

# Bankruptcy and financial distress in PPP projects

## An analysis of the Portuguese case



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July 2020

Dissertation to obtain the master's degree  
Civil Engineering  
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### ABSTRACT

**Keywords:**

Public-Private Partnerships, bankruptcy, financial distress, critical success factors, road transport infrastructure

Public Private Partnerships (PPP) are an increasingly common tool in the conception and design of public infrastructures or services. Combining the efficiency and rigor typically characteristic of the private sector, with the need to reform and develop different areas of public interest, the governments saw in PPP projects a response to the lack of resources, obtaining an alternative to the traditional model.

Several PPP projects were considered viable or successful, either for its financial profitability, for its public use or for having represented lower costs for the State, maintaining the quality and the sectorial knowledge typically superior in the private sector. On the other hand, many PPP projects were considered unsuccessful, either due to high costs, low profitability, reduced public utility or even deficient private performance.

With this study, it is intended to study and evaluate two cases of road PPP financial failure, that is, technical bankruptcy or financial stress, evidencing and justifying which factors led them to such a situation.

The cases under study are the Litoral Centro Concession and the Douro Litoral Concession, two road concessions whose characteristics allow us to conclude on the domain of road PPPs, namely the success/ failure factors typically common to several projects of this nature.

## 1. INTRODUCTION

### 1.1 Background

The Public-Private Partnerships (PPP) model has been a tool used on a global scale at various levels and in various areas, from health, sanitation systems, public transport or road equipment. Portugal was no exception and these projects were applied in different areas, with greater or lesser success.

Regarding the road system, since the 1945 Road Plan there has been no revision of the national road structure, which was verified in 1985 with the creation of the National Road Plan (PRN 85). This, revised with the PRN 2000, aimed to create new accesses, improve accessibility and mobility and reduce socio-economic differences and asymmetries in the Portuguese territory. In total, the roads foreseen in the PRN2000 would add up to 16500 km, representing an increase of 65% compared to what existed.

This plan included a network of highways about 3000 km long. Since the Government intended to accelerate the implementation program of the PRN, in order to complete by the year 2000 the construction of the fundamental network and a large part of the complementary network, it was understood that it would be beneficial for the country to use private investment for the construction and operation of new highways.

Thus, considering the need to increase the supply of road infrastructure and the call to private initiative for

the construction and exploitation of them, Decree-Law No. 9/97 of January 10 was published, which established the procedure for the realization of international public tenders for public-private road partnerships.

The use of PPP models allowed the construction of infrastructure at a pace, which would not have been possible with the traditional model of public works. But, if, on the one hand, the State could have intended to save public financial resources, on the other hand, the contractual limitations associated with erroneous forecasts and low levels of accuracy that often lead to renegotiations or legislative changes, have in many cases led to high spending for the treasury.

### 1.2 Objectives and methodology

This study aims to analyse cases of bankruptcy or financial distress of concessions. As such, two case studies were selected, the Litoral Centro Concession and the Douro Litoral Concession, exploring and relating the various performance factors with the indicators and financial ratios, verifying which variables led to their success/ failure.

In addition, with these conclusions, it is possible to list future solutions and developments that lead to a greater viability of this type of projects, not only from the perspective of the State but also from the perspective of the private grantor.

## 2. LITERATURE REVIEW

### 2.1 Definition of PPP

Although there is no single definition of Public-Private Partnership, for the context of this study, the approach used is the one in which it is argued that a PPP can be understood as a public procurement model, used in the provision of infrastructure and services, in which the public and private sectors establish a contractual or institutional relationship, with pre-established responsibilities. It is also added that a PPP may consist of a public works or public service concession contract and generally includes a significant component of private financing in the form of capital and/ or debt assumed by commercial banking or capital markets [1]. The economic rationale of the PPP model is to seek, when exposed to risk or with a probability of losses, that the private sector achieves a higher level of efficiency, thus increasing the value of projects [1].

### 2.2 Advantages and disadvantages of PPP

The main benefits of PPPs are:

- Enable the introduction of technology and innovation from the private sector in the provision of better public services, through greater operational efficiency;
- Encourage the private sector to deliver projects on time and on budget;
- Impose budgetary certainty by establishing the current and future costs of infrastructure projects over time;
- Allow the transfer of appropriate risk to the private sector during the life of the project;
- Allow the limited capacity of the public sector to be supplemented to meet the growing need for infrastructure and service development;
- Allow the development of private sector resources through joint ventures with large international companies, as well as subcontracting opportunities for local companies in areas such as construction, facilities management, security services, maintenance services, among others [2].

On the other hand, the main risks of PPPs are presented:

- They can lead to higher design costs than in traditional projects. The Government must therefore determine whether the higher costs involved are justified. There are, moreover, several methods for analysing these costs in relation to the benefits arising;
- Although the private sector can obtain financing with greater ease, it is only made available where the company's operating cash flows are expected to provide a return on investment, i.e. the cost

should also be borne by customers or the Government through subsidies;

- The private sector only does what is contracted. Incentives and performance requirements must be clearly defined so they can be easily monitored;
- The State may incur large long-term costs, often triggered by renegotiation processes [2].

### 2.3 Types of PPP

PPPs can be classified in several ways [3]. Each PPP option implies different levels of responsibility and risk to be assumed by the private operator, as well as differences in the structures and forms of contract [4]. The following are the different types of PPP:

- Service contracts;
- Management contracts;
- Lease agreements;
- Concessions;
- BOT;
- Joint Ventures (PPP of the institutionalized type) [4].

### 2.4 PPP model vs traditional model

The main difference between the traditional model and the PPP model is that in the former the State acquires an asset, and in the PPP model not only acquires a service but also possibly an asset [6]. The structure, financing and life cycle of a PPP are significantly different from those of a traditional project. The differences are evident, for example, in portfolio management, asset ownership, project duration, amount of debt and risk, dividend policy and shareholder structure [7]. If there is greater complexity in the PPP contracting model than in the traditional model, the choice for the former should be based on it if it is quantitatively more advantageous. In this way, and to respond to uncertainty, the CSP or CPC (Comparable Public Cost) arises. This value can be understood as the cost of the infrastructure lifecycle in a traditional procurement model, including potential efficiency and service quality gains. This calculation should integrate all the risks inherent in the development of the project, as well as the efficiency gains over time that would result from good public management [1].

### 2.5 Risk sharing and allocation

The concept of risk is naturally associated with the concept of uncertainty. Uncertainty is a characteristic of some aspects of the universe. By reducing the system under analysis to some variables, estimating them is a difficult task, if not impossible. Risk is the uncertainty seen by the individual, in the case of PPPs,

the investor or the State [1]. Risk is divided into three categories:

- Production: planning, design, expropriation, construction, environmental, maintenance, operation, technology, and performance, among others;
- Commercial: demand, competition and collection, among others;
- Context: financing, inflation, legal, regulatory, unilateral modification, public challenge and force majeure, among others [1].

Typically, PPP projects are based on relatively stable models: for a given project, the private sector calculates the necessary CAPEX and OPEX, something that is possible by the existence of similar existing projects, or even by forecasts provided by the Government. Thus, by measuring the risk level of a project, the model calculates the expected return. The structuring and evaluation of a PPP is based on cost and revenue forecasts, as well as an assessment that allows the risk-adjusted return on investment to be determined, and this model is available in a file commonly referred to as a base case. Usually, this file takes on excel format, with all CAPEX, OPEX, projected revenues and/ or any public subsidy [8].

Risk allocation must be preceded by a set of preliminary steps. These include identification, classification, probability quantification, quantification of impact and identification of mitigation measures [9], described below:

- Identification: the progress of any project must be preceded by the identification of all risks that may affect the economic and financial performance of the project;
- Classification: after the identification of project risks, these should be classified according to their nature;
- Quantification of probabilities: allows to measure the reasonableness of a given event to occur. Having the various types of risk and with different probabilities, revenue estimates are likely to be lower than estimated than the estimate of an infrastructure being hit by an earthquake, preventing the provision of the service;
- Quantification of impact: allows the definition of the potential impacts of each identified risk. Combining the probability of occurrence with the impact that results from it, it is possible to hierarchize the risks, with risks with high impact and probabilities being the most critical;
- Identification of mitigation measures: they intend to act on one of the components of the risk, that is, the probability of occurrence and impact. There are risks that do not depend directly on the private partner or the public partner, and it is not possible to predict its occurrence. In such cases, it is

necessary to resort to insurance acting directly on the impact [9].

## *2.6 Bankruptcy and financial distress*

A successful PPP can be defined as a project carried out within the stipulated deadline, within budget and that guarantees Value for Money (VfM). Governments often unilaterally alter project design, destabilising their budgets, and these changes are regarded as an important source of cost overruns [10]. The failure of existing PPP projects can be attributed to:

- inadequate feasibility studies;
- inaccurate traffic forecasts;
- indefinite public contribution [11].

Another factor that can contribute to such failure is the bureaucracy or level of regulation by the public grantor, such as price regulation, regulation in the implementation and regulation of the debt/ assets ratio as well as the sharing and allocation of risk between the parties [12, 13]. Bankruptcy in PPP projects is of two types: financial or economic. Financial bankruptcy usually happens in projects that are economically viable, but in which there is difficulty in paying off debts. On the other hand, economic failure usually characterizes projects with reduced or negative operational profitability and questionable value of operational continuity [14].

## **3. CONTEXT OF THE SECTOR IN PORTUGAL**

The preparation of the package concession program began in 1996, with the first formal steps to be taken with the publication of Decree-Law No. 9/97 of January 10, concerning toll concessions and Decree-Law No. 267/97 of October 2, concerning SCUT concessions (at no cost to the user) [3]. The National Road Network under operation currently comprises 17874 km, 15253 km of IP (Institute of Road Infrastructure) responsibility, of which 13664 km in direct management and 1529 km in sub-concession network. The remaining 2621 km relates to State concessions [15]. The sector consists of 14 concessions of the state Portuguese and 7 sub-concessions directly attributed by IP [16]. The development of the network was mainly due to two factors: regional equity and reduction of road accidents. However, there was no concern about the financing model or the sustainability of the system in the initial implementation period. The first National Road Plan was created in 2000. The development led Portugal to be one of the countries in Europe with the highest density of highways – 28.4 km/ 1000 km<sup>2</sup> when the average is 10 km / 1000 km<sup>2</sup>. Building such an order has led to unaffordable financial pressure on public finances [1]. Over the years described relating to the consolidation of PPPs in Portugal, several

problems and setbacks have arisen. These had essentially three types of consequences:

- financial rebalancing (REF) leading to additional charges to the State;
- impaired hiring principles;
- control and supervision of weakened concessions [3].

The origin of these penalties is based on the failure to comply with the deadline, environmental assessment, political causes, expropriations, reduced technical preparation of tenders, the un-profitable learning process and weaknesses in the organisation of State services [3]. In the case of concessions of the Portuguese State, IP is responsible for making payments that instil to the State and is also the holder of toll revenues [16]. PPPs can be divided into 3 groups:

- Paid concessions based on a road availability scheme: their remuneration is currently composed of a payment relating to the availability of infrastructure, adjusted either for deductions related to availability failures or for the impact of the evolution of accident rates;
- Granting of real toll combined with annual payments of the grantor: presents a remuneration scheme based, in the first line, on the toll revenues, the ownership of which is transferred to the concessionaire, combined with annual payments of the grantor, in the contractually provided terms.
- Toll concession: concessionaires maintain a remuneration system based on toll revenues charged directly by concessionaires to infrastructure users [17].

For IP sub-concessions, the following models can be identified:

- Payments for the availability of roads;
- Payments per service (remuneration based on the level of traffic actually verified in the infrastructure);
- Deductions related to performance and availability failures such as penalties associated with environmental and loss externalities [17].

## 4. ANALYSIS METHODOLOGY

### 4.1 Case studies

This study seeks to follow a global and demonstrative analysis of what are the two PPPs under study: the Litoral Centro Concession and the Douro Litoral Concession. The Litoral Centro Concession has as its object the design, construction, increase in the number of roads, financing, conservation and operation, under toll, of the following hauls:

- a) IC 1 – Marinha Grande (A 8 – IC 1) – Lourical (IC 8);
- b) IC 1 – Lourical (IC 8) – Figueira da Foz (A 14 – IP 3);
- c) IC 1 – Figueira da Foz (A 14 – IP 3) – Quaias;
- d) IC 1 – Quaias - Mira.

It also includes the design, construction, financing and transfer to the grantor, of the haul:

- e) IC 8 – Lourical (IC 1) – nó de Pombal (A 1 – IP 1).

These referred hauls total 92.7 km between Marinha Grande and Mira. This concession is in the coastal area of the Continent and integrates the second North-South road axis, connecting the two main cities of Portugal: Porto and Lisbon. The concessionaire's remuneration corresponds to the revenue of the actual toll charged to the users of the same, and the public entity managing the contract is the Institute of Road Infrastructure, IP.

The contract includes several key clauses highlighting the conditions and criteria of financial rebalancing/compensation, in which it can be read that if the public grantor will require a route for hauls and sub-signs not located in the proposal, there may be a replacement of the financial balance (REF) of the concession or the allocation of compensation. Another criterion in the contract states that a decrease of at least 0.01% in the nominal Internal Rate of Return (IRR) of the shareholders constitutes reason for a REF request. In the period between 2008 and 2012, the concessionaire submitted several requests for financial rebalancing, either by updating the compensation/ financial charges, by changes in layout and additional works, by cases of force majeure or by legislative changes of a specific nature (such as the introduction of tolls, for example).

The Douro Litoral Concession has as its object the design, construction, increase in the number of roads, financing, conservation and exploitation, with toll collection to users, of the following hauls:

- a) A32/ IC2 – São João da Madeira (ER237) / Carvalhos (IP1);
- b) A41/ IC24 – Picoto (IC2) / Nó da Ermida (IC25);
- c) A43/ IC29 – Gondomar / Aguiar de Sousa (IC24).

The concession also incorporates the subject matter of the concession, for the purpose of operation and maintenance, without charging tolls to users, of the following hauls:

- d) EN14 – Ameal (IC23) / Leça do Balio (IP4);
- e) A1/ IC1 – Coimbrões (IC23) / Ponte da Arrábida (Norte);
- f) A1/ IC2 – Nó de Santo Ovídio (IC2) / Coimbrões (IC1);

- g) A20/ IP1 – Carvalhos (IC2) / Nó da VCI (IC23);
- h) A20/ IC23 – Nó de Francos (IC1) / Nó da VCI (IP1);
- i) A28/ IC1 – Ponte da Arrábida (Norte) / Sendim (IP4);
- j) A41/ IC24 – Espinho (IC1) / Picoto (IC2);
- k) A43/ IC29 – Ponte do Freixo Norte (IP1) / Gondomar;
- l) A44/ IC23 – Coimbrões (IC2) / Ponte do Freixo Sul (IP1).

These hauls make up a total of 132.5 km of which 82 km on highway between Gondomar and Aguiar de Sousa, São João da Madeira and Carvalhos, and Picoto and Ermida.

The concession contract was signed on 28 December 2007 ending at 24 hours on the day of the 27th anniversary of the signature, in the case of points (a), b), c) and j). For the hauls referred to in points d), i), k) and l), the term of the Concession shall be five years from the 60th day after the date of signature of the concession contract, automatically expiring at 24 hours on the day on which the 5th anniversary of that day takes place.

The concessionaire's remuneration corresponds to the revenue of the toll charged to the users of the highway flights, and the public entity managing the contract is the Institute of Road Infrastructure, IP. The concessionaire is AEDL – Autoestradas do Douro Litoral, S.A..

The contract includes several key clauses highlighting the clause conditions and criteria of financial rebalancing / compensation, in which it can be read that if the public grantor will require a route for hauls not located in the proposal, there may be a replacement of the financial balance (REF) of the concession or the allocation of compensation. Another criterion in the contract states that a decrease of more than 0.01% in the nominal IRR of the shareholders, constitutes reason for a request for REF. In the period between 2011 and 2013, the concessionaire submitted several requests for financial rebalancing, either by changing the layout and additional works, delays in the availability of land, specific legislative changes, cancellation of other projects or nonviability of the work.

#### 4.2 Analysis methodology

It is used an analysis methodology that combines several factors or subfactors of several approaches studied. Thus, the analysis combines the following points, the description of which can be observed:

1. Project description – brief description of the project, mentioning the hauls of the road infrastructure, its geographical location, the date of signature of the contract and the concession period;

2. Shareholder structure - information about the companies that make up the concessionaire;
3. Remuneration model - information about the model adopted in each case study;
4. Conditions for financial rebalancing (REF) – description and enumeration of the criteria for applying for REF as well as description of the requests made by each concessionaire under study;
5. Public procurement model - description of the public procurement process employed in each case study;
6. Allocation and risk sharing - analysis on transfer and risk sharing between the public and private sectors;
7. Political and public support – analysis of political and public support for the infrastructure concerned, from design and procurement, to built infrastructure and entry into service;
8. Economic and financial analysis – description and sampling of various financial indexes and ratios that highlight the economic and financial situation of the two case studies, drawing conclusions on their feasibility. The financial indexes used are revenue volume, EBITDA, net results, bank debt, assets, liabilities and equity. The financial ratios used are net margin, bank debt/ equity, bank debt/ EBITDA, solvency and financial autonomy;
9. Overall analysis of the concession - conclusion on the overall viability of the concession, combining the various factors.

Subsequently, a comparison is made between the case studies and other selected cases. To carry it out, it is necessary to make a brief description of the two cases selected for comparison, analysing their hauls, size, shareholder structure, date of signing of the contract and term of the concession. The following indicators are then compared using the following indicators:

- Shareholder's IRR;
- debt per km built;
- EBITDA per km built;
- Average Daily Traffic (ADT) per km built;
- assets and liabilities;
- operating income per km built.

Following this methodology, it is possible to understand the reality of the two concessions under study, comparing them with two cases of national road concessions, investigating the differences that highlight the real state of the former.

## 5. RESULTS AND DISCUSSION

### 5.1 Litoral Centro Concession

Regarding the risk, observing the risk matrix of this project, it is observed that it was transferred to the private sector. This evidence stems from the fact that the four risks addressed in section 2.6 were transferred to the private sector. Table 1 gives a summary of the risk matrix.

Table 1 – Risk matrix

Construction risk	Situation
The State does not have a duty to make regular payments for the infrastructure regardless of the state in which it is located.	Construction risk transferred
Availability risk	
State payments decrease, through penalties, or cease in case certain performance criteria are not met.	Availability risk transferred
Demand risk	
The State is not contractually obliged to ensure a certain level of payments regardless of the level of demand for users.	Demand risk transferred
Other factors	
Guarantees provided by the State: existence of financing contracts involving State guarantees.	Non-existent
Early redemption: in case of redemption, the State must pay the asset for a value different from its market value.	Non-existent

Regarding the deadline, there were delays in the sections of that concession, and the inauguration of the last section of the A17 (CI 1) took place in May 2008, one year later than planned (May 2007). Also, the result of a delay in the completion of construction work on the Costa de Prata Concession, the second Lisbon-Porto corridor, was only established in September 2009, with the opening of the Angeja – Estarreja haul (the opening was scheduled for May 2004). In relation to the cost, this concession had a construction/ operation investment of €550.700.000 plus the costs of delays, which according to the contract may have amounted to the value of €62,500 per day of delay. Thus, the total investment in the Litoral Centro Concession amounted to the value of €592.000.000, being higher than the estimated cost. Initially, this corridor allowed for a period of strong growth in traffic and circulation levels, and after about a year of high growth, this trend reversed. The introduction of tolls in the concession mentioned above involved a significant reduction of the expected Average Daily Traffic (ADT), with an inherent reduction in revenues and with consequent reduction of the shareholder IRR from 9,35% to 9,34%, representing a decrease of at least 0,01%, which is the reason for a ref request.

From the analysis to the financial indicators, it is concluded that between 2009 and 2018 the concessionaire only obtained positive net results in 2015 and 2018, which reflects the state of the same. The main reason for such results is the drop in turnover, something provided for in section 2.7, as one of the reasons for technical bankruptcy or financial distress. Revenue volume was significantly lower than estimated in the base case of the contract, which combined with lower or expected operating costs, led to lower EBITDA and net results, on the one hand, and high amounts of bank debt on the other. The indicators, in the same sense, indicate a lack of cash flows for the fulfilment of obligations. The main reason for the results of revenue volume below expected, as already mentioned, is the drop in traffic.

In relation to the balance sheet, the asset is lower than the liability, which is materialized in an unsustainable financing structure. From the analysis of the financial ratios, it is again concluded that according to the ratio of financial autonomy, the liabilities are higher than the assets and indicate an unsustainable financing structure.

It is noted that 2012 was a year of high decrease in net results, with a high decrease in equity, which led to a significant decrease in financial autonomy and solvency. This volume of negative results is associated not only with the decrease in traffic, but also with the recognition in 2012 of losses in their assets over the previous years. In fact, the financial statement of that concessionaire contains the justification for the existence of evidence of impairment associated with the concession contract, resulting from the actual traffic levels presenting significant deviations from the base case. For this reason, the concessionaire carried out impairment tests, considering the cash-flows projections until the end of the concession contract period, based on current traffic projections. As a result of this evaluation, amortization reinforcements were carried out, associated with impairment losses, which resulted in a variation in this expense component of €398,862.00. Subsequently, the excess debt, combined with the materialization of the traffic risk, resulted in a non-compliance of the contracted debt service, and the debt assumed a value greater than 100% of the invested capital. In the years 2015 to 2018, the bank debt/ EBITDA ratio decreased significantly as a result of a slight reduction in debt combined with an increase in EBITDA. The net margin has also increased as a consequence of better results in these years, something that, although positive, does not cover the high indebtedness of the concession. The concession has a better financial autonomy although it remains negative and presents negative solvency values.

## 5.2 Douro Litoral Concession

Regarding the risk, observing the risk matrix of this project, it is observed that it was transferred to the private sector. This evidence results from the fact that the four risks addressed in section 2.6 were transferred to the private sector. Table 2 gives a summary of the risk matrix.

Table 2 – Risk matrix

Construction risk	Situation
The State does not have a duty to make regular payments for the infrastructure regardless of the state in which it is located.	Construction risk transferred
Availability risk	
State payments decrease, through penalties, or cease in case certain performance criteria are not met.	Availability risk transferred
Demand risk	
The State is not contractually obliged to ensure a certain level of payments regardless of the level of demand for users.	Demand risk transferred
Other factors	
Guarantees provided by the State: existence of financing contracts involving State guarantees.	Non-existent
Early redemption: In case of redemption, the State must pay the asset for a value different from its market value.	Non-existent

Regarding the deadline, the works of the Douro Litoral Concession, due to changes and additional works, in the provision of land and events of force majeure, were delayed, namely in the environmental approval of the solutions for the crossing of the stream of Carvalha and Ribeira de Gende. In relation to the cost, this concession had a construction/ operating investment of €777.700.000, plus the overdue costs, the over costs arising from weather conditions and the over costs arising from the imposition by the grantor of changes to the vertical signalling project of the A41 and the A32 and the placement of security guards. Thus, the total investment in the Douro Litoral Concession had a total cost of €1.000.000.000, a value above the estimated. The value of ADT for the year 2011, is substantially below the traffic forecasts for the concession, being one of the reasons pointed out by the concessionaire, the suspension of the Concession Autoestradas do Centro, which should have been completed in 2012, feeding traffic to the Douro Litoral network. Thus, the ADT values for the following years are below the predicted value. This drop in traffic prompted a request for REF, considering the reduction of the shareholder IRR from 6,99% to 6,98%, representing a decrease of more than 0,01%.

From the analysis to the financial indicators, it is concluded that between 2009 and 2018, except for 2017, the concessionaire never obtained positive net results. The main reason for such results is the drop in turnover, something that had been predicted in section 2.7 as one of the reasons for technical bankruptcy or financial distress. Revenue volume was significantly lower than estimated in the base case of the contract, which combined with lower or expected operating costs, led to lower EBITDA and net results and high bank debt values. The indicators, in the same sense, indicate a lack of cash flows for the fulfilment of obligations. The main reason for the results of revenue volume below expected, as already mentioned, is the drop in traffic. In relation to the balance sheet, the asset is lower than the liability, which is materialized in an unsustainable financing structure.

From the analysis of the financial ratios, it is concluded that according to the ratio of financial autonomy, it is verified that the concessionaire reveals a great dependence on financing. It is noted that 2012 was a year of high decrease in net results, with a high decrease in equity, which led to a significant decrease in financial autonomy and solvency. This volume of negative results is associated not only with the decrease in traffic, but also with the recognition in 2012 of the loss of value in their assets over the previous years. In fact, the financial demonstration contains the justification for the existence of evidence of impairment associated with the concession contract, resulting from the actual traffic levels presenting significant deviations from the base case. For this reason, the concessionaire carried out impairment tests, considering the cash-flows projections until the end of the concession contract period, based on current traffic projections. As a result of this evaluation, amortization reinforcements were carried out, associated with impairment losses, which resulted in a variation in this expense component of €376.065.000. Subsequently, the excess debt, combined with the materialization of the traffic risk, resulted in a non-compliance of the contracted debt service, and the debt assumed a value greater than 100% of the invested capital. In 2013, the inflection of operating results stands out, with a positive value of more than half a million euros, contributing to the growth of 11% of traffic compared to the previous year. In the absence of any variability of the predicted negative cash-flows, there was no effective existence of control in this concessionaire, so it was not included in the consolidation perimeter of Brisa. In 2014 and 2015, the continued growth of traffic materialized again in positive operating results. It should also be noted that there is a continued trend towards substantial growth in traffic levels in the following years and the consolidation of toll revenues, which, although still considerably lower than the initial projections,

ensure positive operating results. In recent years solvency remains negative, as has financial autonomy, which has nevertheless been a stabilisation. The bank debt/ EBITDA ratio shows that, despite decreasing for the available data, it still shows great difficulty for the concessionaire to pay its bank debt based on EBITDA generation.

### *5.3 Comparison with other concessions*

From the comparison with the Portuguese concessions and sub concessions, it is possible to observe that the IRR of the Douro Litoral Concession and the Litoral Centro Concession are below the average, which demonstrates that although they may be considered high, they are not a factor of failure in the face of the risk involved in both projects.

On the other hand, addressing the comparison between the two concessions under study and the selected ones, Brisa and Atlântico Concessions, it is possible to see that the amount of debt per km built in the Litoral Centro and Douro Litoral concessions is always higher than the average in those years, unlike the other concessions in which it is lower or even significantly lower. It is important to note that in those years, the debt per km constructed from the first two concessions is quite high compared to the average value, which demonstrates their financial status. Addressing the EBITDA/ km built, compared to 2010, the Litoral Centro Concession presents an above average value (such as the Atlantic Concession) and Brisa and Douro Litoral are below the average value. From 2011, the trend was reversed for the Litoral Centro Concession, always being below the average value. In the case of the Douro Litoral Concession, it is observed that, except for 2017, the value was always lower than the average value. It is possible to conclude that the Average Daily Traffic (ADT) per km built in the Litoral Centro Concession is above the average value, a value conditioned by Brisa, whose size of 1099 km compared to 92.7 km of Litoral Centro, dilutes its value of ADT. Still, comparing these values with those of the Atlantic Concession, whose size of 170 km is closer to Litoral Centro, it is possible to see that they are smaller. Regarding the Douro Litoral Concession, it is possible to observe that the values of ADT per km built are below the average until 2016, when a value equal to or greater than the average value is finally obtained. In view of the aforementioned constraint related to Brisa, it is notorious the failure of this concession in relation to this indicator, that is, even knowing that Brisa, by its size and the impossibility of there being proportional traffic to its entire network, contributes to a sharp reduction in the average value of ADT per km built, the Douro Litoral Concession is below this for six of the nine years under study. It is denoted that this comparison may be unfair compared to other indicators, since there are factors such as location, need for use or dimension, which may condition the value of ADT/ km built. It is possible to observe that only Brisa consecutively presents asset values above the values of liabilities, and eventually, the Atlantic Concession ended up reaching asset values higher than liabilities (2018). Regarding

the Litoral Centro and Douro Litoral concessions, it is denoted that the value of assets is constantly much lower than liabilities, which effectively demonstrates the financial stress that these two concessions show. In the sense of the evolution of assets in relation to liabilities, it is possible to observe that, similarly, the operating income per km of the Litoral Centro Concession, are from 2010, below the average value, except for the year 2015. In the case of the Douro Litoral Concession, the operating income per km built is constantly below the average value, except for the year 2017. The Atlantic Concession begins to be in 2010 below the average value as in 2011 ends up evolving towards presenting above average values. Finally, Brisa always presents values above the average value, in relation to operating income per km. From the comparison between these concessions, it is possible to observe the high disparity of financial health between the concessions under study and the Atlantic and Brisa concessions, and it is clear that the first two are in a clear situation of technical bankruptcy, unlike the following two.

## **6. CONCLUSION AND FUTURE DEVELOPMENTS**

### *6.1 Conclusion*

The concessions under study reflect a set of obstacles and adversities that extend to other projects of this nature, having had a marked impact on the former. In fact, the Litoral Centro and Douro Litoral are two concessions that are in technical bankruptcy or financial distress, not being financially sustainable. The main reason for this failure is the breakdown of traffic, the origin of which lies in the over-optimism of its estimates, in legislative changes, in the cancellation of projects adjacent to the infrastructure concerned or in the oversupply for similar routes. In fact, as set out in section 2.7, typically the causes of technical bankruptcy or financial distress stem from a poorly calculated risk of demand, which, combined with insufficient demand, leads to insufficient revenue stemming from costs. Extending the study to the entire universe of road PPP in Portugal and even to other sectors, it is observed that there is no government model that allows the transfer of knowledge between projects and even between sectors. This increases the pressure on the Government and its business incapacity, which leads to a weakened position in the risk assessment of projects. In the cases under study, the State was subject to a very high risk associated with also high nominal IRR and a low IRR change value for which REF can be requested. One of the possible reasons for this is that there is too much supply (e.g. several infrastructures for the same routes), which leads to a lower predisposition of private individuals to carry out certain projects because they present high risk of demand. The fact is that Portugal has a network of highways whose density is quite high compared to the European average, not presenting traffic data that justify it, unlike



many of the countries in Europe. It should also be noted that the estimates of the IRR include recurrent maintenance costs that may not correspond to reality, representing the so-called shadow gains for shareholders. It is relevant that there is greater monitoring by the State, not only to monitor this type of occurrences, but also to evaluate contractual and effective management decisions and strategies, based on previous projects. On the other hand, it is beneficial (and since 2003 mandatory by law) to use the Public Comparator to investigate the need to adopt the PPP model in relation to the traditional model. The justified choice of the traditional model could have led to positive results contributing to financial gains for the public sector. It is also important to note that legislative changes that directly affect existing contracts are not recommended, since with these changes it is natural to change the risk matrix leading to the possibility of reducing shareholder IRR, which has as a consequence requests for REF by concessionaires which leads to higher public expenditure. If the risk matrix of a concession is changed, the shareholder IRR must be renegotiated in the same way. Finally, it is important to mention that although it does not have a direct impact on the success/ financial failure of PPPs, transparency is a fundamental criterion in the public perception of what PPP projects are and their feasibility, and this criterion could have been developed in a clearer way.

## 6.2 Future developments

Addressing the PPP area in a more generic way, but applied to the theme of road PPPs, a set of solutions is presented that can contribute to both. It is very important that there should be a greater investment in academic studies related to PPPs, which would allow to analyse:

- the future of this type of public procurement model, looking for new, more efficient forms of implementation, which constitute an added value for the State;
- more accurate traffic forecasts;
- the comparison between the average IRR by country, relating them to the risk involved in the projects;
- the risk involved in each area, in a generic way and adaptable to each project.

In another sense, it would be very important to ensure the implementation of the Public Comparator in order to understand whether it is preferable to implement the PPP model or the traditional model, in terms of costs for the state. Although it is mandatory by law, it must be ensured that it is in fact used, under penalty of harming public accounts. As in other countries, it would be beneficial to bet more sharply on a PPP

office, somewhat like UTAP (Technical Unit for Project Monitoring), but with developments that allow:

- knowledge sharing between projects and areas;
- planning and design of contracts;
- monitoring and effective management of contracts, seeking to monetize concessions, reducing factors such as shadow gains referred to in the previous section;
- knowledge sharing between academics, managers and politicians in order to ensure continuity, correlation and knowledge transfer between projects in the medium/ long term, contrary to adversities of the party agenda that may be formed throughout the design of the projects;
- accountability of the institutions and politicians involved in the projects, seeking to analyse and evaluate continuously the factors of failure of each project.

A solution that would be very beneficial to the treasury, recommended by Sarmiento and Reis (2012) [18], is for the State to acquire the former SCUT and sub concessions, buying the future cash-flows of the companies at an update rate of 16%, which is the capital asset pricing model average of the concessions, that is, the rate that relates the risk and the expected return of an investment. The State would thus acquire these projects, using public debt at 3% of interest. With this amount received, the concessionaires would be able to pay their bank debt, distributing the remaining amount to their shareholders. According to Sarmiento and Reis (2012) [18], private individuals could consider this solution to be very beneficial, given the lack of liquidity of most investors in PPPs (mostly in the construction sector). This measure, according to the authors, could lead to a decrease of 600 million euros per year in the burden on the public deficit, in projects that still have twenty years ahead. On the other hand, in the case of sub-concessions, the State would buy equity, i.e. the net value of each parent company's assets. In short, it would be a 16% debt exchange for a 3% debt, and on the other hand, a response to the need to provide liquidity to private individuals. This development, having been thought by two authors with great experience in the sector, is inserted in this dissertation because it is a very beneficial solution for it, resulting in savings for the State and mitigation of a problem that has represented very high costs for the country and for shareholders.

PPPs are a very useful tool, which have had importance for Portugal, for example, from the discovery of new territories in the Age of Discovery to the implementation of a national road network. Today, in order to have the same public utility effect, they must be accompanied in a transversal, deep and complete

way. For this, it is necessary to make changes observing cases such as those studied in the scope of this study, to correct future undertakings. It is important that the various actors in public projects, whether the Government, investors, the public / users of infrastructure / services or the media, do not judge this model of procurement, ideologically, that is, being for or against, *a priori* and generically. It is important that each of these actors understands that the choice should fall on this procurement model when there are two conditions simultaneously: quality/ usefulness for the user and savings for the State. Any choice that deviates from one or both conditions is not the optimal solution, whatever the procurement model.

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