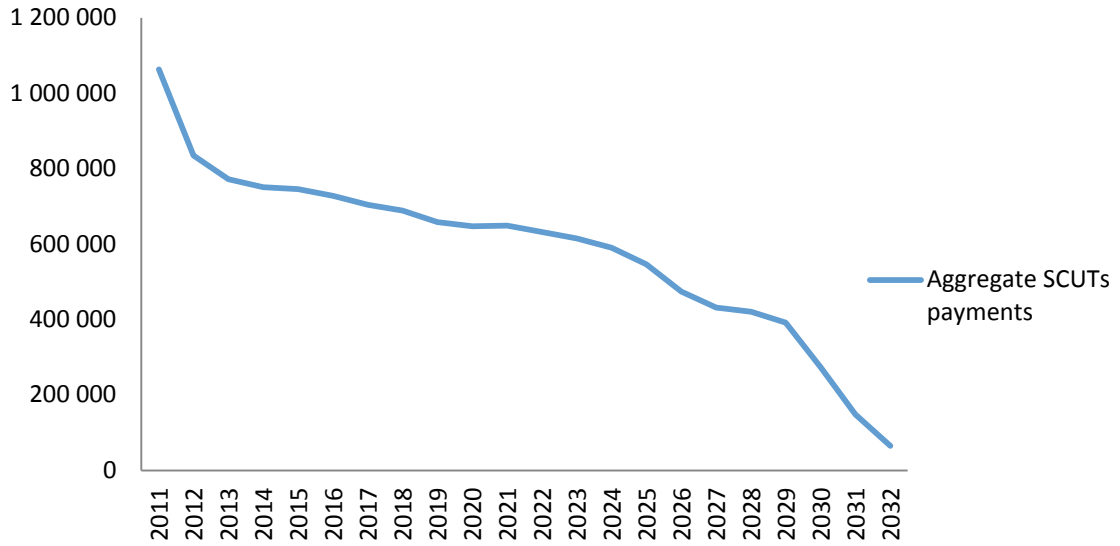
Table III – Absolute difference between current payments and base case payments
(€ Thousands)

	Beira Interior	Beiras Litoral e Alta	Interior Norte	Algarve	Norte Litoral	Costa de Prata	Grande Porto	Total
2011	3 317	-9 697	323 366	7 407	7 276	-525	27 852	**358 996**
2012	36 563	11 334	20 470	8 435	17 597	13 432	31 305	**139 136**
2013	24 514	7 677	14 527	8 170	19 959	16 052	31 018	**121 917**
2014	-7 134	8 827	13 210	8 866	10 351	-23 334	32 433	**43 219**
2015	6 543	7 378	-2 130	7 521	19 762	1 945	22 263	**63 282**
2016	-71	4 653	6 849	7 133	18 187	2 586	26 082	**65 419**
2017	-10 896	1 033	-3 871	5 701	15 645	-6 446	16 832	**17 998**
2018	17 353	-1 770	-6 182	5 224	14 114	-6 533	21 316	**43 522**
2019	-18 862	-4 761	-7 470	3 700	12 588	-6 346	12 525	**-8 626**
2020	-17 709	-12 945	-9 867	3 128	11 059	-7 489	13 991	**-19 832**
2021	-11 002	-11 440	-9 198	1 506	9 538	-9 901	68 569	**38 072**
2022	-13 082	-14 090	-12 847	1 367	8 006	-3 375	47 055	**13 034**
2023	-9 603	-15 566	-10 042	-7	6 491	-7 707	41 636	**5 202**
2024	12 386	-17 614	-10 545	-415	5 971	-10 331	34 846	**14 298**
2025	412	-9 363	-11 945	-1 858	3 433	3 193	31 600	**15 472**
2026	-2 555	10 551	18 086	-2 336	1 888	-7 051	31 208	**49 791**
2027	-6 518	23 190	6 558	-3 852	333	-3 584	19 558	**35 685**
2028	-5 475	20 866	2 996	-4 405	-229	-1 049	14 584	**27 288**
2029	-6 160	5 287	2 839	-997	-2 800	-2 925	26 598	**21 842**
2030	0	-3 025	2 466	-13 589	-4 348	-2 831	13 384	**-7 943**
2031	0	-9 547	0	0	-69 302	0	55 732	**-23 117**
2032	0	0	0	0	0	0	65 000	**65 000**
NPV 4,5%	14 944	-307 980	-528 943	140 329	522 787	1 025 285	-791	**865 632**
NPV 6%	426 536	-65 183	-255 938	333 648	844 370	1 389 353	281 506	**4 686 676**

Source – Authors

VIII. Appendix B

Figure 1 – Aggregate current SCUTs payments per year
2011 – *2032, (€ Thousands)*



Source – GASEPC – Gabinete de Acompanhamento do Sector Empresarial do Estado, Parcerias e Concessões (2011 Report)

Figure 2 – State payments to the SCUT Interior Norte before and after the first renegotiation scenario,
2011-2030, *(€ Thousand)*