

FUNDAÇÃO GETÚLIO VARGAS
ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

AMAL NAIT HAMMOU

Performance of Incentive Contracts in Highway PPP Projects in Brazil

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Advisor Prof. Dr. Julia Alice Sophia von Maltzan Pacheco

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ABSTRACT

Private-Public Partnerships (P.P.P.) is a new contractual model institutionalized in 2004 that could be used to remedy to the infrastructure deficit in Brazil. In a context of a principal and agent relation, the public partner goal is to give incentives to the private partner in the contract so that their interests are aligned. This qualitative research presents the findings of an empirical study examining the performance of incentive PPP contracts in Brazil in the highway sector. The goal is to explain how the contracting parties can align their interests in an environment of asymmetric information. Literature identified the factors that can influence PPP design and efficient incentive contracts. The study assesses the contribution of these factors in the design of PPP contracts by focusing on the case of the first and only PPP signed in the highway sector in Brazil which is the MG-050. The first step is to describe the condition of the highway network and the level of compliance of the private partner with the contract PPP MG-050. The second step is to explain the performance of the private partner and conclude if the interests of both partners were aligned in contractual aspects. On the basis of these findings and the analysis of the contract, the study formulates suggestions to improve the draft of PPP contracts from the perspective of the incentive theory of contracts.

KEY WORDS: Public-Private Partnership, contract incentives, incomplete contracts

RESUMO

A parceria público-privada é um novo modelo contratual institucionalizado em 2004 que pode ser usado para remediar o déficit em infra-estrutura no Brasil. No contexto de uma relação principal-agente, o objetivo do parceiro público é dar incentivos contratuais ao parceiro privado para que os interesses de ambos sejam alinhados. Essa pesquisa qualitativa apresenta os resultados de um estudo empírico que examina o desempenho dos contratos de PPPs com incentivos no Brasil no setor das rodovias. O objetivo é explicar como os contratados podem alinhar seus interesses num ambiente de informação assimétrica. Literatura identificou os fatores que podem influenciar o desenho das PPPs e dos contratos com incentivos eficientes. Esse estudo avalia a contribuição desses fatores no desenho dos contratos de PPPs focando no caso do primeiro e único contrato PPP assinado no setor de rodovias no Brasil, o PPP MG-050. O primeiro passo é descrever a condição da rede de rodovias no Brasil e o nível de cumprimento do parceiro privado com o contrato PPP MG-050. O segundo passo é explicar o desempenho do parceiro privado e concluir se os interesses dos dois parceiros foram alinhados em aspectos contratuais. Com base nesses resultados e na análise do contrato, o estudo formula sugestões para melhorar o desenho dos contratos de PPPs apoiando-se na teoria dos incentivos em contratos.

PALAVRAS-CHAVE: Parcerias Público Privadas, incentivos em contratos, contratos incompletos

Table of Content

Chapter 1. Introduction	13
1.1. Benefits of Investments in Transport Infrastructure	13
1.2. Definition of PPPs	14
1.3. History of PPPs	16
1.4. Definition of PPP Framework in Brazil	18
1.5 History of Brazilian PPPs in Highways	20
1.6. Objectives of the Study	25
Chapter 2. Literature Review: Key Success Factors for PPP Planning	28
2.1. Definition of Interests for the Contractual Parties.....	29
2.2. Risk Management.....	33
2.2.1 Moral Hazard Risk	33
2.2.2. Credit Risk.....	39
2.2.3 Relationship Risk	40
2.2.4. Contract Risk.....	42
Conclusion of the Literature Review	43
Chap 3. Methodology	44
3.1. Participants	44
3.2. Research Design: Procedures	45
3.3. Data Analysis	48
Chapter 4. Empirical Data: Factors Impacting Highway Management in Brazil	50
4.1. Operational Conditions of the Highway Network in Brazil.....	50
4.2. Causes of the Operational Conditions of the Highway Network in Brazil	54
Chapter 5. Case Study Presentation: the PPP MG-050.....	61
5. PPP Environment	61
5.1. Governance of PPPs in the State of Minas Gerais	61
5.2. MG-050 Basic Data.....	64
5.3. Performance of the SPV	68

Chapter 6. Case Study Analysis: The Incentive Level of the Contract PPP MG-050 72

6.1. Overview of the Incentive Structure 72

6.2. Application of the Theoretical Framework to the Main Contractual Responsibilities of the SPV..... 82

6.3. Reasons for Misaligned Incentives 88

6.4. Recommendations 92

Conclusion..... 97

References 99

Appendix 106

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Glossary

P.P.P: Public-Private Partnerships

MG-050: the name of the PPP project based on the name of the highway that is located in the state of Minas Gerais (MG)

C.P: *Contrasprestação Pecuniária* in Portuguese stands for the subsidy paid by the public partner to the private partner)

Q.I.D: *Quadro de Indicadores de Desempenho* in Portuguese stands for the table of Performance Indicators that the private partner needs to comply with to receive the subsidy

S.P.V: Special Purpose Vehicle stands for the legal structure of the private partner

List of Figures and Tables

Figure 1.1: PPPs Classification Based on Risk Level.....	15
Figure 1.2: Maturity Curve of Some Countries in PPP Development.....	18
Figure 1.3: Share of the Highway Network in the Transportation Matrix in Brazil....	21
Figure 1.4: Share of Paved and Non-Paved Road Network in the Brazilian Network.	22
Figure 1.5: The Three Phases of the Federal Highway Concession Program in Brazil (1995-2012).....	24
Figure 1.6: Main Phases of a PPP Project.....	26
Table 2.1: The Multidisciplinary Aspects of PPPs.....	28
Figure 2.2: Investment in Infrastructure Based on the Percentage of GDP in 2008....	30
Table 2.3: Evolution of Infrastructure Investment in Brazil from 1970 to 2012 (% GDP).....	31
Table 2.4: The Evolution of Highway Length Extension (1960-2010).....	31
Figure 2.5: Two Types of Tendering Models.....	36
Figure 2.6: The Typical Approval Process and Stakeholders for a PPP at the State Level.....	41
Table 3.1: PPP Highway Projects Announced by the Ministry of Transportation.....	45
Table 3.2: Data Description.....	47
Figure 3.3: The Theoretical Foundations.....	49

Figure 4.1: Map of the Highway System in Brazil.....	51
Figure 4.2: Comparison of Highway Densities in the State of Sao Paulo in Brazil, California, France, Spain and Germany in 2011	52
Figure 4.3: Comparison of Fatal Accidents on the Highway in Brazil, the Union European and the U.S.A.....	53
Figure 4.4: Comparison of Investment on Highways Based on Percentage of GDP in Brazil, China and the US.....	54
Figure 4.5: Ongoing Highway Investment in Brazil in 2012.....	55
Figure 4.6: Map Illustrating the Potential Regions for PPPs and Private Concession Use	57
Figure 4.7: Highway Quality Assessment Over Time.....	58
Table 4.8: Current Situation of the Brazilian Highway Network and Impact on Contractual Parties of PPPs	59
Figure 5.1: Overview of the Approval Process for the PPP MG-050.....	63
Figure 5.2: The Three Main Groups of Stakeholders of the PPP.....	64
Figure 5.3: Map of the Drawing of the Highway MG-050.....	66
Table 5.4: Main Components of the Revenue of the SPV.....	68
Table 5.5: Total Number and Value of Delayed Works and Works with Defaults.....	68
Figure 5.6: Average QID Grade for the SPV from Year 3 to Year 7.....	69
Figure 5.7: Total Number of Accidents in the MG-050 from 2003 to 2013.....	70
Figure 5.8: Annual Revenue of the SPV (in million of R\$).....	71
Figure 6.1: Description of the Payment Mechanism of the CP.....	74
Figure 6.2: Composition of the Final QID Grade.....	75
Figure 6.3: Operational Indicators of the QID.....	76
Figure 6.4: Environmental Indicators of the QID.....	77
Figure 6.5: Financial Indicators of the QID.....	79
Figure 6.6: Social Indicators of the QID.....	80

Figure 6.7: Table of Fines for Each QID Indicator.....81

Chapter 1. Introduction

"Public-Private Partnerships are not supposed to cure the weaknesses of the Brazilian public sector. If efficiently designed and implemented, they are rather the opportunity to significantly contribute in reducing the infrastructure gap of the country." (Bacha, 2013; p.9)

1.1. Benefits of Investments in Transport Infrastructure

All nations share the same need to construct, repair and, modernize their infrastructure. Infrastructure investment initiatives are more urgent in developing countries that lack basic services (Levy, 1996). Improving infrastructure facilities yields economic gains by increasing economic growth, human welfare and competitiveness of the country. Inequality does not only decline with a larger stock of infrastructure, but also with improved quality (World Bank Toolkit, 2009).

Investment in transportation holds economic, environmental and social benefits for a series of stakeholders. Theory shows that countries with a high level of transportation investment reduce travel time and cost for users on top of increasing reliability and connectivity. This increased productivity and efficiency in market access are benefits for the business community. The consequent economic growth is then captured by users, taxpayers, business and public authorities (Zhang, 2006).

Infrastructure investment spending in the world in the 2000's accounted for 3,26 % of the GDP at Purchasing Power Parity while researchers estimate that this proportion should be of 4,5% of the world GDP. In terms of sectors, telecommunications is the sector that receives the most investment. While transportation and energy are increasing their shares worldwide investment in water is decreasing. Within the transportation sector, the highways segment is leading with a 0,38 % share of the world GDP (PPI, 2013).

Due to the difficulty to exclude non-payers to use the infrastructure service¹, the public sector has historically been in charge of providing and financing infrastructure investment because it is associated with positive externalities². The democratic ideal also

¹ It is referred to the so-called free rider problem.

² An externality is positive if the social benefit is superior to the private gain.

urges governments to provide citizens with infrastructure even for the population that cannot afford it (World Bank Toolkit, 2009).

Until the nineties, public investment and privatization were the instruments most used to finance infrastructure investment. However, since 1995, the emergence of hybrid institutional arrangements called the Public-Private Partnerships (PPP)³ has occurred impacting cooperation frameworks between public and private players (World Bank Toolkit, 2009).

1.2. Definition of PPPs

Three major options for infrastructure provision exist: direct public provision, contracting-out and public-private partnerships. PPPs are becoming tools increasingly used by governments with budget constraints to faster meet the needs of infrastructure development (Hodge, 2004). The PPP emergence reflected the private economic interest to provide services that were traditionally fulfilled by the public sector.⁴ From 1990 to 2012, the worldwide number of infrastructure projects with private participation in water and sewage, transportation, telecom and energy sectors⁵ increased yearly by 5% to reach an accumulated of more than 2.400 projects (Private Participation in Infrastructure Data Base, 2013).

Despite their continuous popularity around the world, PPPs remain a vague notion because they cover a diversity of contracts, governance arrangements and operations (Asian Development Bank, 2000; AusCID, 2003; European Commission, 2003). Internationally, the term PPP refers to a broad concept including several types of structures. Besides, according to the World Bank Toolkit (2009), other terms are internationally used to describe the partnership between the public and the private sectors such as PFI (Private Finance Initiative), PPI (Private Participation in Infrastructure) or PSP (Private Sector Participation).

Considering the lack of consensus on the concept definition, PPPs can be defined based on two trends: PPPs can be considered new governance tools or rhetoric tools (Teisman and Klijn, 2002).

On the one hand, when considered as governance tools, PPPs are institutional arrangements with three basic characteristics: “long-term orientation”⁶, “significant risk-sharing” and “cooperation resulting in a joint-production”. The definition of PPP coined by Van Han Ham and Koppenjan (2001) reflects these three criteria: “cooperation of some sort of durability between public and private actors in which they jointly develop products and

³ For future references to the term Public-Private Partnership, the abbreviation PPP will be used.

⁴ The reasons of this increasing interest are detailed in section 1.3.

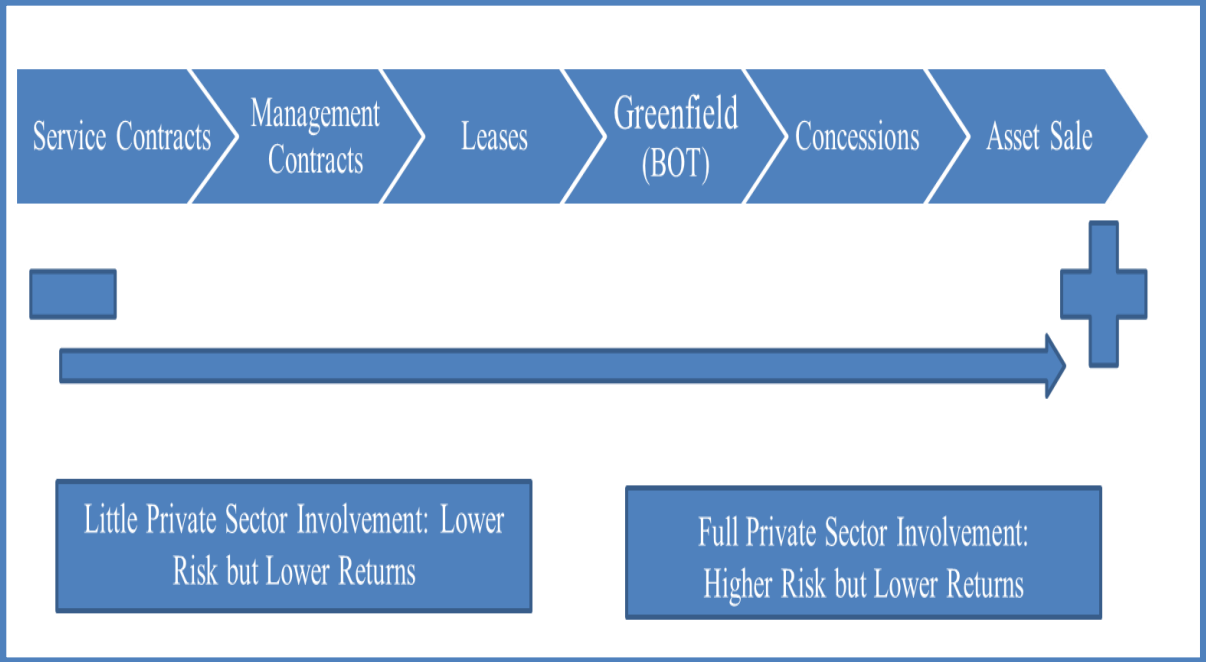
⁵ Sectors where public sector investment is relatively dominant compared to the private participation.

⁶ Contracts typically last between 30 to 50 years.

services and share risks, costs and resources which are connected with these products” (p. 598). This first definition captures the collaborative nature of PPPs and differentiates them from contractual arrangements such as contracting-out.⁷

According to Akitoby et al. (2007), PPPs classification is based on the level of risk sharing between the public and private partners. Before a public partner chooses a specific contract of partnership for a given project, it is expected to perform a pre-analysis of the desirable and feasible level of risk transfer. As Figure 1.1 illustrates, a PPP can take the format of service contracts, management contracts, leases, Build-Operate-Transfer (BOT) contracts and concessions. The selection of a specific type of contract is based on the level of risk transfer between the two partners. Moreover, the sector of the project plays a role in the selection of a specific contract.

Figure 1.1: PPPs Classification Based on Risk Level



Source: Akitoby et al. (2007)

On the other hand, others scholars view PPPs as a language game emphasizing that PPP can be a misleading term. Under the rhetorical approach, PPP multiple meanings hide implicit strategies and purposes of the partnership members (Linder, 1999). In this line of reasoning, Hodge (2004) states that: “It seems fair to say that a number of governments have tried to avoid using the terms privatization and contracting out to speak instead of *partnerships*. That may be part of a general trend within public management of needing to renew the buzzwords from time to time (...)”(p. 547).

⁷ Since the accountability for the public service provision is still detained by the public sector, PPPs cannot be related to privatization.

For the purpose of this research, considering PPPs as governance tools, the PPP will be defined based on the De Clerck et al.⁸ (2012) definition: “A PPP is a settlement between a public party and a private sector company to engage in a long-term contractual arrangement for designing, building and operating capital-intensive projects while trying to attain value for money by the appropriate allocation of risks” (p.247). Value for money is an essential concept coined and used by PPP literature to justify the existence and use of this specific contractual method. In brief, value for money refers to the state when value is created for all stakeholders of the PPP meaning public and private partners, users and citizens (Colman, 2000; Akintoye et al., 2003; Morillos et al., 2008; Yuan et al., 2009).

1.3. History of PPPs

History indicates that there always has been some degree of cooperation between the public and the private sector. Civilizations have adopted early cooperative forms of partnerships between public and private players in the world (Wettenhall, 2003). However, the sudden rise and institutionalization of these partnerships took place in the nineties. In fact, in a context of surveillance of public expenditures, a conjunction of three factors triggered the development of PPPs: (i) the public deficit, (ii) the value-added created by PPPs and (iii) the rise of collaborative frameworks worldwide (Koppenjan, 2005).

(i) The PPP arrangement first started in 1992 in the UK, this being the most experienced PPP market. The early nineties is considered the period where the PPP term got a buzzword status. The main argument that pushed OECD governments to choose the PPP route in infrastructure development was the conversion of up-front fixed costs into a stream of future obligations (Bovaird, 2004). It is called the off-balance sheet treatment. The expression was coined because the capital invested by the government does not entirely appear on its account as one liability. Instead, the amount of the debt is split in different streams. With the off-balance sheet treatment, PPP can be seen as a mega credit card for governments (Hodge, 2004).

(ii) With the risk of accentuating possible fiscal crises, this accounting benefit was reduced and PPPs were treated more and more as a case of optimal risk allocation in public infrastructure projects. Indeed, PPPs were seen as a way to guarantee a risk allocation to the party that is more able to manage it. With the right mix of risk sharing between public and private partners, the product and service should be delivered with quality, securing then the “value for money” for the public sector (Colman, 2000; Akintoye et al., 2003; Morillos et al., 2008; Yuan et al., 2009).

⁸ This definition of PPPs is in line with the one of Van Ham and Koppenjan (2001): “cooperation of some sort of durability between public and private actors in which they jointly develop products and services and share risks, costs and resources which are connected with these products.”(p. 598)

PPPs have been used to reach the goal of obtaining greater value for money, which is materialized by the lowest life-cycle cost⁹ (Akintoye et Al, 2003; Zhang, 2006). In brief, instead of a public investment, PPPs were presented as a great deal for the taxpayer thanks to four factors: a) construction and operation are centralized in one contract, b) temporary transfer of the assets to the private partner, c) risk-sharing with the private partner during all contract life and d) private financing. These factors make the private partner accountable and may result in a lower life-cycle cost (Brinkerhoff and Brinkerhoff, 2004; Sedjari, 2004).

(iii) In the nineties, with the advent of “network” societies¹⁰, interdependencies between public and private sectors were increased and deepened. During globalization, people and institutions collaborated to create networks of knowledge. In this context, partnerships were increasingly used to share knowledge (Castells, 1993).

After their start in the OECD countries, PPPs then proliferated in emerging countries. In emerging economies, after the privatization period of the nineties, governments were striving to attract foreign investment and the building of quality infrastructure emerged as a top requirement. With limited budget capacity, governments considered the use of PPPs to reduce the infrastructure gap. Budgetary conditions were the first factor that dynamized the PPP use in these countries (World Bank Toolkit, 2009).

Despite their popularity, the participation of PPPs¹¹ in the total global infrastructure investment is low. It is only of 5,26% in 2011, against 7,36% in 2010. This decrease is continuous since the global economic crisis of 1997 where PPP infrastructure investment peaked (USD 180 bn). The low participation of PPPs at the global scale is due to the fact that the public sector remains the major investor in a lot of countries (PFI, 2013).

Yet, PPPs may have a more significant role than it appears in the global figures. These statistics are aggregated and it therefore underestimates the higher growth rate of PPPs in developing countries some of which face an explosive construction of infrastructure. Thanks to the increase of the revenue per capita and the improvement in education and access to information, society will demand better infrastructure. Moreover, PPP potential may also be soon materialized in a case in which public investment will be more limited due to fiscal restrictions and difficulty in terms of management capability of complex infrastructure projects (World Bank Toolkit, 2009).

Concerning Latin American concessions, the region has shown dynamism thanks to the leadership of Chile and Brazil. According to the Private Participation in Infrastructure

⁹ Lowest life cycle cost implies that infrastructure costs need to be calculated over their entire life spans and not limited to up-front costs.

¹⁰ In “network” societies, these interdependencies reduced hierarchical relationships in favor of more horizontal ones (Castells, 1993).

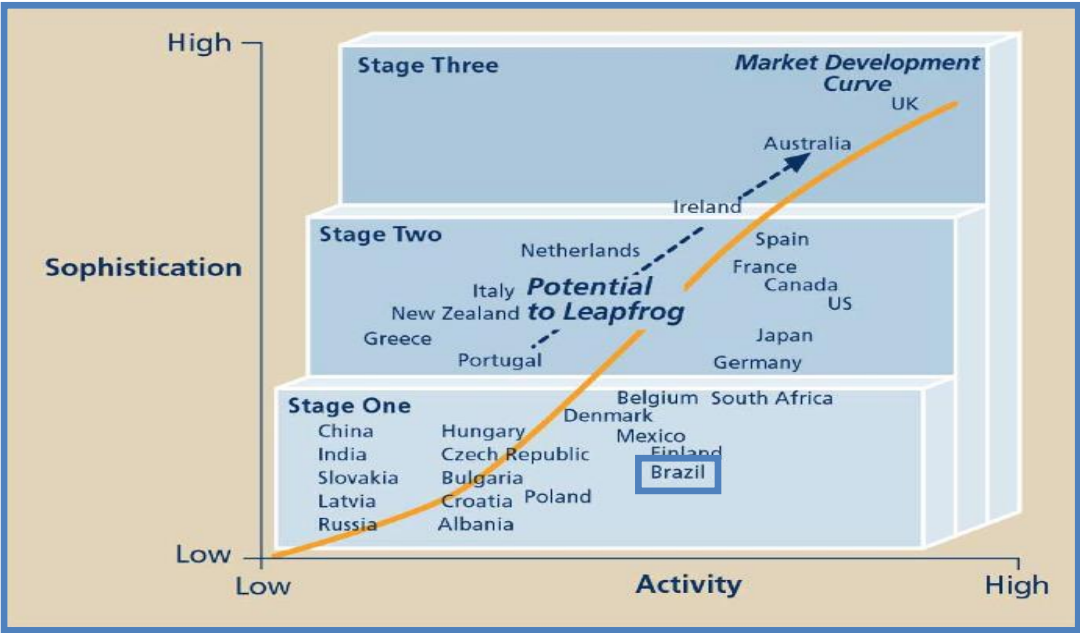
¹¹ The data available for the number of PPPs only relate to expectations of investment. Specific statistics of PPPs do not exist because of the peculiarity of each country’s legal system that results in a specific interpretation of the concept in each of them.

database (2013), from 1990 to 2012, infrastructure projects with private participation¹² amounted close to USD 770 bn about 38% of worldwide value.¹³ Within the Latin America region, Brazil is the leader both in project value and number. Worldwide, Brazil is ranked in the top three of countries with the highest project numbers with private participation, only after China and India. Moreover, Brazil is the leader in terms of project value in the world in 2011.

1.4. Definition of PPP Framework in Brazil

Compared to the other OECD countries with a mature experience in PPP development, the sophistication degree of PPPs in Brazil is low (UNECE, 2008). As Figure 1.2 below illustrates, although the country has developed a significant number of projects, the sophistication level of PPP framework is low related to the number of projects undertaken. Low sophistication means that in Brazil, market foundations are under construction and that regulation frameworks need to be further developed.

Figure 1.2: Maturity Curve of Some Countries in PPP Development



Source: UNECE (2008)

¹² These figures do not refer to PPP but all types of investment with private participation such as PPPs, concessions or private works.

¹³ USD 770 bn in a total of USD 2,026 bn

In 2004, PPPs in Brazil have become part of the legal agenda with the improvement of PPP enabling laws. The Federal Law N^o 11.079/04 innovated to permit the creation of not commercially-feasible PPPs that have significant social returns.¹⁴ Based on this Federal Law, a PPP minimum contract value is R\$ 20 million, and the length of contract needs to be framed between 5 to 35 years and the subsidy paid to the private partner is limited to R\$ 35 million per year (Ministry of Transportation, 2012).

The Law N^o 11.079/04 was later amended in 2012 by Law N^o 12.766/12. This amendment brought three new modifications. Firstly, the mechanism of fund allocation was created that enables the private partner to receive the subsidy from the public partner during the phase of construction of the physical asset. Secondly, the scope of the Federal General Fund of Guarantees that gives financial guarantees to the private partner for the payment of the subsidy was extended to the state and municipal level. Thirdly, engineering studies must be carried out before the tendering procedure to define the value of the PPP investment expected from the private partners (Ministry of Planning, 2013).

According to Federal Law N^o 11.079/04¹⁵, in Brazil, PPPs are defined as a type of concession (Ministry of Planning, 2013). The country allows four types of concessions:

- **Administrative concessions:** public partner makes periodic payments to the private partner for the services provided because it is not possible to charge users¹⁶. The project is wholly subsidized by the public partner;
- **Sponsored concessions:** private partner charges users and receives periodic payments from the government for the services provided¹⁷. Public partner only subsidizes the part of the project that is not covered by user fees;
- **Traditional concessions** based on the Law N^o 8.987/95¹⁸: these are concessions where public services are delegated to the private partner whose revenues come from the user fees. There is no payment from the public partner to the private partner in the form of a subsidy.

PPPs are defined either as administrative or sponsored concessions.

¹⁴ Meaning positive externalities

¹⁵ Chapter 1 of the Law is detailed in Appendix 1.

¹⁶ Common in waste management and prison

¹⁷ Common for low-traffic highways for example

¹⁸ Chapter 1 of the Law is detailed in Appendix 2.

In this text, PPPs in Brazil will be defined as governance instrument mechanisms¹⁹ and *stricto sensu* based on the terms of the Federal Law N^o 11.079/04²⁰. The term PPP will only be applied to describe sponsored or administrative concessions. Since the use of the PPP concept is restricted to these legal terms, political manipulation of the term described by Hodge (2004) can be if not entirely avoided, clearly circumscribed.

1.5 History of Brazilian PPPs in Highways

The dynamics of low investment capital and flows in Brazil resulted in an inefficient and poor transport infrastructure system (Guash, 2004). In 2013, it was estimated that 3.4 % of the GDP or R\$ 125 bn should be invested to maintain and extend the current transport network. It is equivalent to more than half of the service of the national public debt in 2012 (IPEA, 2013). The context of preparation of the 2014 World Cup²¹ and the 2016 Olympic Games increased the need of transportation investment.²²

The issue of the infrastructure deficit in Brazil has been on the top of the political agenda with the improvement of the regulatory framework²³ and a series of communications about investment initiatives. In 2007, the Growth Acceleration Program²⁴ was announced to improve the infrastructure level of the country. The PAC initiative was launched by President Lula and followed by President Dilma Rousseff under the name of PAC 2 (Ribeiro and Prado, 2007).

Compared to countries with similar size, Brazil is a country where the road is the most dominant mode of transportation. Figure 1.3 depicts the transportation matrix in Brazil and

¹⁹ Based on De Clerck et al. (2012) definition: “A PPP is a settlement between a public party and a private sector company to engage in a long-term contractual arrangement for designing, building and operating capital-intensive projects while trying to attain value for money by the appropriate allocation of risks” (p.247) as previously presented in 1.1.

²⁰ A PPP contract value is of R\$ 20 million minimum and the length is limited between 5 to 35 years as previously observed.

²¹ World Cup will take place in July 2014.

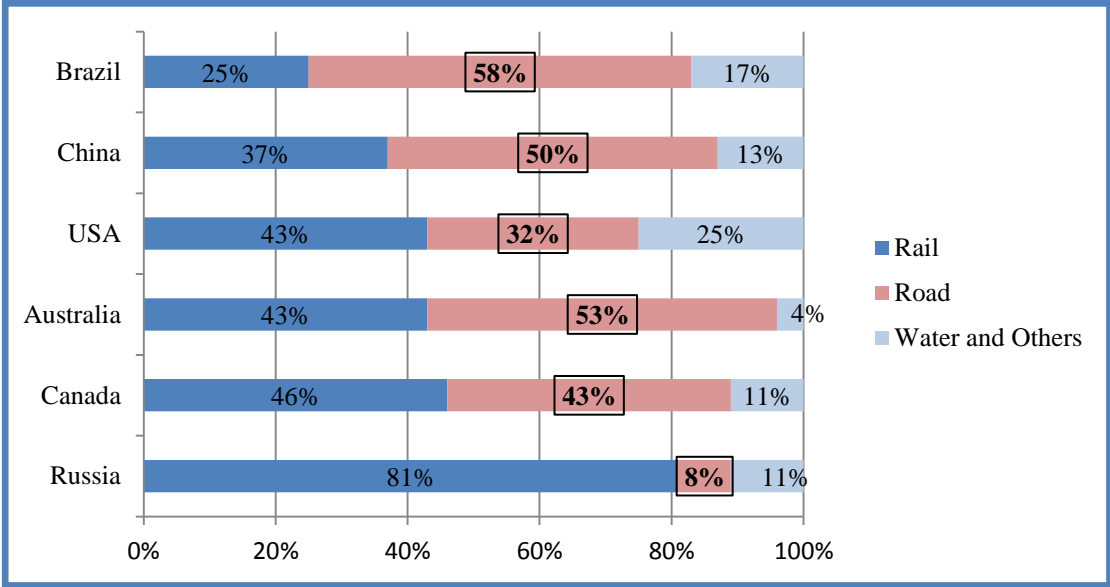
²² One of the central topics of the series of demonstrations that faced the Brazilian government in June 2013 was the low quality of the state infrastructure provision.

²³ The 2004 PPP Federal Law 11.079/04 was amended in 2012 as previously detailed in 1.4.

²⁴ For future references, the abbreviation (PAC) will be used for the Growth Acceleration Program. It comes from the translation of the term from Portuguese (*Programa de Aceleração do Crescimento*).

five others countries with similar territory size. In Brazil, roads amount to about two thirds of total transportation infrastructure modes. With the PAC program, the goal of the government is to rebalance the transportation matrix by further developing the railway network and waterborne transportation systems²⁵ (Ministry of Transportation, 2012).

Figure 1.3: Share of the Highway Network in the Transportation Matrix in Brazil



Source: Ministry of Transportation (2012)

In this text, highways will be differentiated from roads. Based on the definition of the Brazilian Código de Trânsito (1997), a highway is a paved road.

Investment in highways within the PAC firstly targets the rehabilitation of the existing network and then its extension. The focus on network rehabilitation is due to the state of deterioration of the highway network in Brazil. As Figure 1.4 thereafter shows, most of the road network is non-paved²⁶ (Ministry of Transportation, 2012).

Brazil already has one of the widest highway networks under concession among developing countries with a total length of 12,000 km²⁷. PAC plans to target 58.500 km of highways: 53,585 km are existing highways and will be maintained, 2,989 km of new

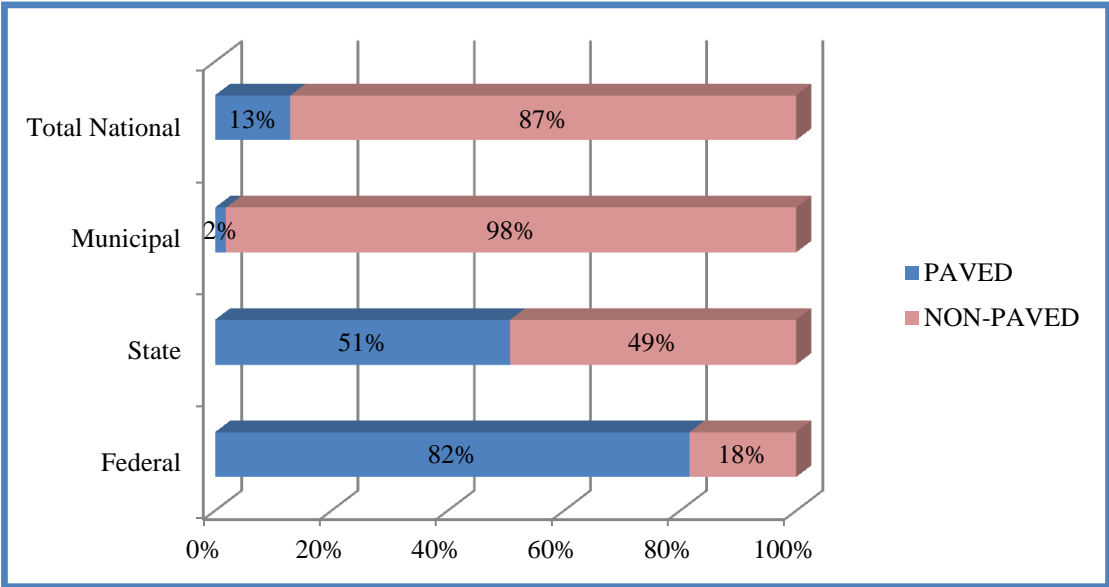
²⁵ The expected results to this progressive shift from road to railway and water modes are gains in economic and energy efficiency.

²⁶ The largest share of the unpaved network is the responsibility of the municipal level.

²⁷ Brazil is just second to China.

highways will be constructed and 1,926 km of existing highways will be expanded (Ministry of Transportation, 2012).

Figure 1.4: Share of Paved and Non-Paved Road Network in the Brazilian Network



Source: Ministry of Transportation (2012)

After decades of low investment, better economic conditions²⁸ in Brazil favored partnerships between the public and private sector to rehabilitate the highway network (Ribeiro and Prado, 2007). Before 1995, private parties, mostly engineering firms, built highways but operation and maintenance operations were managed by the public sector. In 1995, the first phase of the Federal Highway Concession Program started with the award of six highway concessions²⁹. In 2007 and 2012, the second³⁰ and third³¹ phases of the Federal Highway Program were launched. The program of concessions for Federal Highways has steadily increased the network under private management from 1,428 km to 6,240 km (i.e. a multiplication by 4). The three phases span a process where private participation in

²⁸ From 2000 to 2013, the GDP per capita in Brazil increased from USD 3,694 in 2000 to USD 11,340 in 2012 in nominal terms.

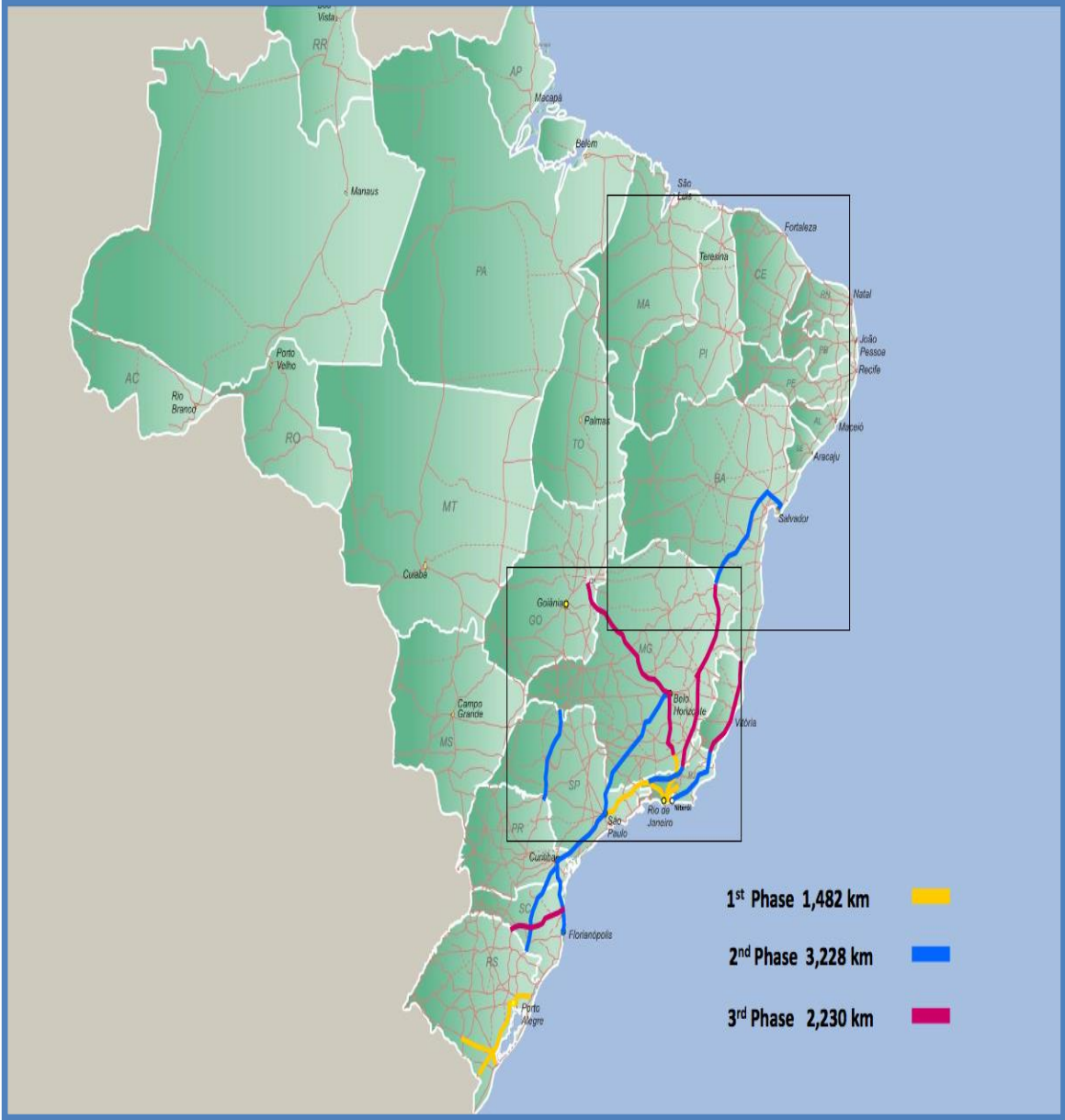
²⁹ Phase 1: program was launched in the states of Rio Grande do Sul, São Paulo and Rio de Janeiro

³⁰ Phase 2: program was deployed in the states of Bahia, Minas Gerais, Rio de Janeiro, São Paulo, Parana and Santa Catarina

³¹ Phase 3: program was deployed in the states of Minas Gerais, Espirito Santo, Goais, Distrito Federal and Santa Catarina

infrastructure investment was combined with the improvement of the legal framework (ANTT, 2013). Figure 1.5 below illustrates the progressive extension of the Federal Highway Concession program in Brazil.

Figure 1.5: The Three Phases of the Federal Highway Concession Program in Brazil (1995-2012)



Source: Ministry of Transportation (2013)

Although the government is increasingly transferring responsibility to run highways to the private sector, less than a quarter of the total road network (16%³²) is financially feasible for private concession due to a low traffic volume and/or low GDP per capita of the potential users to afford toll payment. Therefore, the major part of the Brazilian road and highway network requires the payment of subsidies to enable private parties’ participation (Bain, 2013), and therefore are, under Brazilian law potential PPPs.

³² Out of 63.000 km of federal highways, it is estimated that the financially feasible segments that are suitable for private concessions is only of 10.000 km, ie, less than 20% (CNT, 2013).

1.6. Objectives of the Study

Brazil needs infrastructure in transportation especially in the highway sector that is the main mode of transportation for goods and passengers (Ministry of Transportation) The problem is that for highways, the main part of the network is not financially feasible for exclusive private players, thus investment needs public funding (Bain, 2013).

There is thus an increasing need and potential for partnerships between the public and the private partner. PPPs, which law (N^o 11.079/04) passed in 2004, established one of the contractual forms possible. Yet, in reality, after a decade of law enactment, only few PPPs have been used. Since 2004, only 35 PPP contracts have been registered to be under project with all at the state level except 1 at the federal level. Concerning the highway sector, only one PPP project became reality with its contract signed in Brazil: the PPP contract for the exploitation of the highway Minas Gerais 050 (MG-050) (Ministry of Transportation, 2012).

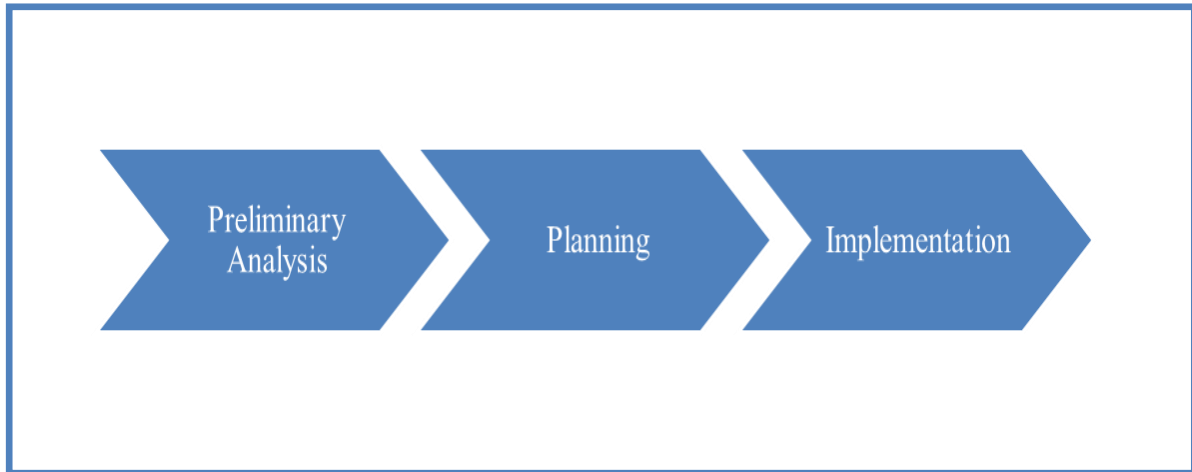
By signing a PPP contract, public and private partners may intend to align their interests. However, there are conditions where interests might not be aligned between the two contracting parties. In fact, the context is one of a relationship between one principal (the public partner) and an agent (the private partner). PPP arrangement can be subject to the typical agency problem. The principal relies on an agent to work or provide services for the interests of the principal. In case where it is difficult to watch the results of the private partner, the private partner can be tempted to work for their own interests rather than for the public partner. Therefore, the research question is how the contracting parties in a PPP can align their interests (Milgrom and Roberts, 1992).

The first approach to the research question is descriptive. The condition of the highway network in Brazil will be described because it has an impact on the design of PPP incentive contracts. The PPP MG-050 is currently the only one signed in the highway sector in Brazil. Data about this first PPP will be presented to describe the level of compliance to the contract of the private partner.

The second approach to the research question is analytical. Literature review about PPP efficient design will identify the principles that design efficient contracts. On the basis of these theoretical foundations, the contract PPP MG-050 will be analyzed to make explicit the embedded incentives. Eventually, the study formulates suggestions to improve the design of the contract from the perspective of the theory of incentive contracts.

The study encompasses an analysis of the contract and its implementation, which refer to the phases of planning, and implementation of a PPP. Figure 1.6 below describes the three main phases of any PPP project (Koppenjan, 2005).

Figure 1.6: Main Phases of a PPP Project



Source: The author based on Koppenjan (2005)

Firstly, this study aims at addressing the current lack of relevant study in PPP incentive contracts in Brazil. There is still little understanding about how partners should deal with the problems of implementation and risk management in PPPs (Koppenjan, 2005).

Secondly, since the PPP Federal law (N^o 11.079/04) has been applied in few cases³³, institutions that need to accompany this new contractual type has not gained enough experience. This study will contribute to describe the level of maturity of institutions that should support PPP development (Yuan et al., 2009).

Thirdly, the PPP topic is very political because governments may be under pressure of users and taxpayers to renegotiate contracts (Hirschman, 1970). This study will adopt a fact-based view and attempt to stay away from the political interferences of such topic but remain aware of moral hazard implications in the contract.

Regarding limitations, the scope of the study will only include the agent-principal relationship between the public and private partner. The relation between the public partner and the user/taxpayer will be ignored. The perspective adopted is that the public partner has the ultimate responsibility for providing the service and act benevolently³⁴. Given the fact that the state of public finances does not allow such role, a possible alternative to the public partner is to attract private player investment. This allows the focus on the agency problem between the public partner and the private partner.

³³ Since 2004, only 34 PPP projects are under project at the state level and 1 at the federal level (Ministry of Planning, 2013).

³⁴ Due the assumed existence of positive externalities

Moreover, the study is limited to the examination of contractual incentives in terms of the economic theory of incentives adopting a qualitative perspective and not a quantitative approach.

Eventually, the findings of this study are limited to the Brazilian PPP environment. The contextual and idiosyncratic nature of PPPs is due to the non-transposition of legal frameworks and also because the level of maturity of institutions that enforce contracts in Brazil is also peculiar to the country.

Chapter 2. Literature Review: Key Success Factors for PPP Planning

“Infrastructure projects in emerging countries require significant financing from the private partner resulting in partnerships more complex and with more risks. These particular characteristics of emerging markets such as Brazil imply significant challenges for the PPP design” (Oliveira et al., 2013).

There is a significant scarcity of data, information and academic papers about the Brazilian experience of PPP contracts. Oliveira et al., (2013) explain that this lack of research is due to the fact that there are not significant number³⁵ of PPP contracts in Brazil either at the state or the federal level. Given the lack of knowledge of this new contractual model and the potential use of private resources in infrastructure projects, Ribeiro and Prado (2007) state that PPPs in Brazil will raise the interests of researchers.

The fact that PPPs are a complex topic explains that the little available literature is scattered covering specific fields of PPPs. As Table 2.1 below shows, the literature on PPPs is mainly divided into six different research fields. Each research field has various impacts on risks and incentives of each contractual party. Hodge (2004) points that this multidisciplinary character of PPPs may be one of the major challenges to improve their contract application. Indeed, both public and private partners need to evaluate the impact of this multitude of fields on contract elaboration.

Table 2.1: The Multidisciplinary Aspects of PPPs

FIELD	EXAMPLE OF IMPACT
LAW	Contractual theory defines the obligations of each party.
ACCOUNTING	A project must meet certain conditions in order to allow the government to remove it from its balance sheet.
ECONOMY	The impact of PPPs on the welfare of the society and its social marginal cost can be taken into consideration.
ENGINEERING	Feasibility studies are essential to estimate project cost.
PROJECT MANAGEMENT	The definition of adequate planning of the project is essential to design risk-coping strategies.
FINANCE	Raising equity capital and debt finance can be mandatory to make the investment viable for both partners.

³⁵ See note 33

Source: The author based on Hodge (2004)

As seen, the research question is how the contracting parties in a PPP can align their interests. As previously seen, the elaboration of a PPP contract happens during the planning phase of a project but incentives should be aligned during the whole life cycle of the project³⁶ (Koppenjan, 2005; World Bank Toolkit, 2009; Veron and Cellier, 2010).

Authors have shown that the interests of the contractual parties should be clearly defined for both parties so that the goal of the contract is clearly identified and can be associated to measurable tasks and strong incentives (Koppenjan, 2005; World Bank Toolkit, 2009; Veron and Cellier, 2010). The first part of this literature review reviews the interests of the principal and agent in elaborating a PPP contract.

The majority of scholars show that PPP contracts should be designed to include an optimal risk-sharing scheme meaning that risks should be allocated to the best party capable of handling them (Guash, 2004; De Clerck et al., 2012; Frishtak, 2013; Mattos, 2013). For any project, risk management is a tremendous task but it is all the more complex with PPPs due to the addition of the complexity of the arrangement itself. The second part of this literature review will expose the main risks weighing in the contractual parties that are largely described in literature since they should be managed in any PPP contract. The economic theory of incentive contracts will also be described to show how the principal can give incentives to the agent in a context of high risk.

2.1. Definition of Interests for the Contractual Parties

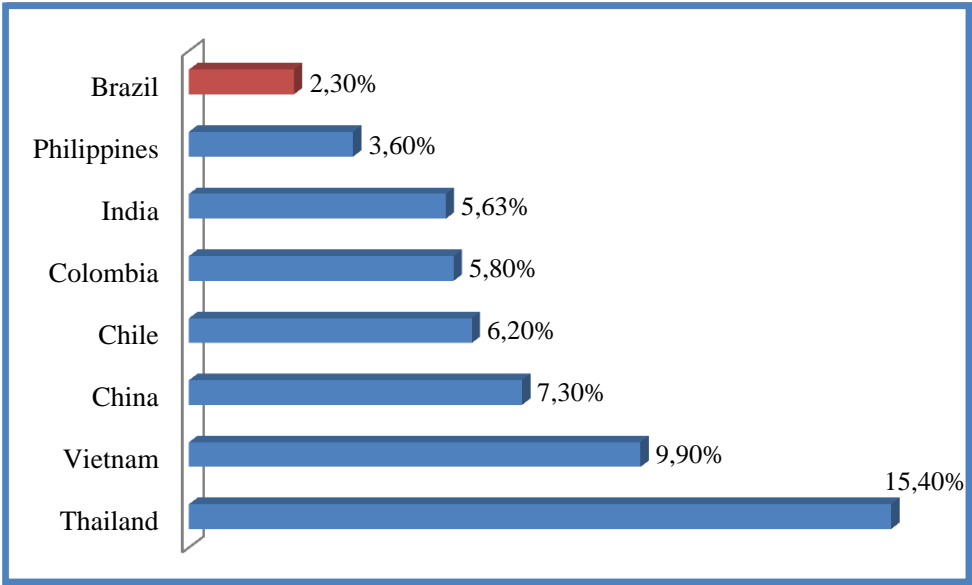
As seen in Chapter 1, poor infrastructure is one of the factors reducing the competitiveness of Brazil in international trade and investment attractiveness (World Bank Toolkit, 2009). In the Global Competitiveness Report (GCR) of 2012, out of the 144 countries analyzed, Brazil was ranked 107nd in the quality of its infrastructure. The low performance was reported especially in terms of transport logistics where Brazil ranked 100th on railroads, 123rd on highways, 134th on airports and 125th on ports. In contrast, the country is placed 48th for the total index competitiveness and 52nd in revenue per capita. These results show that Brazil does not have a sufficient development level of infrastructure compared to its level of development and reflects the lack of priority for this type of investment (World Economic Forum, 2012).

The lack of infrastructure investment and the bad quality of the infrastructure are the top problem for private companies in Brazil. It was the first time that the issue of infrastructure surpassed the problem of high taxation (World Economic Forum, 2012).

³⁶ Chapter 1 showed that a PPP is structured in three phases: preliminary analysis, planning and implementation.

According to Oliveira et al., (2013), Brazilian governments have abandoned the country’s infrastructure showing very low levels of investment flows. For example, compared to the group of emerging countries shown in Figure 2.2 below, Brazil had the lowest share of infrastructure investment in 2008³⁷ (2,03%), which represents about one third of the proportion of other countries such as Chile or Colombia (Frischtak, 2008).

Figure 2.2: Investment in Infrastructure Based on the Percentage of GDP in 2008



Source: Frischtak (2008)

This situation of low investment is explained by the decline of the investment in infrastructure in Brazil stemming from the low investment levels since the eighties (Oliveira et al., 2013). As Table 2.3 below shows, the percentage of GDP investment has steadily decreased each decade starting from 5,42% for the period 1970 to 1980 and ending at 2,32% for the decade from 2000 to 2010.

³⁷ This investment level was registered in 2008, i.e, before the announcement of the PAC.

Table 2.3: Evolution of Infrastructure Investment in Brazil from 1970 to 2012 (% GDP)

	1970-1980	1981-1989	1990-2000	2000-2010	2011-2012
Electricity	2,13%	1,47%	0,76%	0,67%	0,59%
Telecoms	0,80%	0,43%	0,73%	0,65%	0,50%
Transportation	2,03%	1,48%	0,63%	0,71%	0,75%
Water	0,46%	0,24%	0,15%	0,29%	0,17%
Total	5,42%	3,62%	2,27%	2,32%	2,01%

Source: The author based on World Economic Forum (2013)

As Table 2.3 shows, the decrease of investment levels has affected all sectors (World Economic Forum, 2013). The federal highway network is a typical sector that suffered from a lack of investment (Mattos, 2013). The precarious situation of the highway infrastructure is reflected when compared to the average of some Latin American countries. Only 13% of the Brazilian roads are highways against an average of 29% in Latin America (Mattos, 2013) (Pineiro, 2013; Almeida, 2013).

The precarious state of the Brazilian infrastructure is due to the increase of the demand for these services. The high demand was not compensated by a corresponding supply and created thus a higher congestion and deterioration of the quality of services (Pineiro, 2013). For example, the traffic in highways increased by 14,6% between 2006 and 2011 and this increases causes the saturation of highways, facing slow investments (Mattos, 2013).

As shown in Table 2.4, the proportion GDP/km of highways highly increased from 1960 to 1980 but was drastically reduced from 1980 to 2000. These figures about the extension of the network underestimate the saturation of highways during this period. Indeed, due to the fact that highways were built two or three decades ago, technology age is increasing which decreases the average speed and traffic capacity (Mattos, 2013).

Table 2.4: The Evolution of Highway Length Extension (1960-2010)

Time Frame	Proportion GDP/km of Highways (km/year)
1960-1980	8,7 to 47,5 km (1900 km/year)
1980-2000	47,5 to 56,1 km (430km/year)
2000-2010	56,1 to 62,0 km (587 km/year)

Source: Pineiro (2013)

To explain the situation of infrastructure supply in Brazil, Oliveira & al., (2013) show that every government has limited fiscal resources and need to make trade-offs. They show that in Brazil, infrastructure has just not emerged as a priority relatively to other types of spending. From 1970 to 1980, the investment rate in infrastructure was around 5% of GDP (cf Table 2.4), but it was then reduced because of the pressure on fiscal spending. Faced with the threat of huge deficits, governments preferred to cut infrastructure investment and increase current spending (World Bank Toolkit, 2009). In fact, the public consumption started to increase from 1985: from 1947 to 1985, it was on average of 10,8 % of the GDP and it increased to 21 % from 1985 to 1995. Since 1995, it is around 20,2 % of the GDP. In addition, there was an increase of transfers (especially pensions) expanding from 3,4 % of the GDP in 1991 to 7,0 % in 2012 (Afonso and Biasoto, 2013).

This fiscal expansion was enormous and was accompanied by the increase of taxes. Until 1990, aggregate taxes were 25% of GDP for an infrastructure investment rate of 5% of the GDP. Starting 2005, this shifted to a gross tax rate of 35% for an investment in infrastructure of 2%. Therefore, investment infrastructure did not benefit from the increase (World Bank, 2013).

Some other authors also show that the lack of funds is not the only reason to explain the poor state of Brazilian infrastructure. Almeida (2013) does not deny that this situation is due to fiscal constraints. Yet, he emphasizes that the state of infrastructure depends on the public institutions management capabilities that were shown to be poor when it comes to execute infrastructure projects. Therefore, according to Almeida (2013), a lack of priority for infrastructure investment and management skills are the cause of low investment in Brazil. It is what he calls the “paradox of the public investment” in Brazil where there is an apparent excess of funds but few infrastructure projects become a reality. For example, he states that in 2011, the authorized budget for investment was of R\$ 107.4 bn. However, the executed investment by the Federal Government was R\$ 50 bn, less than 50% of the amount authorized by the Annual Budget Law of 2011 (Ministry of Transportation, 2012).

Literature has extensively studied the question of the lack of infrastructure in Brazil (World Bank, 2009; De Clerck et al., 2012). Authors in majority agree on the fact that infrastructure levels are not sufficient for Brazil economic development. Therefore, the interest of the public partners in a PPP contract is to increase investment to face demand and implement investment via the increasing use of private resources to prevent the pressure on the fiscal resources³⁸. Private partner needs to consider that this is the principal goal because public partner will set sanctions and incentives to make investment happen (Oliveira et al, 2013).

For private parties, as agents, their interests in elaborating a PPP contract are to open up new markets and investment opportunities that would not be accessible without the

³⁸ As Chapter 1 detailed, public partners may have other reasons to opt for a PPP contract in addition to the scarcity of resources such as knowledge transfer or better transparency provided by the private sector.

partnership with the public partner. Given the long-term frame of these contracts, risk involved in PPPs are high and in many cases, the public sector's financial contribution to the project is indispensable to make the project viable for the private angle (Koppenjan, 2005; Bain, 2012). As the principal, public partner needs to plan that without financial guarantees, the private partner will not have incentives or will bear too many risks to make investment.

2.2. Risk Management

Al Bahar and Crandall (1990) demonstrate that as for any project, both partners in a PPP contract should identify and quantify risk as well as design a strategy to respond to each risk occurrence. Fisher (2010) points out to the peculiarity of risk management in PPP projects because risk is higher in a PPP due to the hybrid nature of the partnership (Fisher, 2010).

Zwikael and Saleh (2007) specify that the definition of specific risk management strategies should happen during the negotiation phase of the contract and carefully be implemented all along the project life: "Risks are not only to be considered upon negotiation of the contract, but risks should be monitored during the life-cycle of the project (...)" (p. 758). By monitoring the balance of risks between partners, risk transfer from one party to another is more likely to be prevented.

According to De Clerck et al. (2012): "the risk of contracting with the adagio allocate the risk to the party that is most capable to deal with it is not always a bed of roses" (p. 253). Literature underlines the challenge to design incentive schemes that would align private and public interests due to the occurrence of a multitude of risks. Four types of risks largely discussed by literature will be described: moral hazard risk (2.2.1), credit risk (2.2.2.), political risk (2.2.3) and contract risk (2.2.4).

2.2.1 Moral Hazard Risk

The goal of the public partner is to provide a service at the least life-cycle cost. The most efficient firm should be chosen and this firm will do its best to minimize this cost. This is the case when the decision is based on perfect information (Milgrom and Roberts, 1992).

In the case of imperfect information, a private partner can have more information than the public partner regarding the cost when the PPP contract is signed and also the contingent factors that have an impact on costs over time. A private partner frequently knows more than the public partner about two elements: the 'attribute' such as the cost parameters that drives

efficiency and commitment to costs reductions. These two elements are difficult to observe and therefore subject to asymmetry of information (Starkie, 1990).

Because their costs are not revealed, the private partner can obtain rents, i.e. profit in excess in comparison to the situation where costs could perfectly be observed. In this environment of asymmetric information, agent and principal can adopt opportunistic behavior (Milgrom and Roberts, 1992).

The occurrence of opportunistic behaviors during the enforcement of the contract may depend on the type of tendering procedure chosen. This is an old debate in the economic theory between Demsetz (1968) that advocates for concessions based on the lowest toll price to the customer while Williamson (1976) proposes a model based on the best value paid to the concession.

According to Demsetz (1968), the concessions of services should use the tender based on the best price of the service. Based on this criteria, the winner of the tender is the one with the lowest average cost since she is willing to offer a price that is between its own average cost and the average cost of the second best candidate, something that the other participants and the second positioned would not be ready to do. This tendering model would solve two problems for governments in the context of asymmetry of information about the cost of companies: firstly, they will know the best price of the service and secondly, they will know which candidate is the most efficient to operate the service.

Williamson (1976) criticizes this model saying it can create a lack of commitment of the tendering participants and incentivize opportunistic behavior from the private partners. According to Williamson (1976), projects based on the tendering model of the best price of service are more likely to generate contract renegotiations. He explains that because of two reasons: firstly, the private partners are incentivized to bid with very low to win the tender; secondly, they can rely on their ability to successfully renegotiate.

Williamson (1976) warns that the government can lack the capacity *ex post* to not give way to price renegotiation due to the transaction costs of replacement of the supplier. In this context, it is difficult for the public partner to mitigate the risk of opportunistic behavior such as the renegotiation of the price (Carrasco et al., 2013). Therefore, although the tendering model based on the best price to customer appears to be benefitting the customer, if renegotiated, the effect of the revenue transfer to the customer is less reached. To lower the likeliness of contract renegotiations, Williamson (1976) proposes a model based on the best value paid to the concession that ensures the best productivity to the customer because it selects the most productive company.

Empirical data shows that in Latin America and Caribbean, when contracts were based on the best price, 60% of them were renegotiated while this proportion is only of 11% when it comes to tendering processes based on the best value paid to the concession (Guash, 2004). Guash (2004) shows that between mid 1980 and 2000, close to 30% of the concession contracts in Latin America were renegotiated 2,2 years on average after their signature. This

short-time frame shows the existence of private opportunism because renegotiation occurred early. In fact, since renegotiations took place during the phase of the constitution of the physical asset and close to the signature of the contract, there is a low probability of occurrence of external factors that could significantly alter the contractual equilibrium (Bajari and Tadelis, 2001).

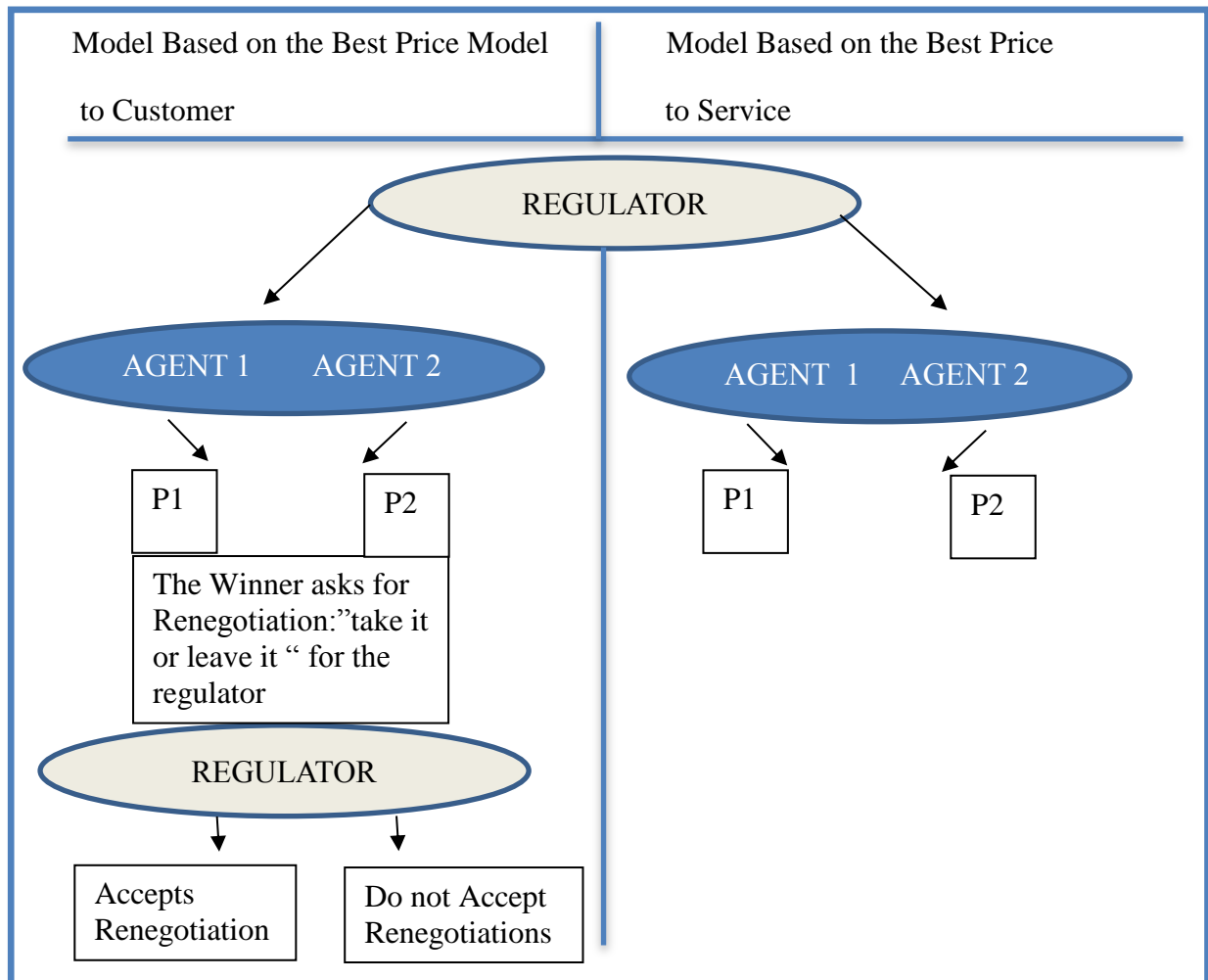
The high frequency of contracts renegotiations is due to the existence of high sunk costs. Such as warned by Williamson (1976) since replacement costs of suppliers are high, this allows opportunistic behavior from both partners. For example, governments can avoid the change of suppliers because they prefer to not waste time to organize a new tender. This delay could deceive voters and put in risk the reelection of governments. Governments can also be reluctant to switch suppliers because they have preferences over a specific company that gives contributions to the political party that fits their interests. In brief, the negotiation capacity of government can be highly reduced because of a series of variables.

Renegotiations from one partner will depend on capacity of negotiation skills and the strength of the threat of termination of the contract. If the private partners participating in the tender believe that the government will not stick to the commitment of the price originally negotiated and will tend to accept renegotiation, there is a risk from tendering companies to offer prices that are less based on their variables of costs and demand but rather on their capacity to successfully lobby the regulator. In this sense, the company that will have the best political connections or the most optimistic view on the difficulties of the regulator to avoid renegotiations will be more likely to win the tender (Williamson; 1976).

According to Mills (1991), the better capacity the government has to renegotiate, the more welfare for the people. In case of opportunistic renegotiations, the goal of reaching efficiency maximization from the public partner is less likely to be reached (Bajari and Tadelis, 2001). Guasch (2004) also alerts at opportunistic renegotiations: *“If tendering companies believe it is possible or probable to negotiate, their incentives and tendering prices will be affected and the tender will choose not the best companies but the one more apt at renegotiations (...)”* (p. 24). All in all, the process tends to be plagued by moral hazard and, quite frequently, adverse selection.

The different scenarios of the tendering model based on the best price to customer and the one based on the best value paid to the concession are described in the Figure 2.5. In each tendering model, the game between the government and the two tendering companies is described in three stages. First, the government chooses between the two tender models. In each model, agent 1 and 2 offer their best price, respectively P1 and P2 (see Figure 2.5). One of the companies wins and goes to stage 2. In this second stage, there is a likeliness that the company asks for a renegotiation for a new price and it will be a “take it or leave it” offer for the public partner. In the third stage, the government decides if it wants to renegotiate or not. If the government refuses, the partnership ends. In the case of the tendering model based on the best value paid to the concession, the likeliness of negotiations from the agent is very low since the commitment from the principal is high (Williamson, 1976).

Figure 2.5: Two Types of Tendering Models



Source: Williamson (1976)

The fundamental difference between the first and second model is that the concessionaire is less able to ask for renegotiations when the tender is based on the best price paid to the concession. This derives from the fact that in the case of the tendering model based on the best values paid to the concession, there is a stronger institutional resistance from institutional organizations that will make the renegotiation highly difficult. The presence of this institutional control represents a high probability that the government will not renegotiate after contracting (Mattos, 2007; Carrasco et al., 2013).

On top of the type of tendering procedure, the object of the contract impacts the likeliness of renegotiations. According to Hirschman (1970), there are some services that users are less likely to stop using even if they are not happy with them such as water or transportation. Since customer cannot avoid the use of these services, there is no “exit” in Hirschman’s terms and users thus have less powerful tools to express their opinions. If there are mechanisms for customer to express their voices such as organizations or public audiences,

the customer is more likely to prevent opportunistic behavior from the contract suppliers. In brief, the enforcement of the PPP contract will be more efficient in case of a service highly used.

On top of the type of tendering procedure, the object of the contract impacts the likeliness of renegotiations. Laffont and Tirole (1993) show that if the government fixes high penalties for the company in charge of the investment and that there is a strong enforcement capacity, private partners will be less likely to ask for price renegotiation. Milgrom and Roberts (1992) are more specific and show that this incentive works more for contractable investment than for non 'contractable' investment. Contractability of investment means that investment performance can be verified and enforced *ex post*.

In the case of 'contractable' investment, renegotiations of higher price increase the incentive of the company to invest more and that decreases the cost of monitoring and enforcement of the government. This is an incentive for the private company because it creates additional rents and it can appropriate the results of the investment. On the contrary, the "non-contractibility" generates problems because it can imply opportunistic behaviors from the partners since progress on the investment cannot be monitored (Milgrom and Roberts, 1992).

This requirement of contractable investment is the basis of one of the four principles proposed in the framework of Milgrom and Roberts (1992). The two authors established a set of four principles that should be respected in order to design incentive contracts between a principal and an agent and minimize the occurrence of opportunistic behavior. Their fundamental idea is that even if the evolution of the remuneration cannot solely depend on elements that can be observed by the public partner, the performance of the private partner is the best element to base the payment of the private partner. They demonstrate that incentive contracts should be based on four principles:

(i) The Principle of Incentive Intensity

The principle of incentive intensity requires that the more the private partner increases its effort level per unit, the more the remunerations should increase. Therefore, the level of effort that the public partner is asking needs to be compatible with the level of incentives that it offers to the private partner. The private partner private partner will select its effort level so that the marginal gain of efforts will be equal to the marginal cost of the effort.

(ii) The Principle of Informativeness

The remuneration of the private partner needs to be based on performance. The measure of the performance needs to present a low error variance. The methodology used to measure performance needs to exclude elements that increase the probability to include non-controllable factors. These hazard factors would interfere with the assessment of all performance levels. If the principle of informativeness is not respected, the increase/decrease of the performance level observed could be due to good/bad luck rather than the increase of the effort level.

(iii) The Principle of Monitoring Intensity

Although a part of the effort of the private partner cannot be measured, the public partner can improve its knowledge of the performance level of the private partner by allocating resources for that goal. For example, the public partner can hire auditors to conduct quality tests. These measures are costly but since the goal is to pay the private partner based on performance, they help to improve the information that the public partner has about the performance level of the private partner. Therefore, the principles of incentive intensity and intensity of control are complementary.

(iv) The Principle of Equal Compensation

The public partner does not have the means to control how the private partner spends its effort and time on different tasks. Therefore, the marginal yield of the private partner in all activities needs to be equal. If the public partner offers more incentives for a specific activity than others, the private partner will rationally focus on the activities with more incentives and spend less time on the others.

Since real contracts are incomplete and never mention the totality of contingent factors, the moral hazard risk will never completely disappear. Yet, contract renegotiations are not always triggered by opportunism from contractual parties (Milgrom and Roberts, 1992). There is a difference between “good” and “bad” renegotiations, terms coined by Carroscio et al. (2013).

Good renegotiations derive from contingencies because contracts are incomplete. The more the economic scenarios are unpredictable, the more renegotiations are necessary. The predictable contingencies should be included in the contract (Carroscio et al., 2013). According to the ANTT (2013), in the case of federal highways, contracts often include this idea of contingencies with the possibility for both partners to ask for a potential revision of the works schedule. However, there is always a risk for “bad” renegotiations by deciding for example on toll price increases not justified by a cost increase. This risk depends on the degree of asymmetric information about the actual cost of the works (Veron and Cellier, 2010). In both cases, i.e. predictable and non-predictable contingencies, renegotiations should reestablish the economic and financial equilibrium of the contract and not to incentivize opportunistic behavior (Milgrom and Roberts, 1992).

2.2.2. Credit Risk

In administrative and sponsored PPPs, the private sector remuneration depends on the public partner subsidy partially (sponsored PPPs) or entirely (administrative PPPs). In this sense, there is a high risk for the private partner to go bankrupt. Most authors established that the lack of financial guarantees from the public sector is one of the obstacles for the execution of PPPs (Ribeiro and Prado, 2007; World Bank, 2009; Amorelli, 2009; Veron and Cellier, 2010; PPP Brasil, 2013).

In PPPs, the private partner is responsible for the construction and funding of the project and received its remuneration all along the operation of the infrastructure. If the public partner does not pay the remuneration at the start of the operation period, the private partner would already have funded the necessary investments and would have to pay back all its funders (Guash, 2004; Vittor and Samples, 2011).

In order to decrease the credit risk, state companies and funds that guarantee PPPs were created whose role it is to guarantee the financial obligations of the public partners bound by the contract. For example, the Guarantee Fund, enacted by the Federal Law of 2004, is a type of guarantee for the private partner regarding financial obligations that were contracted by the public sector in the celebration of a PPP contract (Ministry of Transportation, 2012). These guarantees exist because many states and cities do not have liquid assets to serve as capital for a public fund or company that could guarantee PPPs (Santos, 2009).

On top of the Guarantee Fund, according to the Ministry of Planning (2013), the guarantee of states and cities can also come from the stream of future tax revenues of the project and from the Federal or State Participation Funds. However, there are two obstacles to make viable these two financial guarantees. First, the Brazilian Constitution does not allow the link of future tax revenues for the purpose of financial guarantee. Furthermore, the link with the Federal or State Participation Funds is also not very practiced because banks have not accepted these resources as a credit guarantees (Oliveira et al., 2013).

Thanks to Law N^o 12.766/12 that created the mechanism of fund allocation (“*aporte de recursos*”), the subsidy to the private partner can be paid during the phase of construction of the infrastructure. Before the introduction of the fund allocation, there was no payment from the public partner during the pre-operational phase to avoid public spending in projects that would not be implemented. Because private partners incur significant debt when they are responsible for all the investment, the “*aporte de recursos*” lowered the cost of capital and increased the profitability of the project. Moreover, the fact that the “*aporte de recursos*” is subject to deferred tax payments also generates benefits in terms of cash flow for the private partner (Afonso and Biasoto, 2013).

2.2.3 Relationship Risk

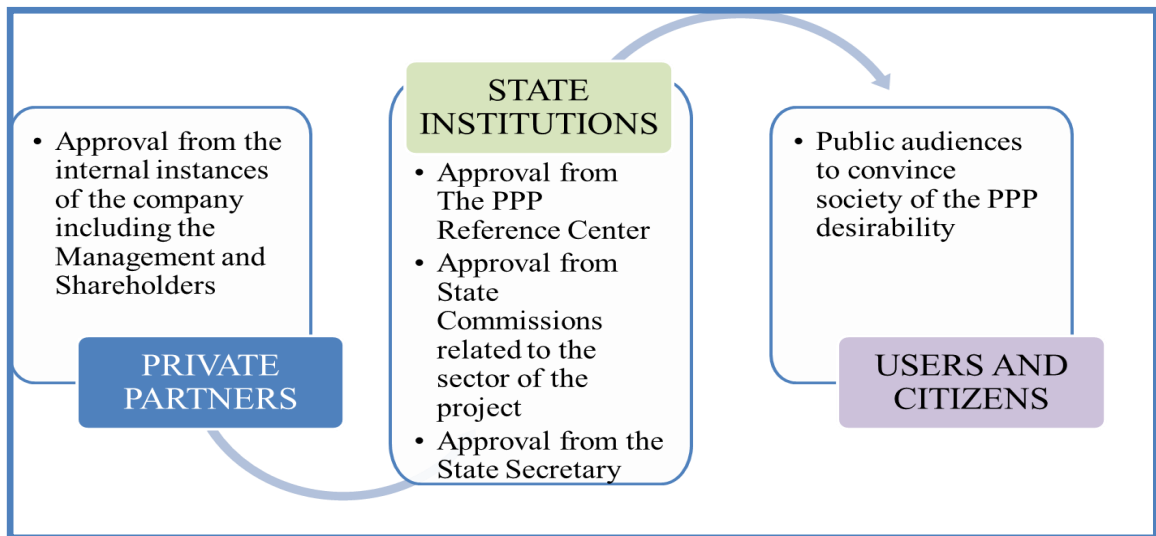
Building good relationships is far more important in PPPs than in traditional procurement methods due to the high risk and complex profile of the project (Kumarawamy and Anvuur, 2008). Yet, the fact that political, institutional and cultural characteristics of the contractual parties differ has an impact on the negotiation approach of each partner.

According to Jacobs (1992), risk management can be difficult due to the different political orientations of both partners that they may not know and/or understand. On one hand, private partners can bear the risk of administrative uncertainty that can occur when the government is not able to complete the administrative procedures on time. In fact, private partners could be faced to uncertain transaction costs in the case the public partner who has a multiple role of principal in the contract and regulator would be able to shift legal procedures that have an impact on the contract enforcement (Koppenjan, 2005). On the other hand, public parties can also risk the private discontinuity subsequent to a change in company strategy, bankruptcy or take-over for example. Another threat for both partners is the use of corruption (Guash, 2004; World Bank, 2009; Veron and Cellier, 2010).

For Hirschman (1970), private parties are not always equipped to manage the public tumult and publicity that can surround major PPP projects. In fact, the nature of PPPs implies high visibility and therefore attracts social pressure groups. The PPP project proponents should implement a communication plan so that the general public can understand the long-term implications and benefits of the project. This support is essential for viability of the project (Salman et al., 2007).

One of the possible consequences of the primacy of politics from the public partner is that it can hinder the decision making process where projects are discussed over and over but are not materialized (Oliveira et al., 2013). According to Afonso and Biasoto (2013), the practice of PPP planning in the public sector in Brazil could be improved by increasing the level of coordination between the different institutions in charge of managing PPP projects. According to Oliveira et al. (2013), the approval depends on various instances and can be bureaucratic and very slow. This approval process can conflict with the market practices of the private partners. Figure 2.6 thereafter illustrates the typical long approval process of PPPs in Brazil at the state level:

Figure 2.6: The Typical Approval Process and Stakeholders for a PPP at the State Level



Source: Ministry of Planning (2013)

Spatial differences may not facilitate the coordination and the decision-making process of a PPP. On one hand, private parties may be faced with the complexity of public administration. For example, according to Koppenjan (2005), “*private partners often see government as a hierarchical organization that can command local government*” (p. 138). Yet, the centralization power of the public sector is more limited in reality and can be fragmented across a set of players, even at the central level. On the other hand, public partner often assumes that private partners are regionally or nationally based in a partnership. Yet, although it is not the case in Brazil, in some countries, the organizational trend for private partners is moving more towards international companies and consortiums (Weihe, 2005).

The different time orientations between the public and private partners can also make it more difficult to manage adequately and spread the risks involved in PPPs (Koppenjan, 2005). For instance, regarding project success, there might be a time horizon gap between both partners. For example, the public partner could base the project follow-up based on electoral cycles while the private partner could have a different time frame (Li et al., 2005 b).

There should be sufficient knowledge from the society about the definition and the potential benefits of PPPs in order to facilitate contract negotiation between the two partners and the adhesion of other shareholders of the project such as citizens. Yet, information about the main concepts, advantages and disadvantages of PPPs are not yet well spread in the public, private and academic fields in Brazil (Afonso and Biasoto, 2013). According to Oliveira et al., (2013) and Ribeiro and Prado (2007), a better diffusion of the theory and practice of the PPPs will allow a reduction of natural resistances to a new mechanism.

2.2.4. Contract Risk

The respect of contracts between the private and public partner is fundamental. There is distinction between the public partner, which is contracting a PPP, and the government. The public entity is permanent while the government is transitional. A new government must carry on the contracts signed by the previous one because it inherits the responsibility of the public entity. If contracts can be contested in such a manner, it introduces an element of risk that tends to increase the costs of future contracts (Van Ham and Koppenjan, 2001; Rosenau, 2000).

In Brazil, there are examples where governments tried to nullify the contracts of previous administrations. When governments have a history of not respecting contracts such as in Brazil, the contract risk is perceived to increase and therefore the private partner tend to require a higher internal rate of return (IRR) (Ikemura, 2011).

The use of sanctions in contracts in Brazil is not very efficient since the legal procedures can give the opportunity to contract contestation and potential opportunistic behavior. In most cases where contracts tried to be nullified, although courts guaranteed the enforcement of the contract, the simple contestation of contracts generates insecurity and more risks to the private partner since such legal processes can last a long time (Afonso and Biasoto, 2013). Furthermore, current law does not envisage sanctions to public administrators that create obstacles for the enforcement of contracts (Veron and Cellier, 2010).

In order to ensure a minimal legal security, specific PPP regulatory agencies were created by states and have an essential role in the management of PPP contracts (Frischtak, 2008). However, authors have shown that for several states, these agencies only stick to their role of approval by using bureaucratic processes that do not add value to the PPP planning. In fact, some agencies only focus on filtering PPPs at the tendering phase and take special care of fiscal costs (Alves et al., 2013).

Authors thoroughly explained that the issue for the regulatory agencies is the lack of resources to monitor, enforce and regulate PPP contracts in an adequate manner. They only have a minimum structure to work and lack financial and technical resources to adequately fulfill their role of overseeing PPP contracts (TCU, 2004).

On top of the financial aspects, these agencies can suffer from a lack of human resources. In fact, 28 positions of 7 federal agencies were empty for on average of 50 days from 2003 to 2009. This lack of continuity causes problems such as the lack of planning (Monteiro, 2013).

Besides, the nominations of the members of the regulatory agencies are not based on a standard process including technical expertise. Yet, the planning of PPP requires very specific technical knowledge (often sector-based) and the implementation of complex studies. Furthermore, Monteiro (2013) demonstrate that on top of not having the resources internally,

they have the difficulty of talent acquisition of external consultants and specialists for the planning of PPP projects. By not having a talent pool, these agencies are facing the risk to submit technical aspects to the political analysis (Santos, 2009).

Conclusion of the Literature Review

The literature review presented the key factors for a successful PPP contract planning. It has been shown that goals of each contractual party should be clearly defined. The main goal of the public partner is to increase the level of investment in a context of scarcity of fiscal resources. The private partner is willing to participate in a PPP to increase market opportunities and this is could only be possible with the guarantee of financial revenues.

However, as seen in Chapter 1, the potential of the PPP procurement alternative is yet to be seen (Oliveira et al., 2013). Indeed, the application of the 2004 legislation has been quite long because few PPPs contracts are being enforced. Currently, the main fact is that investments in infrastructure transportation in Brazil remain dominated by the public sector.

PPPs have been used minimally in Brazil and the literature review gave us various hypotheses to understand why. Competitiveness of the tendering procedure has been identified as critical for the design of a PPP contract but it is threatened by moral hazard and adverse selection. This context of asymmetric information can be the occasion for opportunistic behavior from both partners. As De Clerck et al. (2012) state: *“A divorce without huge opportunity costs in PPP contracts is often not possible, so planning of the marriage is vital”* (p. 255). On top of the moral hazard, contract, credit and relationship risks have also been identified as a serious threat to align the interests of both parties.

Chap 3. Methodology

The topic of the study deals with the incentive level of Public Private Partnerships (PPP) contracts. The research question centers on how contracting parties in a PPP can align their interests. The first goal of the research question is descriptive, aiming to assess the level of incentives given to private partners in PPP contracts. The second goal of the research question is explanatory. The objective is to explain the incentive level of the contract and conclude if the interests of both partners were aligned in contractual aspects.

This research question aims to respond to the economic agency problem where a principal has difficulty in enforcing a contract upon an agent because of moral hazard factors and asymmetric information. Above, chapter 2 presented prior research on how to design incentive contracts. This section will justify methodological³⁹ choices by describing the participants (3.1), the procedures (3.2) and the data analysis methodology (3.3).

3.1. Participants

The target population of interest is composed of infrastructure PPPs in Brazil. The role of PPPs to boost strategic infrastructure investment has been discussed in Chapter 1 as one of the drivers since the public partner is limited in budgetary resources to fund all infrastructure projects necessary for economic growth. Chapter 1 also noted that the PPP contractual model has a high potential since the major part of the highway network (which is the main mode of transportation in Brazil) is not financially viable for the private partner only.

The sample of this study will be composed of the PPP MG-050 contract, signed in 2007. This is the first and only PPP signed in the highway sector by a state after the First Federal Law on PPPs (Nº 11.079/04). This case study selection was based on the official list of PPPs published by the Brazilian Ministry of Planning, Budget and Management (2013). The target population is limited in scope and consists of 34 PPP projects at the state level and one that is at the federal level. From this total of 35 projects, there are 10 projects related to the transportation sector and only 4 to the highway sector. Table 3.1 below describes the sample of the 4 PPP projects from the highway sector:

³⁹According to Harding (1987): "Methodology is a theory and analysis of how research does or should proceed" (p.3).

Table 3.1: PPP Highway Projects Announced by the Ministry of Transportation

Name of the Project	State	Project Phase
MG-050 Highway	MG	Toll collection started
Transcerrados Highway	PI	PPP abandoned.
Progress Highway⁴⁰	RG	PPP abandoned.
16 Highway Lots	MG	Exploration (feasibility study)

Source: Ministry of Planning (2013)

From these four projects, only one is adequate for the present purpose since its contract has been signed: the PPP MG-050. The other PPP in Minas Gerais, the so-called “16 Highway Lots” cannot be included in the study since the contract is still under negotiation. The ‘Progress Highway’ and the “Transcerrados Highway” cannot be considered either since their contracts’ negotiation phase never materialized.

3.2. Research Design: Procedures

This work is a qualitative study investigating the incentive level of PPP MG-050 contract. The design of a PPP contract takes place in the stages of planning. As Chapter 1 showed, a PPP project is typically developed in three main phases: preliminary analysis, planning and implementation. Contract information will be then collected from planning and implementation phases of the project because at the phase of preliminary analysis, the contract did not exist yet.

After identifying the principles that compose an efficient incentive contract through the literature review, two research stages follow: first, I will gather the empirical evidence and then I will present the results.

Regarding empirical evidence, I will describe the factors that need to be taken into account to manage highways in Brazil because I will show that they have an impact on the design of incentive contracts for PPPs. I will then collect data specific info about the case study of the PPP MG-050. Data collected in the case study will describe the level of compliance of the private partner with the contract. The case study is meant to evaluate the

⁴⁰ The name of the highway in Portuguese was “Rodovia Progress”.

degree of adherence of the incentive principles that were highlighted in the literature review to the contract.

Regarding the results section, from the empirical evidence, causal inferences will be made to explain the level of incentives of the contract. After the explanation of the results, recommendations will be made to increase the level of incentives envisaged in the contract.

Because the empirical evidence will measure the nature of incentives set for the PPP MG-050 contract, the results of this case may be generalizable to PPP contracts that will be signed in the future in Brazil. However, this specific experience of PPP project cannot be generalized to all PPP projects in the world. Indeed, based on the constructionist theory, this case study is contextual. Every PPP case is inserted in a political, economic, institutional and historical context. This context can have effects on the type of motivations of the stakeholders and the nature of the incentives that they are willing to respond to.

Thereafter is Table 3.2. that summarizes the data types, sources and timeline of each research stage.

Table 3.2: Data Description

Chapter Title and Number	Goal	Data type	Data sources	Timeline
Introduction (1)	Present the agency problem	Theory and empirical facts	Scientific articles and reports from international institutions	From 1970 to 2013
Theoretical Foundations (2)	Present theoretical foundations to analyze the efficiency of PPP contracts and chose one of the proposed frameworks	Theory	Scientific articles and official documents from international institutions and the Brazilian government	From 1970 to 2014
Empirical Data (4)	Describe the factors that impact highway management in Brazil	Empirical Facts	Reports from international institutions	From 2008 to 2013
Case Study Presentation (5)	Describe the compliance of the contract with the incentive framework	Empirical facts	Reports from the State of Minas Gerais and the contract	From 2007 to 2013
Case Study Analysis (6)	Explain the level of incentives of the contract and make recommendations to improve it	Analysis	The contract and theoretical hypotheses	From 1993 to 2014

Source: the author

The disciplines of origin related to my research will be economics, law, political sciences.

During data collection, some difficulties are expected. First, the contracts' technical aspects could be an obstacle to assess the incentive level of each clause. Second, some interpretations could not be perfect due to the fact that Portuguese is not my native language and the language of the data collected will be Portuguese.

Furthermore, another difficulty is the lack of availability of multiple sources of data. Indeed, there is only a single source of information concerning the contractual performance of the private partner, which is the Secretary of Transportation of the State of Minas Gerais. The institution has a monopolistic position on data publication and this study is limited to the availability of this single source of information.

3.3. Data Analysis

For the purpose of data analysis, the analysis of the contract will be based on the framework of Milgrom and Roberts (1992). Milgrom and Roberts present the most common paradigm in organizational economics and contract theory, which is the agency problem.

As Chapter 2 detailed, Milgrom and Roberts (1992) demonstrate the necessity to set incentives in contracts to prevent post-contractual opportunism. Indeed, theory states that under the postulates of rationality, the agent will chose the lowest effort level without incentives. To induce an opportunistic agent to have a higher effort level, the public partner is also rational and selfish, will have to offer incentives to the agent (private partner). According to Milgrom and Roberts (1992), a properly designed incentive contract will take into consideration the following four principles: the principle of incentive intensity, the principle of informativeness, the principle of monitoring intensity and the principle of equal compensation.

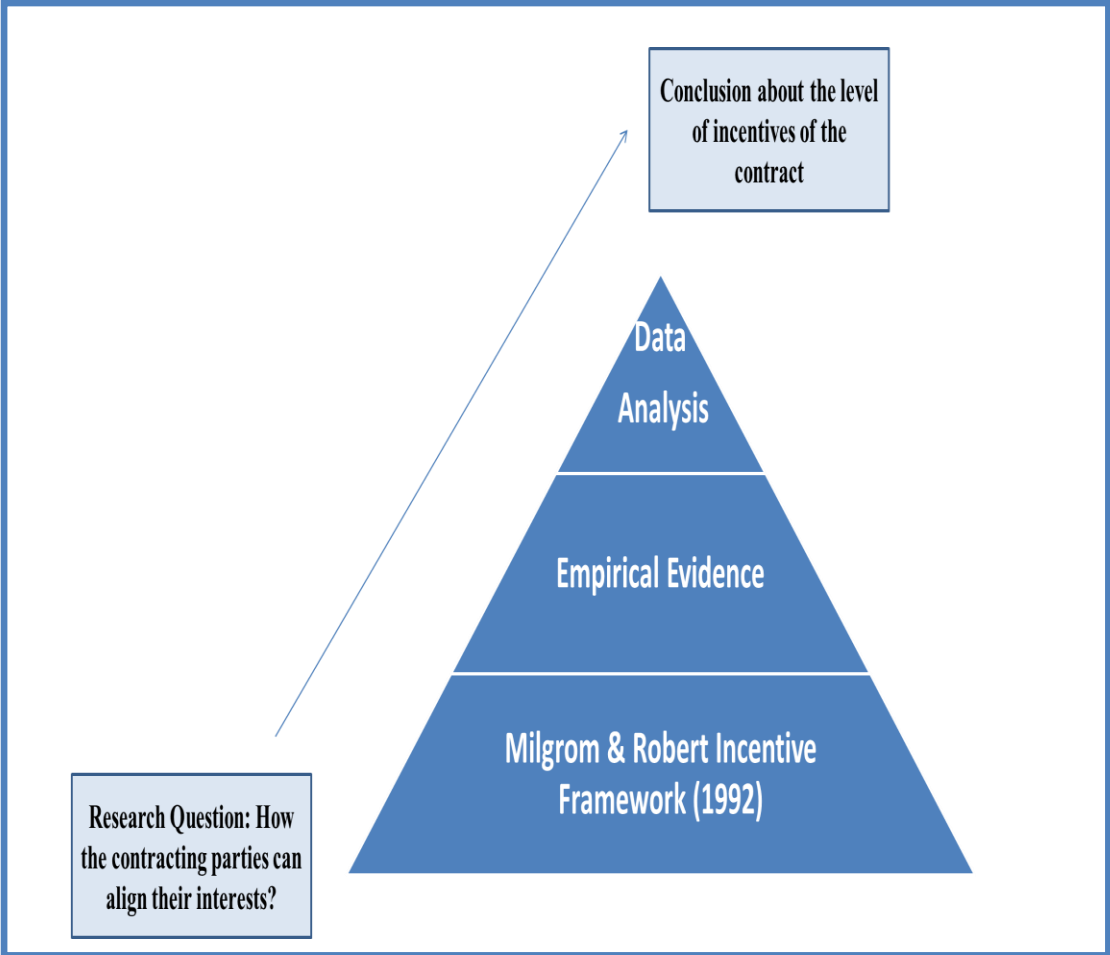
This theory is based on the concepts of rationality and efficiency meaning the participant wants to maximize a properly defined budget function. In other words, when the marginal benefit equals marginal cost is the principle of optimal choice for the agent. The fixed payment is independent from the effort level and has no impact on the marginal benefit. The return share determines marginal benefit. Price is maximized at the optimum because the public partner cannot be made better off without the private partner worse off.

This theory was chosen because its fits the goal of the research question in the sense that it proposes a framework to assess what an optimal contract design is. Indeed, this theory establishes a correlation between return share and effort level. It will help me to conclude that if performance of private partner were low, it would be because return share was low.

I also chose this theory because it is based on the theory of incomplete contracts meaning that incentive contracts exist because the principal cannot enforce a contract that stipulates a particular effort level due to asymmetric information and moral hazard.

In brief, starting with how, the research question goal is to understand how the interests of both parties can be aligned in a context of asymmetric information. This qualitative approach adopted an inductive approach meaning that to answer the research question, I will observe the PPP contract and show if it confirms Milgrom and Roberts (1992) model of incentive contracts. Below is Figure 3.3 that summarizes the methodological choices.

Figure 3.3: The Theoretical Foundations



Source: the author

Chapter 4. Empirical Data: Factors Impacting Highway Management in Brazil

This chapter aims to describe the factors that need to take into account to manage highway in Brazil because they have an impact on the design of incentive contracts. Operational conditions will be described first (4.1) and later their causes (4.2).

4.1. Operational Conditions of the Highway Network in Brazil

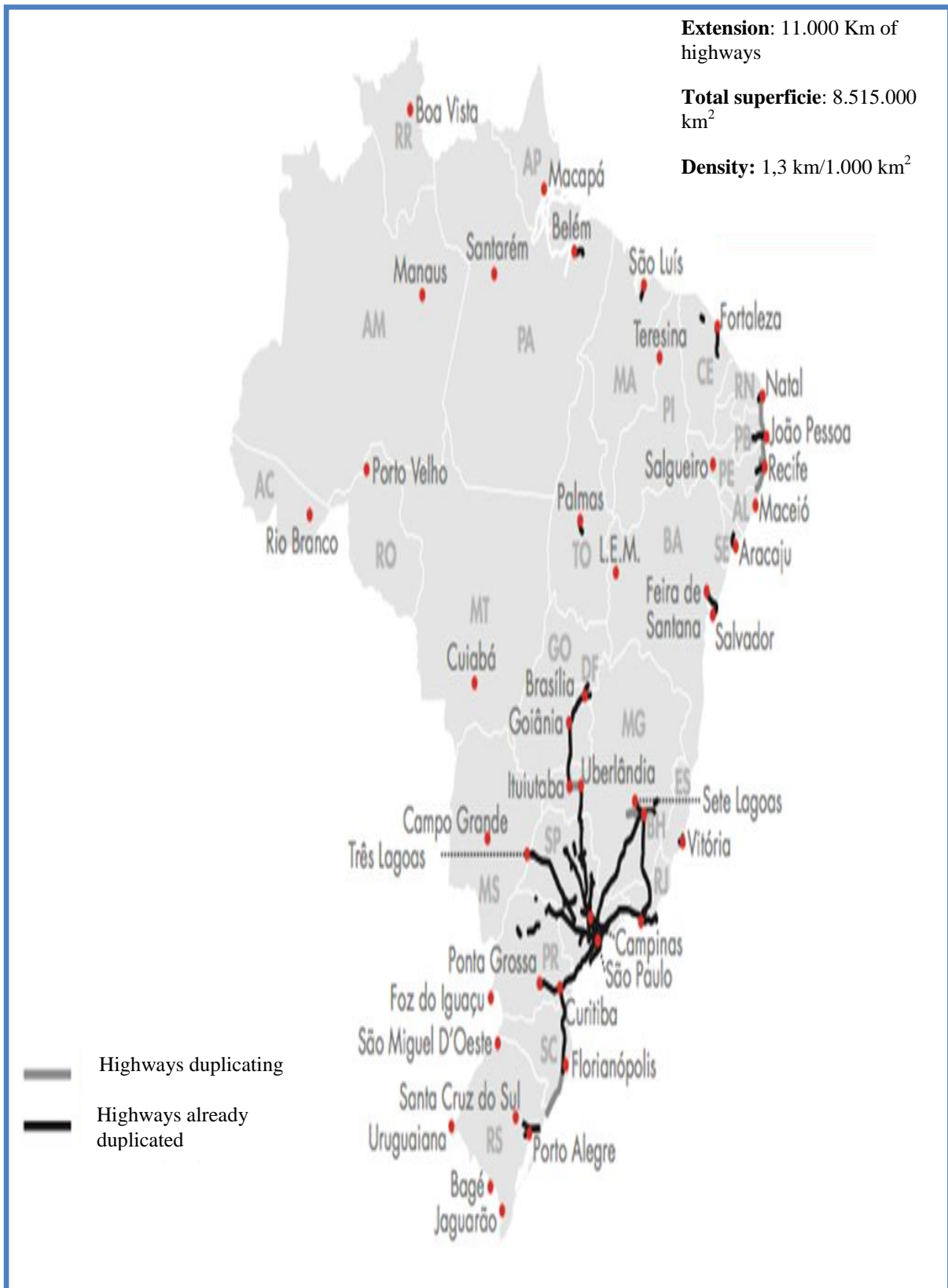
Investment on highway is essential for a country with continental proportions such as Brazil. It is needed for national integration and defense, to increase people and capital mobility and to guarantee safety of people and of transported goods (World Bank Toolkit, 2009). Yet, Brazil does not have a sufficient coverage of highways both in quantitative and qualitative aspects.

4.1.1. Quantitative Aspects: Low Highway Density

As seen in Chapter 1, Brazil has a very low highway density⁴¹ compared to other similar geographies such as the U.S or China. As Figure 4.1 below shows, the length of the highway network in Brazil is not only small but also very concentrated on the economic center of Brazil, i.e. in the Southern and Southeast regions (Bain, 2013).

⁴¹ Highway density is the number of km of duplicated highways by 1.000 km². The bigger the highway density, the higher the speed of locomotion is within the territory (Ministry of Transportation, 2011).

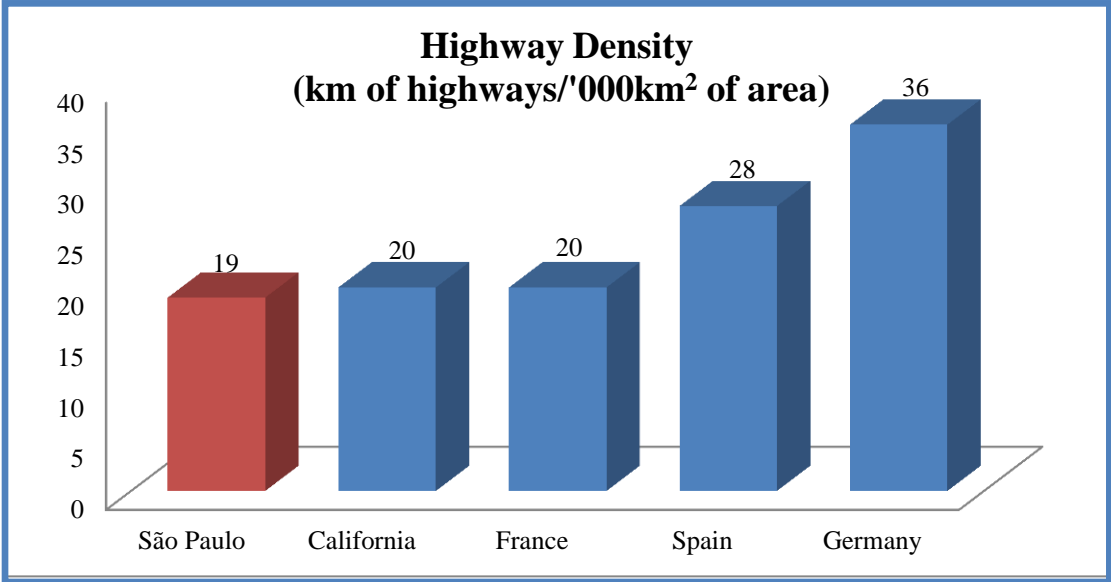
Figure 4.1: Map of the Highway System in Brazil



Source: Bain (2013)

As Figure 4.2 describes, the State of Sao Paulo is the exception in Brazil with a high highway density comparable to other developed states with a similar size. Indeed, the State of Sao Paulo is well ranked with a highway density of 19 km/1000 km² very close to the levels of California, France or Spain (Bain, 2013).

Figure 4.2: Comparison of Highway Densities in the State of Sao Paulo in Brazil, California, France, Spain and Germany in 2011



Source: Bain (2013)

4.1.2. Qualitative Aspects: Low Levels of Quality and Safety

(i) Quality

The general condition of Brazilian highways is poor. According to the National Confederation of Transportation, more than 60% of the country’s highways⁴² were considered in bad maintenance condition with problems in the highway geometry, signalization and pavement conservation (CNT, 2013).

The coverage of highways in the total network of a country is an index of quality of the transportation matrix of a country. Compared to territories with similar sizes, Brazil has 214.000 km of highways that only accounts for 13% of its total highway network. This proportion is twenty times lower than the US that has 4,37 million of km of highways.

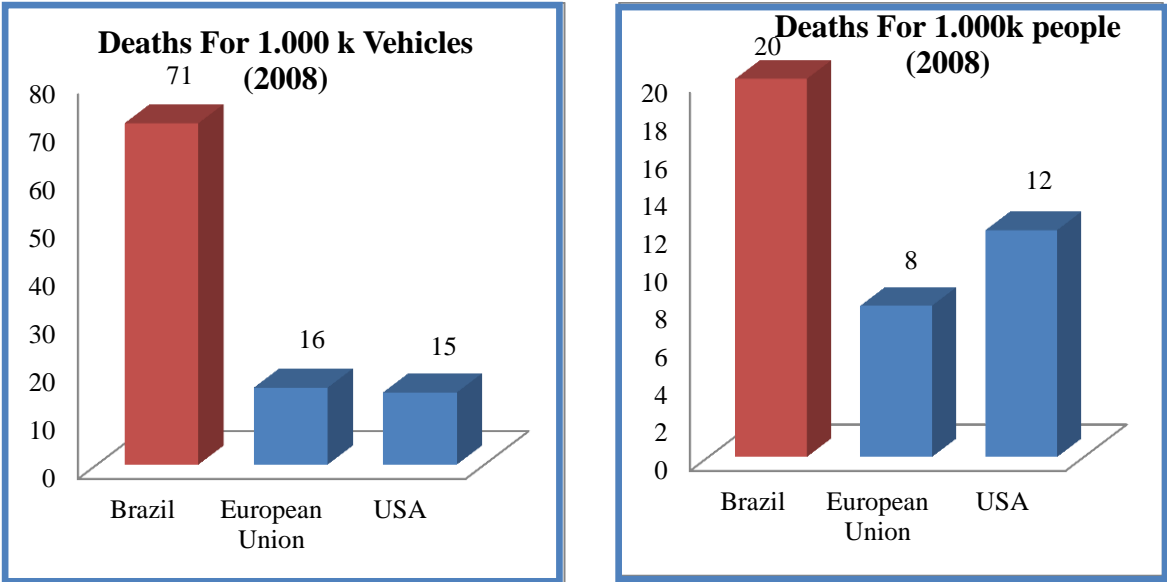
⁴² According to the CNT (2011), out of the 77.373 km of pavement under public management, 66,2 % are in regular or bad or very bad conditions, while the highways under private administration (i.e. 14.552 km) , the situation is the contrary: 86,9% have the pavement in good or excellent conditions. The CNT (2011) also presented a ranking of the best Brazilian highways, 19 out of the 20 highways classified in excellent conditions are privately managed and the only one under public management is at the 19th place of the ranking.

Although its territory is three times smaller than the Brazilian one, India has three times more highways (ILOS, 2011).

(ii) Safety

In Brazil, the level of safety of highways is low in comparison to OECD countries. As Figure 4.3 below shows, in 2008, Brazil registered 19.9 deaths for 100.000 people due to highway accidents, which is higher than in the US and the European Union, that score respectively 12 and 8 deaths for 100,000 people. The gap is wider considering the mortality statistics based on the use of the vehicles. Indeed, in Brazil, 71 people die for each 100,000 vehicles on the highway, against 15 in the United States and 16 in the European Union (Bain, 2013).

Figure 4.3: Comparison of Fatal Accidents on the Highway in Brazil, the Union European and the U.S.A



Source: Bain (2013)

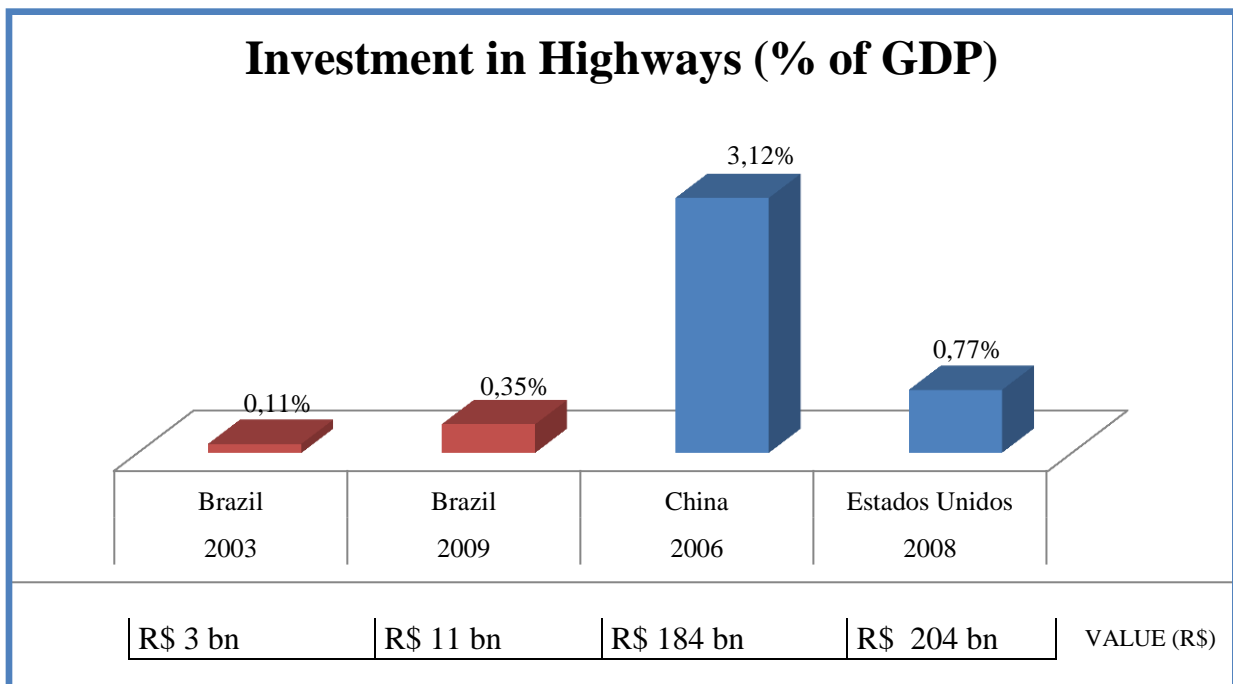
The costs of accidents, estimated around R\$ 6,5 bn per year, are directly or indirectly supported by users and taxpayers. In 2010, the lost value of highway accidents in the federal highways reached R\$ 1,4 bn which is the equivalent of 0,5% of the GDP of 2012 (IPEA, 2013). Nevertheless, the conditions of the highway network are not the only reason for the occurrence of accidents, the behavior of the drivers and the quality and age of the fleet also play a role (TCU, 2012).

4.2. Causes of the Operational Conditions of the Highway Network in Brazil

4.2.1. Lack of Investment

As seen in Chapter 2, funds are lacking for the construction, maintenance and enforcement of contracts in the highway network. As Figure 4.4 below shows, in 2009, the public and private sectors in Brazil invested 0,35% of the country GDP (i.e. R\$ 10, 9 bn) on highways⁴³. In comparison with countries with a similar territory size, it is less than China and the United States that respectively invest 3,12 % and 0,77 % of their GDP, especially taking into account the fact that the U.S grid is quite extensive requiring little extension efforts (Bain, 2013).

Figure 4.4: Comparison of Investment on Highways Based on Percentage of GDP in Brazil, China and the US



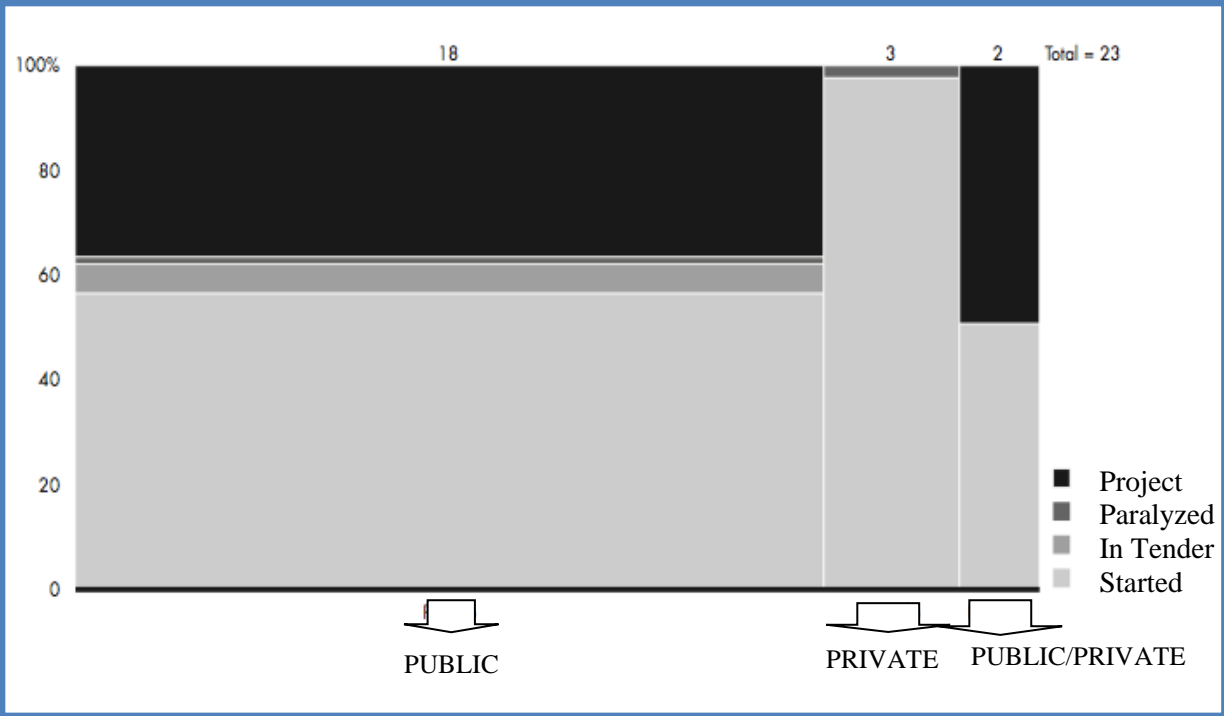
Source: Bain (2013)

In 2007, at the launch of the National Plan for Transportation and Logistics (PNLT), it was estimated that the improvement of the highway network via construction, maintenance and rehabilitation programs would need a minimum R 2 bn per year for the two following Multi-Year Plans (2008/2011 and 2012/2015). This would amount to a total of R\$ 16 bn and that would be complemented by investment of about R\$ 101 bn for the period 2008-2015 (MT, 2012). In comparison with such requirements, the current levels of on-going and projected

⁴³ For construction and maintenance of the highway network

investment for the next decade are still insufficient. As Figure 4.5 below shows, R\$ 18 bn of public investment in highways are expected but two-thirds are either in the design phase or paralyzed (Bain, 2013).

Figure 4.5: Ongoing Highway Investment in Brazil in 2012



Source: Bain (2013)

A large share of the future investment in the highway network will depend on the public sector. Currently, the public sector accounts for around 80 % of the investment, the private sector for 15% and 5% for the public and private sector. The investment announced by the Federal government in 2007 with the Growth Acceleration Plan⁴⁴ and the National Integral Logistics Plan amounted to R\$ 94 bn. However, these announcements are still below the needs of the country that should invest at least at 2% of the GDP in the improvement of the highway network (Bain, 2013).

⁴⁴ Plano de Aceleração do Crescimento (PAC)

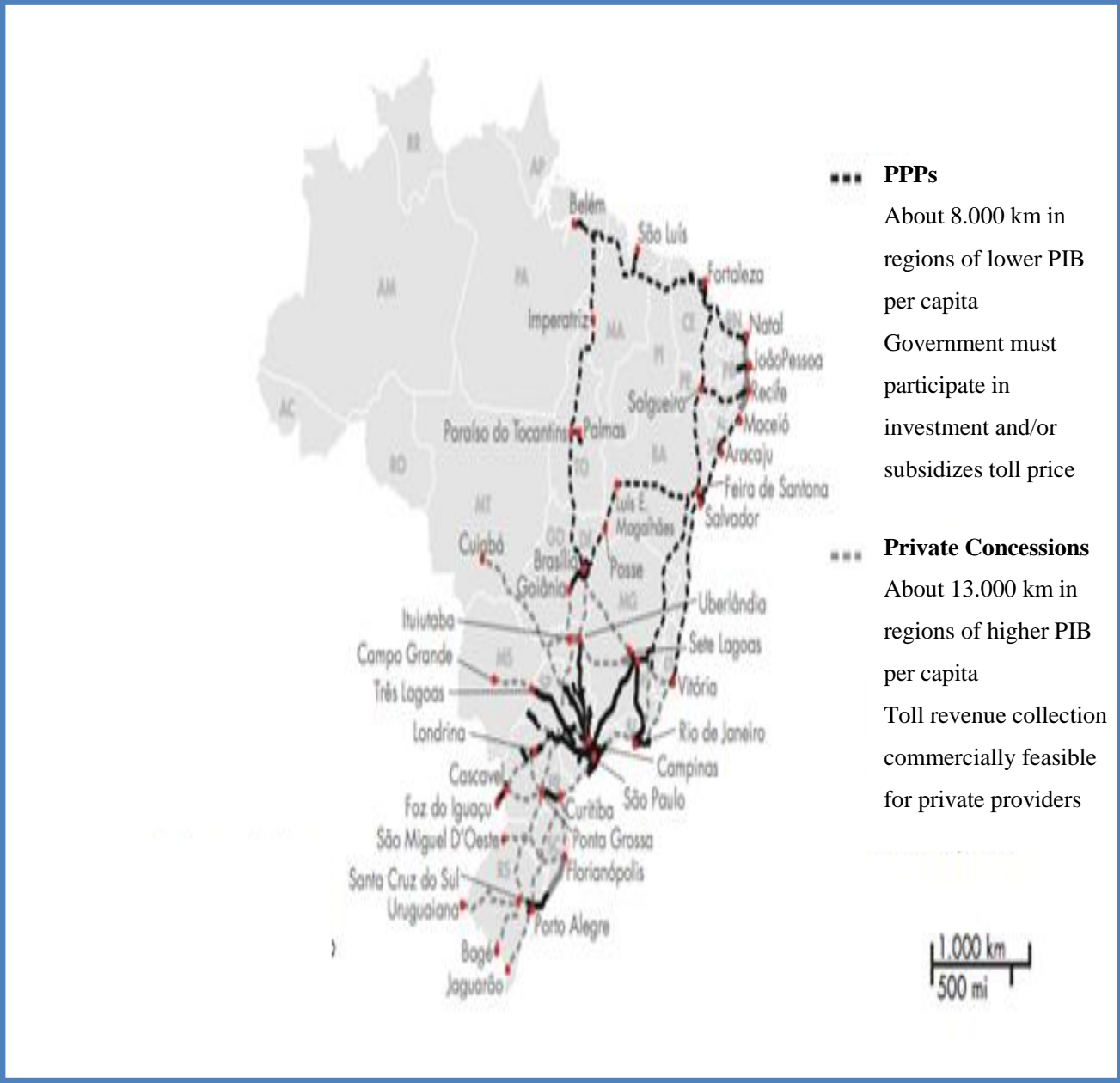
On top of the scarcity of funds, allocation was inefficient: only 48% of the available credit for the federal highway network in 2009 was used in the same year (Almeida, 2013).

4.2.2. Exploitation of the Major Part of the Highway Network is not Financially Feasible

The characteristics of the highway network in Brazil have an impact on the type of investment that can be possibly undertaken. Out of the total federal highway network, the major part is not financially feasible for private participation meaning that demand is not sufficient to enable toll collection requiring thus the payment of subsidies to enable private parties' participation. Out of 63.000 km of federal highways, it is estimated that the financially feasible segments that are suitable for private concessions is only of 10.000 km, ie, less than 16% (Bain, 2013; CNT, 2013).

As Figure 4.6 thereafter shows, the exploitation of highways that requires the payment of subsidies will be mainly located in the Northern regions of the country. In regions with higher GDP per capita, investment can be done via the use of private concessions. In the less developed regions, public investment will be essential to make feasible the participation of the private sector via PPPs (Bain, 2013; CNT, 2013).

Figure 4.6: Map Illustrating the Potential Regions for PPPs and Private Concession⁴⁵ Use



Source: Bain (2013) adapted by the author

⁴⁵ As referred in introduction, PPPs are a type of concessions that deal with projects integrally or partially subsidized or by the public partner. In private concessions, the income generation of the project is sufficient so that it does not need subsidies, as detailed in chapter 1.

4.2.3. Poor Maintenance

Degradation is an inherent phenomenon for any highway pavement. From its opening to traffic, pavement starts to degrade with the impacts of load and weather. Deterioration is described by the occurrence of defects that can be classified into three categories: splits, deformations and desegregations. If pavement reached the state of desegregation, it means that the life cycle of the pavement is terminated (ILOS, 2011; ANTT, 2013). According to the International Road Federation (2008), the life cycle of a pavement is the span of time that was forecasted for the pavement to remain in operating conditions.

The life-cycle cost of a highway project needs to take into consideration the useful life of the pavement. Pavement life cycle cost only can be minimized with frequent maintenance actions. For each monetary unit spent in the maintenance of a highway, it is estimated that one avoids spending three times more for its reconstruction years later. A highway with pavement that receives adequate maintenance lasts 10 to 15 more years before it needs recuperation. On the contrary, the lack of maintenance can lead to severe deterioration in less than 5 years.

Figure 4.7 thereafter shows the deterioration of a pavement with highway quality presented in the vertical axis and time on the horizontal axis. The first rehabilitation of the highway happens at point A. If maintenance is delayed and happens only at the point B⁴⁶, its cost will be higher. It is then shown that any reduction in the required investment will result in the increase of future investments that will be 4 or 5 times higher than the initial estimate (International Road Federation, 2008).

Figure 4.7: Highway Quality Assessment Over Time



Source: The International Road Federation (2008)

⁴⁶ A delay in the investment can happen due to the lack of funds for example.

According to ANTT (2013), in Brazil, poor maintenance of the network is due to the fact that investment are not framed on the basis of life cycles and this does not optimize maintenance and initial investment costs. Service providers usually manage the highway network on average for 5 years. Such time frame is too short to incentivize appropriate investment according to the construction standards⁴⁷. The consequence is that the provider may adopt cheaper inputs since it will not have the responsibility of the whole life cycle cost of the project.

In brief, Table 4.8 summarizes the factors of the operational conditions of the highway network in Brazil. The current condition of the highway network shape the potential interests of public and private parties when they take part in a PPP contract.

Table 4.8: Current Situation of the Brazilian Highway Network and Impact on Contractual Parties of PPPs

SITUATION	PUBLIC PARTNER INTERESTS	PRIVATE PARTNER INTERESTS
<p><u>Low Highway Density</u></p> <p>Due to lack of investment and the difficulty in project financing in the regions of low GDP</p>	<p>Increase of investment</p> <p>More Investment is needed to maintain and increase economic growth.</p>	<p>Financial guarantees in the contract</p> <p>Due to the lack of demand for toll collection and low GDP in some regions</p>
<p><u>Low Quality of Service</u></p> <p>Poor maintenance due to lack of investment and the fact is that investment not optimal according to construction standards</p>	<p>Better maintenance and performance</p> <p>Improvement of infrastructure will increase economic growth.</p>	<p>Long-time frame of contracts</p> <p>Time frames should be sufficient to amortize investment</p>

Source : the author

⁴⁷ AASHTO advises that maintenance investment should be made every five years minimum.

When designing PPP procurement contracts, public and private partners have goals and interests. Incentives for each of these goals should be set in the contract.

Chapter 5. Case Study Presentation: the PPP MG-050

Since PPPs have the potential to cover the investment needs of the highway network in Brazil, it is important to analyze how private parties complied with PPP contracts since their institutionalization in 2004. The analysis of the only case that had performed the contract signature will help us understand the application of the PPP contractual model in the highway network. Chapter 6 will later explain and analyze the level of incentives of the contract.

5. PPP Environment

5.1. Governance of PPPs in the State of Minas Gerais

Unless otherwise specified, all the information from this section (5.1) is sourced from the Reference Center of PPP of the state of Minas Gerais website (Unidade PPP MG, 2013).

Minas Gerais is the state that most counts PPP projects either under preparation or with a contract signed.⁴⁸ Minas Gerais is the state most advanced in Brazil in terms of PPP regulatory framework. The State Law N^o 14.868/03 was the first one to regulate PPPs in the country. Minas Gerais is also known for being the first state to create PPP regulatory agencies.

PPP governance in Minas Gerais will be detailed by describing (i) the Program in Minas Gerais, the various institutions starting from (ii) the Management Board of PPPs, (iii) the Reference Center of PPP⁴⁹, (iv) the PPP Fund (iv) and (v) the Minas Gerais PPP Network.

(i) The PPP Program in Minas Gerais

The PPP program in Minas Gerais was created in December 2003 in order to structure and promote the use of PPPs in that state. Based on Laws N^o 14.868/03 and N^o 14.869/03, the PPP program created institutions and designed agents of the Public Administration to implement functions of planning, enforcement and technical consulting.

A Manual of Operations was published in September 2007. It is a document adopted by the state of Minas Gerais that details the institutional model of the PPP program and serves as a training basis for the institutions and entities involved in the program. This document promotes transparency in the procedure and actions of the state.

The PPP program is embedded on a strategic vision detailing three goals set by the state:

- Transformation of the future in concrete results;

⁴⁸ As of January 2014, there are 6 PPP projects with a contract signed and 15 under preparation.

⁴⁹ By convention, the institution was named the Reference Center of PPP but the exact translation from the Portuguese would be the Central PPP Unit.

- Funding of public, private or mixed sources;
- Management with defined focus, costs and results.

(ii) Planning: The Management Board of PPPs

The Management Board of PPPs is under the responsibility of the state Governor who is also its president.

The role of the Management Board of PPPs is to elaborate the PPP program of the state and approve *Editais*⁵⁰, PPP contracts and contract amendments. Moreover, the Management Board of PPPs evaluates projects from other State public institutions to screen them for PPP adequacy.

(iii) Technical Consulting: The Reference Center of PPP

The Reference Center of PPP is linked to the Secretary of State for Economic Development that was also instituted by the State Law N^o 14.868/03. The main responsibility of the Reference Center of PPP is to coordinate PPP projects. The Reference Center of PPP also helps the Management Unit of PPPs by providing technical advice in the elaboration of projects and contracts, by doing project proposals and following-up the implementation of the PPP Program.

The other responsibility of the Reference Center of PPP is to promote the techniques specific to PPP contracts. It aims to be the reference center of knowledge about concepts, methodology and tendering of PPP projects.

(iv) Financial Guarantee: The PPP Fund

Brazilian law allows the public sector to offer guarantees to the private partner regarding the payment of the subsidies that are agreed in the contract. Based on the PPP Law (N^o 11.079/2004), the guarantee can be formalized among various options such as (i) use of specific funds foreseen by state Law, (ii) insurance contracting from companies unrelated to the state, (iii) guarantee given by international institutions unrelated to the state or (iv) the guarantees given by a fund or state company created for this purpose.

Based on the State Law⁵¹, the PPP Fund was created in 2003 to offer financial guarantees to the PPP program. The State Secretary manages the PPP Fund for Economic Development and the Development Bank of Minas Gerais. Its funds mainly come from endowments in the state budget.

(v) The Minas Gerais PPP Network

The MG PPP network comprises thirteen institutions of the state of Minas Gerais that aim all at exchanging general information and training to implement the PPP policy of the state.

Two important members of the PPP Network are essential to describe: the Department of Roads (DER-MG) and the Company for Economic Development of Minas Gerais (CODEMIG)⁵².

⁵⁰ Editais are official and mandatory documents to call a public project for tender detailing the requirements to participate in the tender

⁵¹ Law N^o 14.868/03

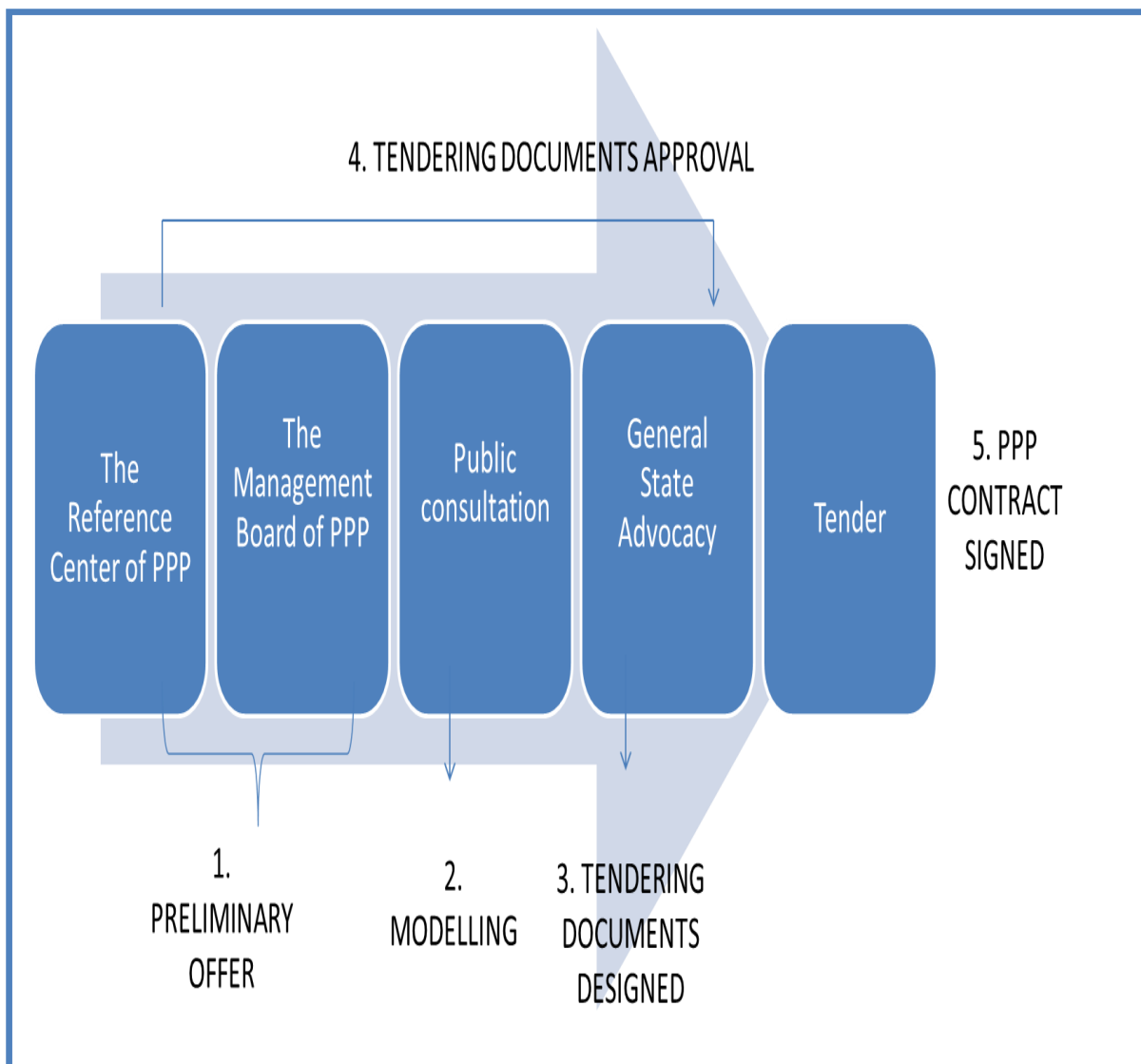
⁵² For future references, DER-MG and CODEMIG.

For the highway sector, DER-MG plays the role of contracting party of the PPP and CODEMIG is the one that guarantees the payment of the subsidy to the private partner.

The components of the MG PPP network may communicate to share information about the PPP projects and all the documents relative to the projects under development.

In brief, Figure 5.1 illustrates the main institutions and stakeholders involved in the typical approval process of a PPP at a state level:

Figure 5.1: Overview of the Approval Process for the PPP MG-050



Source: The author based on Unidade PPP MG (2013)

5.2. MG-050 Basic Data

Unless otherwise specified, all the information from this section (5.2) is sourced from the contract of the PPP MG-050 (Contrato PPP MG-050, 2007).

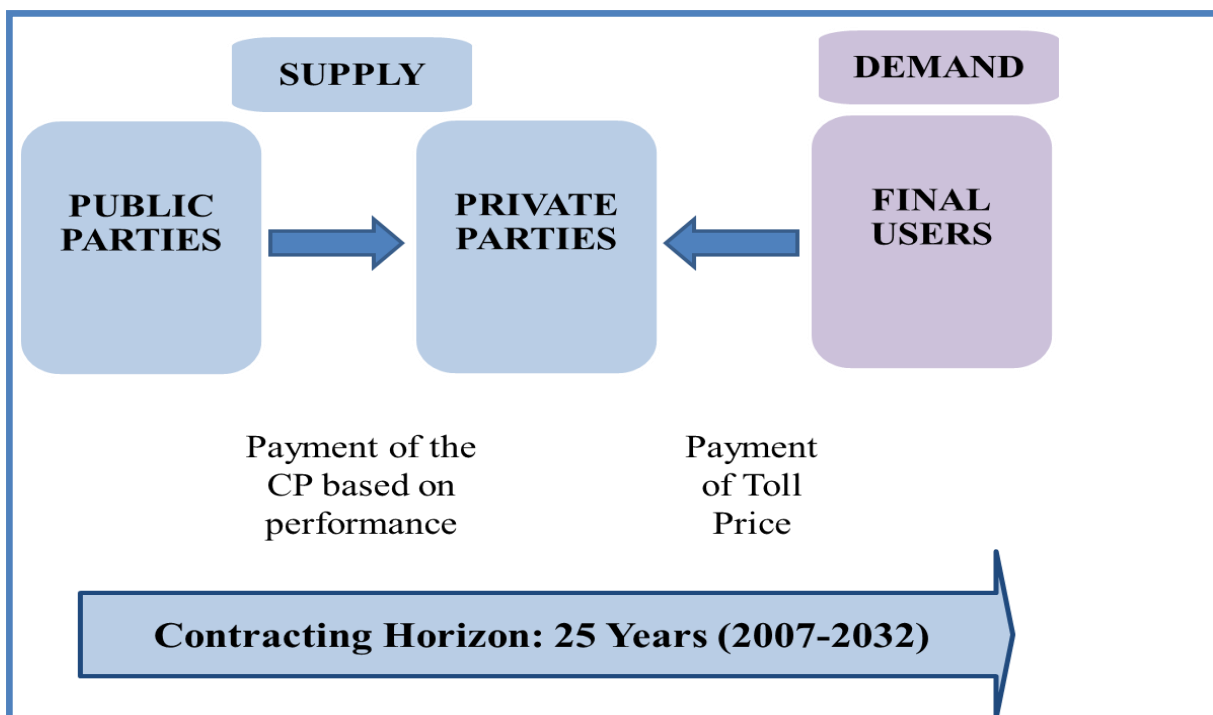
The PPP project will be described in terms of (i) parties, (ii) object, (iii) tendering procedure and (iv) economic and financial model.

(i) MG-050: Definition of Parties of the Contract

The PPP under study is a sponsored concession as framed by the PPP Law of 2004. Based on this legal piece, the government makes periodic payments to the private partner and the latter can also charge users. In this funding scheme, the public partner funds a share of the project paying a monthly subsidy to the private partner called *Contrasprestação Pecuniária (CP)*⁵³. The payment of the CP is based on performance. The private partner charges a toll price to the user called basic toll price (Ministry of Transportation).

Figure 5.2 illustrates the three basic groups of stakeholders involved in the PPP: public parties, private parties and final users.

Figure 5.2: The Three Main Groups of Stakeholders of the PPP



Source: the author

In order to detail the member roles of these three main groups of shareholders, the basic process of the PPP will be described. At the origin, the Department of Highways of the Minas

⁵³ For future references, the abbreviation CP will be used.

Gerais State (DER-MG)⁵⁴ signed a PPP contract for the concession of the MG-050 in the model of a sponsored concession. This contract has duration of 25 years. A Special Purpose Vehicle (SPV) represents the private partner⁵⁵.

The State Treasury gives the authority to the DER-MG to pay a CP to the SPV on top of the toll price that it collects. CODEMIG⁵⁶ plays the role of guarantor for the payment of the CP to the SPV. CODEMIG has to keep the amount of the CPs secured in a banking account in case of default by the DER-MG.

The Reference Center of PPP and DER-MG will follow-up the work of the Independent Controller⁵⁷ that will assess the performance of the SPV by attributing it a performance grade based on the performance indicators of the Table of Performance of Indicators⁵⁸. The QID grade performance is on a pro-rata basis meaning that if 100% of the performance was reached, the total amount of the CP will be paid to the SPV⁵⁹.

(ii) Object of the Contract

The MG-050 PPP contract was signed on May 21, 2007 for a time frame of 25 years, i.e. from 2007 to 2032. The SPV is in charge of the reconstruction, extension, maintenance and exploitation of the highway MG-050. The contract only encompasses highway sections located within the state of MG. Figure 5.3 below depicts the total sections of the highways under concession which comprise of 371.4 km. The PPP project is called MG-050 but in fact two other highways are part of the project: the BR 491 and the BR 265. However, the dominant part of the PPP is related to the MG-050, i.e., more than 90% of the total length of the highway under concession).

⁵⁴ Role of DER-MG is described in section 5.1. (v) The Minas Gerais (MG) PPP Network.

⁵⁵ The Federal Law 11.079/04 obligates the private partner to have a SPV as a legal entity. For future references, the abbreviation SPV will be used.

⁵⁶ Role of CODEMIG is described in section 5.1. (v) The Minas Gerais (MG) PPP Network.

⁵⁷ The independent controller was hired by DER-MG and is in charge of giving the QID grade.

⁵⁸ The Table of Performance of Indicators is the translation of the Portuguese term *Quadro de Indicadores de Desempenho*. For future references, the abbreviation QID will be used.

⁵⁹ The composition of the performance indicators of the QID system will be further detailed in section 6.1.2 of Chapter 6.

Figure 5.3: Map of the Drawing of the Highway MG-050



Source: Unidade PPP MG (2013)

The influence area of the highway under concession covers an influence area of the state of Minas Gerais that encompasses 50 cities and a population of about 1.3 million people, i.e. 7,4% of the total population and 7,7% of the GDP of the state⁶⁰ (PPP Brasil, 2013).

(iii) Tendering Procedure

In April 2006, the DER-MG published an *Edital* called DER-MG 070/2006 that is an official and mandatory document to take a public project for tender. The essential requirements of the *Edital* were that investment in the MG-050 had to be of R\$ 645 million with R\$ 320 million in the first 5 years. In conformity with the PPP Federal Law, the amount of the CP was limited to 35 million per year (i.e. R\$ 2.916.666, 67/month). Both the CP payment and the toll price charge could only start in the 13th month of the contract subsequent to the functional recuperation of the highway. Furthermore, the toll price was fixed at R\$ 3,00 per toll point and could only be charged at 6 toll points.

⁶⁰ In May 2007 at the signature of the contract

The tendering was based on the modality of competition and the winning factor was the lowest price asked for the CP. The Special Commission on Tendering of the DER-MG was in charge of analyzing the proposals that were received in August 2006. The tendering procedure was divided into 2 phases:

1. Analysis of the documentation of Habilitation and Execution. Technical experience on the operation and maintenance of highways is needed to participate in the tender;
2. Analysis of the economic proposal.

Out of the five participants, the winner was the company Equipav⁶¹ S/A – Pavimentação, Engenharia e Comércio for presenting the best financial deal with the offer of a CP equivalent to R\$ 7, 89 million/year, well below the limit of 35 million/year.

The SPV formed by Equipav is a non-listed limited liability company with a capital of R\$ 5.000.000 (Grupo Equipav, 2013).

The tendering procedure has been delayed due to legal problems. In fact, although the *Edital* was published in April 2006, the contract was only signed on May 21, 2007. The reason is that one of the participants, the consortium Constran-Schahin-Maireengineering was initially not authorized to participate in the tender because it did not present the financial guarantees (presentation of the minimum equity ratio) required by the DER-MG. The company contested the constraint in Court and was eventually allowed to participate in the tender (Direito GV, 2013).

(iv) Economic and Financial Model

Table 5.4 below describes the sources of revenue for the SPV. The SPV obtains its revenue from two main sources: toll collected and the CP. Toll collection comes from six toll points and the CP which amount depends on the QID⁶² grade performance on a pro-rata basis.

To these two sources of revenues, the costs, expenses and tax need to be reduced and increased by the cash flow coming from investors. Investors of the SPV are the Brazilian Bank for Investment and Development (BNDES) (60%), the pension funds (20%) and the SPV (20%).

⁶¹ Equipav is part of Metin, a conglomerate that also has activities in the sector of energy, commodities and construction. The company has experience in highway management with two concessions in the states of Sao Paulo and Rio Grande do Sul.

⁶² Chapter 6 will detail the mechanism of the QID that measures the performance of the SPV.

Table 5.4: Main Components of the Revenue of the SPV

Profit	Loss	Total
-Toll collection	Taxes	Revenue
-CP		

Source: The author based on Contrato PPP MG-050 (2013).

Toll revenue depends on the traffic volume and the toll price⁶³. The CP and the toll price are automatically indexed to inflation, using the IPCA-IBGE index.

5.3. Performance of the SPV

Unless otherwise specified, all the information in this section (5.3) is sourced from the performance report of the private partner published by the Reference Center of PPP (Relatório Ano 6, 2013).

The compliance of the SPV with the contract will be described based on four elements: (i) the investment levels, (ii) quality, (iii) safety and (iv) revenue.

(i) Non-Compliance with Investment Levels

According to the contract, the SPV must invest R\$ 350 million during the first 5 years of the contract and the total investment value should be of R\$ 659 million. The contract also details the type of investment required from the SPV. The obligatory interventions (IO) refer to the investment that the SPV must execute during the 12 first months of the concession.

As Figure 5.5 shows thereafter, the SPV did not respect the contract since almost 30% of the works are delayed (32 out of 106) and 56% (59 out of 106) present defaults and are subject to fines.

Table 5.5: Total Number and Value of Delayed Works and Works with Default

Type of Investment	Number of Projects	Value (in million)
Concluded IO	37	R\$ 24
Concluded IO with Defaults	23	R\$ 33
On-going IO	8	R\$ 1
On-going IO with defaults	6	R\$ 17
Delayed IO	2	R\$ 3
Delayed IO with Defaults	30	R\$ 82
Total	106	R\$ 159

Source: Relatório Ano 6 (2013)

⁶³ The current toll price (valid from October 2013 to June 2014) can go from R\$ 4,40 to R\$ 26,40 and depends on type of vehicle.

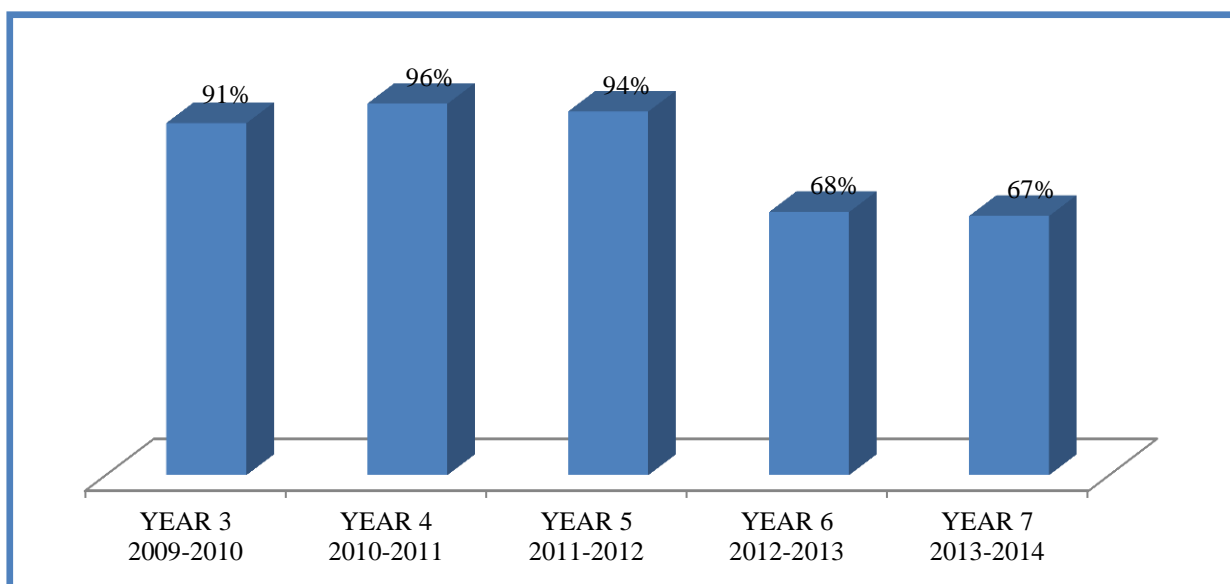
In terms of value, it means that investment works that worth R\$ 85 are delayed (more than 50% of the total investment value). Moreover, R\$ 132 of the works present defaults and are subject to fines (more than 80% of the total investment value).

(ii) Low Performance on Quality

As previously detailed in Figure 5.4, the amount of CP paid to the SPV is based on the performance grade and the quality of the service that the independent controller audits with the QID system.

Figure 5.6 below describes the average QID grade during the last five years of the contract. The average grade of the QID system of the SPV shows a downward trend of the performance level of the SPV. While the SPV showed excellent results from year 3 to year 5 (93% on average), from year 6, the average QID grade dropped from 94% to 68%. For year 7⁶⁴, the performance remained low with a grade of 67%.

Figure 5.6: Average QID Grade for the SPV from Year 3 to Year 7



Source: Relatório Ano 6 (2013)

The PPP contract mentions a minimum service level that is called level D. There are a total of six service levels from A rated the best to F the worst. The lower the level, the best the highway capacity. If the service is inferior to D, investment to expand the highway is required. For the last three years⁶⁵ of the contract application, the SPV has reached twice the level D, demonstrating thus very low levels of investment.

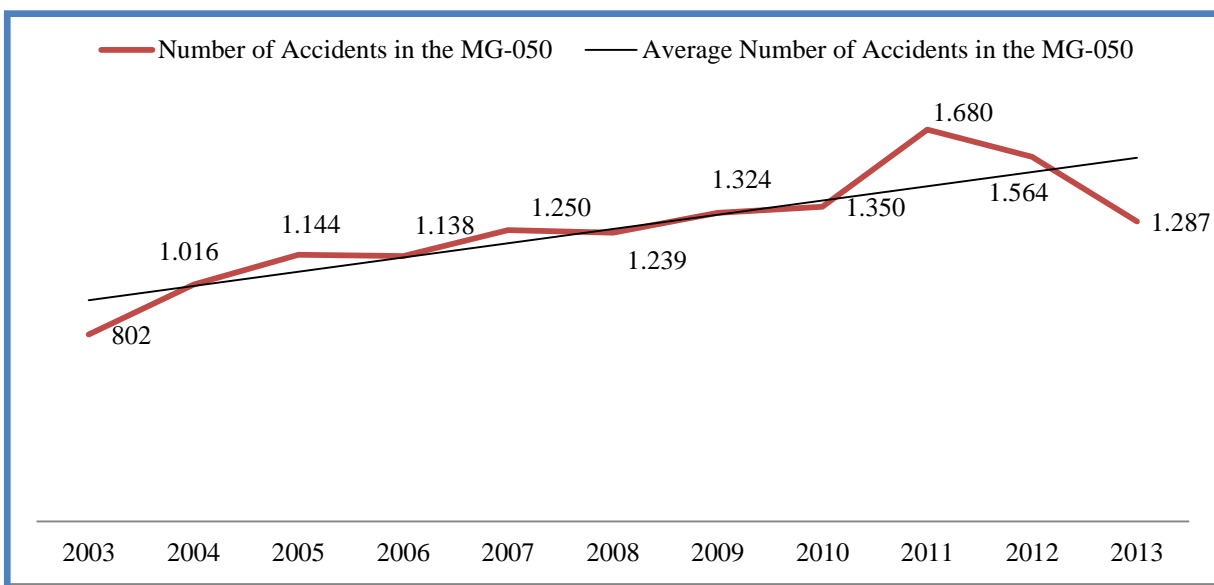
⁶⁴ Please note that available data for Year 7 only accounts from June to October 2013. Since the contract was signed on May 21st, the month considered for the start of the contractual year is June.

⁶⁵ The last three years account for 2010-2011, 2011-2012 and 2013-2014.

(iii) Safety

The other component of the quality of the service is the number of accidents. As Figure 5.7 below shows, since the start of the PPP in 2007, the number of accidents compared to the total traffic has continued to increase⁶⁶. Yet, since the exact amount of vehicles flow is not known, a correlation can not be established between the decreasing safety levels and the management of the highway by the SPV.

Figure 5.7: Total Number of Accidents in the MG-050 from 2003 to 2013



Source: Relatório Ano 6 (2013)

(iv) Revenue

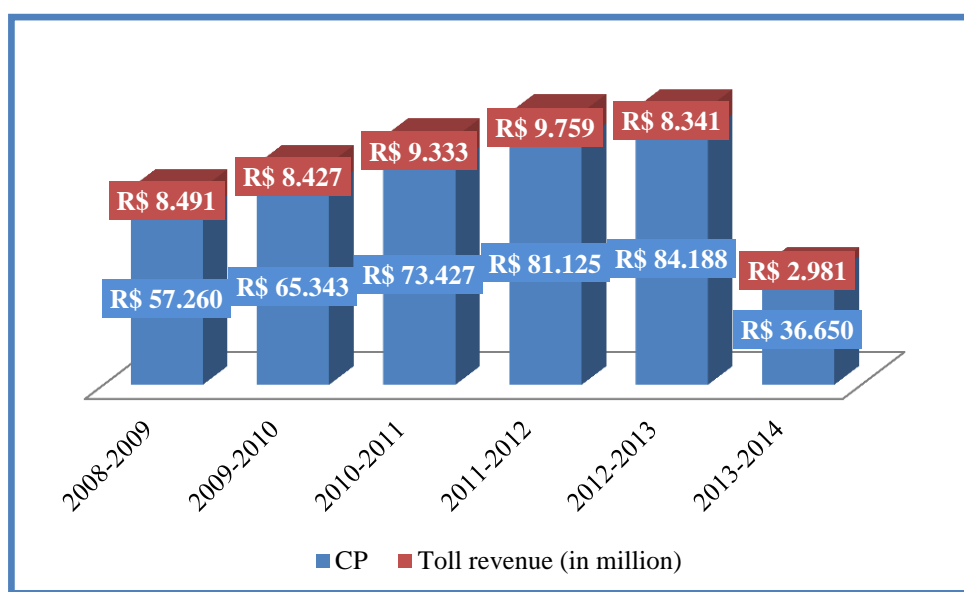
The annual revenue of the SPV increased from year 2 to year 6 of the contract. As illustrated by the Figure 5.8 below, the revenue started to grow⁶⁷ from R\$ 6,5 million in year 2 of the contract to R\$ 9,2 million in year 6⁶⁸ (i.e. a total increase of more than 40%).

⁶⁶ The same evolution is true for the number of accidents with fatal victims since it continued to increase and be volatile after the start of the PPP.

⁶⁷ From year 3 to year 6 of the contract, the SPV had high revenue thanks to the fact that the observed traffic surpassed the forecast.

⁶⁸ Year 7 of the contract is not yet finished (from June 2013 to June 2014).

Figure 5.8: Annual Revenue of the SPV (in million of R\$)



Source: Relatório Ano 6 (2013)

The performance of this first PPP could be improved due to the non-compliance with many clauses of the contract. In fact, the SPV did not respect the obligatory interventions specified in the contract and it received though the CP. Besides, on February 5th 2014, The Brazilian District Attorney Office entered in a legal process to end the toll collection in the MG-050 (Unidade PPP MG, 2013). Data collected also show that the quality and safety of the service are decreasing. Yet, the SPV is making money thanks to an increasing traffic level and toll price.

This performance level of the SPV reflected how the SPV reacted to incentives of the contract. One hypothesis that could explain the low performance of the SPV is that the contract was poorly designed. Chapter 6 will make an economic analysis of the incentives embedded in the contract.

Chapter 6. Case Study Analysis: The Incentive Level of the Contract PPP MG-050

The case study presentation (chapter 5) shed light on the performance level of the SPV from the signature of the contract in May 2007 to October 2013. The performance of the SPV potentially reflected how the SPV reacted to incentives present in the contract. This section aims to analyze the level of contractual incentives based on the incentive variables previously identified of the Milgrom and Roberts (1992) framework.

In order to do that, an overview of the incentive structure of the contract (6.1) will be followed by an assessment of the level of incentives of the contract (6.2).

Unless otherwise specified, all the information from this chapter will be based on the contract (Contrato PPP MG-050, 2007).

6.1. Overview of the Incentive Structure

6.1.1. Payment Mechanism: the CP Retention

The contract MG-050 is an incentive contract since payment of the SPV is linked to performance. QID is a system that automatically calculates the performance level of the SPV and it is monitored by the DER-MG. The QID system assesses performance into 4 categories: operational, environmental, financial and social. The indicators that compose each of these categories will be detailed in this section.

According to clause 34 (Contrato PPP MG-050, 2007), the independent controller⁶⁹ is a company specialized in monitoring performance indicators. Its role is to audit the operations of the highway and frames the results in the QID system.

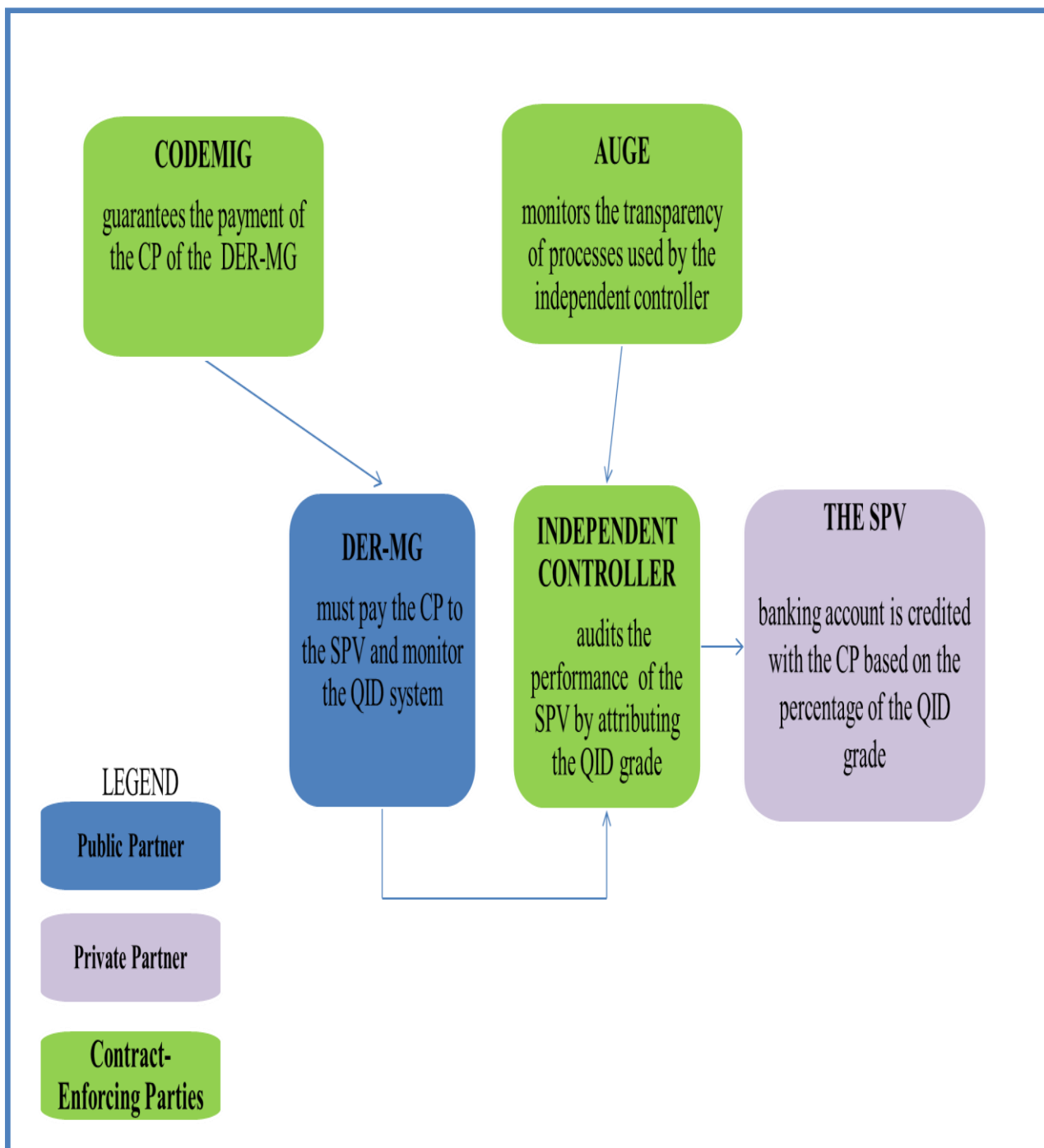
The result of this audit in the four categories is the final grade of the QID. The QID grade will give the percentage of the total CP that the SPV can receive. Payment is based on a pro-rata basis. In other words, if the SPV respects all indicators of the QID, it will receive 100% of the CP. Figure 6.1 below illustrates the payment mechanism of the SPV that is based on performance. The institution that has the responsibility for paying the CP is the DER-MG and the CODEMIG⁷⁰ gives the financial guarantee that the CP will be paid as already seen in section 5.1. (v). Thanks to the CODEMIG that endorses the payment, the SPV bears less the default risk described in clause 38⁷¹ (Contrato PPP MG-050, 2007).

⁶⁹ Reference to clause 34 (appendix 10). The company that won the tendering procedure to be the independent controller was PCW. The company started its job on December 7th 2012. The contract of the independent controller has a duration of 3 years.

⁷⁰ The CODEMIG guarantees the payment by depositing the amount of the CP in a banking account

⁷¹ Cf appendix 11

Figure 6.1: Description of the Payment Mechanism of the CP



Source: The author based on Contrato PPP MG-050 (2007)

On top of the independent controller, the other institution put in place to monitor the QID system is the State Auditor (the AUGÉ)⁷² whose role is to verify whether processes of the independent controller are transparent and to ensure the accurate reporting of the activities of the SPV.⁷³

⁷² Cf appendix 11

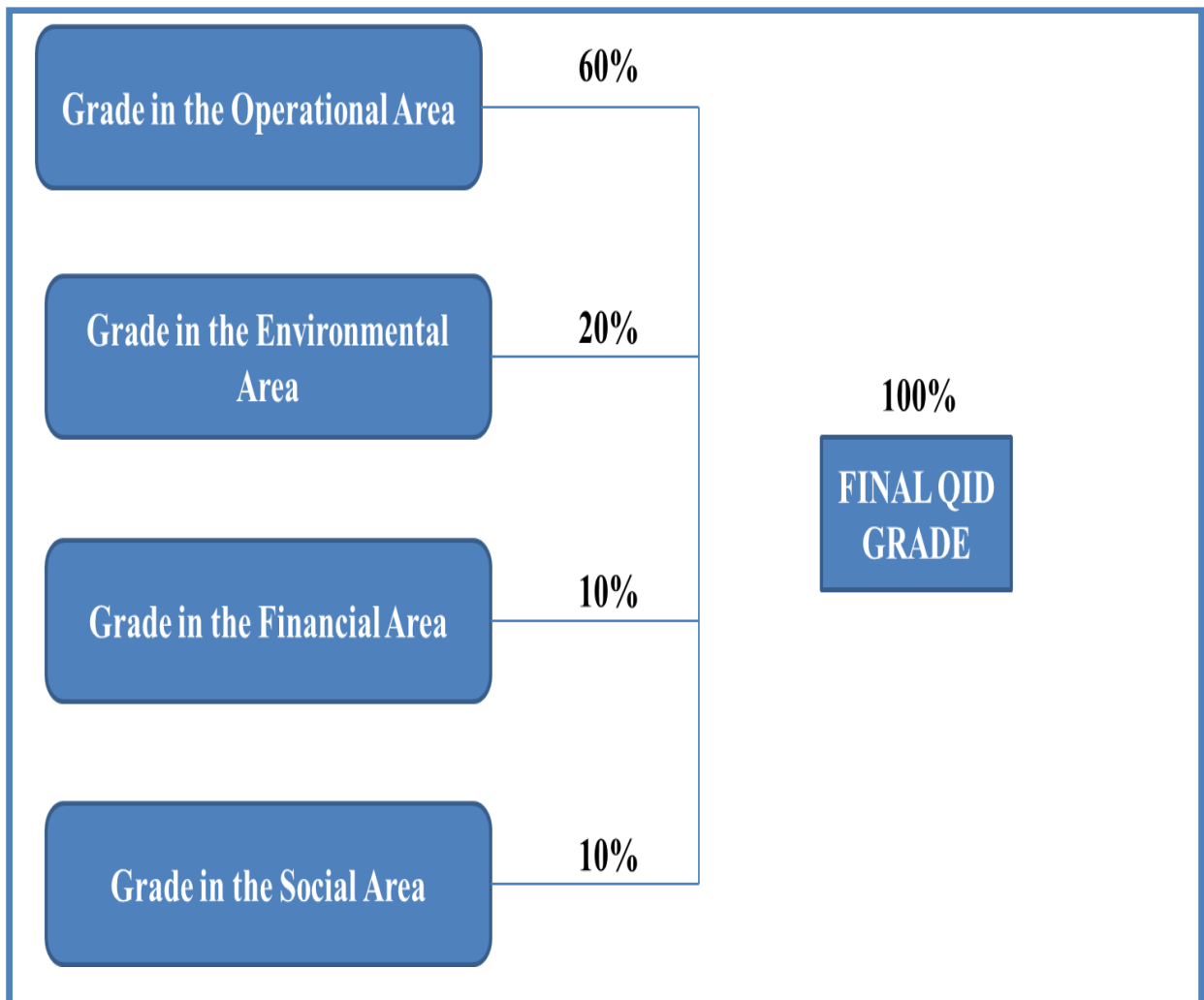
⁷³ Cf appendix 15

For the SPV, the payment mechanism based on CP reduction in case of non-compliance with the QID indicators should play the role of a strong incentive mechanism.

6.1.2. The QID System

The SPV performance is graded in 4 categories: operational, financial, social and environmental. As Figure 6.2 below depicts, these 4 categories are the basis of the QID grade and do not have the same weight in the final QID grade.

Figure 6.2: Composition of the Final QID Grade



Source: The author based on Contrato PPP MG-050 (2007)

The critical aspects of risks and incentives for each category will be assessed below.

6.1.3. Contractual Responsibilities and Incentives of the SPV

6.1.3.1. Contractual Responsibilities of the SPV in the Operational Category

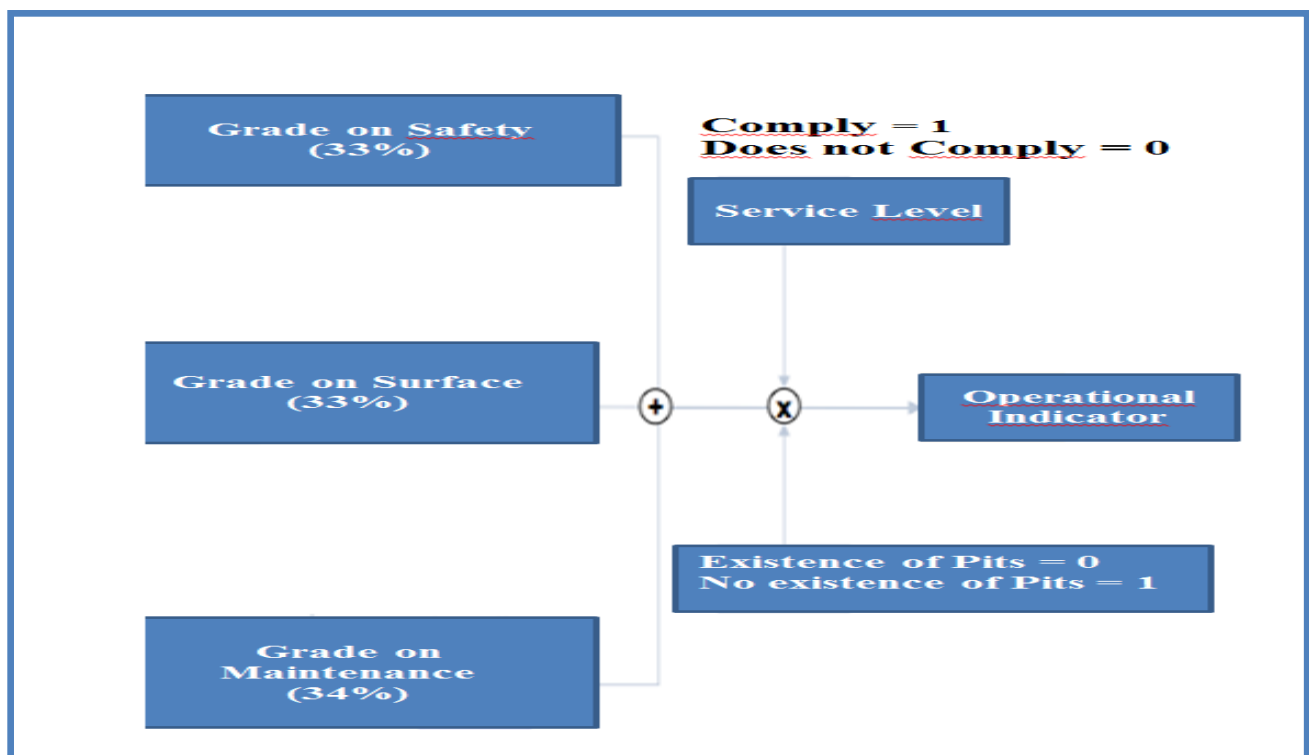
According to clause 22⁷⁴ (Contrato PPP MG-050, 2007), construction and maintenance costs⁷⁵ are borne by the SPV. There is a specific problem about maintenance in highways related to weight excess that increases maintenance costs and accelerates the deterioration of the highway. The SPV is responsible for the installation and operation of weighting posts.

As Figure 6.3 below shows, the QID grade in the operational category is the result of the performance level of the SPV in the 3 following indicators:

- Safety
- Surface
- Maintenance

Each indicator is made of different indexes. If only one of the indexes is not complied, the total grade for each indicator is 0. Given the weight of the operational category within the QID system, the SPV can lose up to 60% of the value of the CP by not complying with the indicators.

Figure 6.3: Operational Indicators of the QID



Source: The author based on Contrato PPP MG-050 (2007)

⁷⁴ Cf appendix 7

⁷⁵ The SPV contracted performance bonds to ensure compliance with third parties on externalized tasks. Before the start of construction operations, the SPV also audited the terrains to check if there were no structural problems because there was a high risk to start construction on land with defects.

6.1.3.2. Contractual Responsibilities of the SPV in the Environmental Category

According to clause 14⁷⁶ (Contrato PPP MG-050, 2007), the SPV is responsible for the acquisition of all licenses (and the costs associated with it) required in the plan of environmental management. The public partner needs to provide the private partner with support for the acquisition of licenses. The SPV must also comply with all the duties resulting from the licenses.

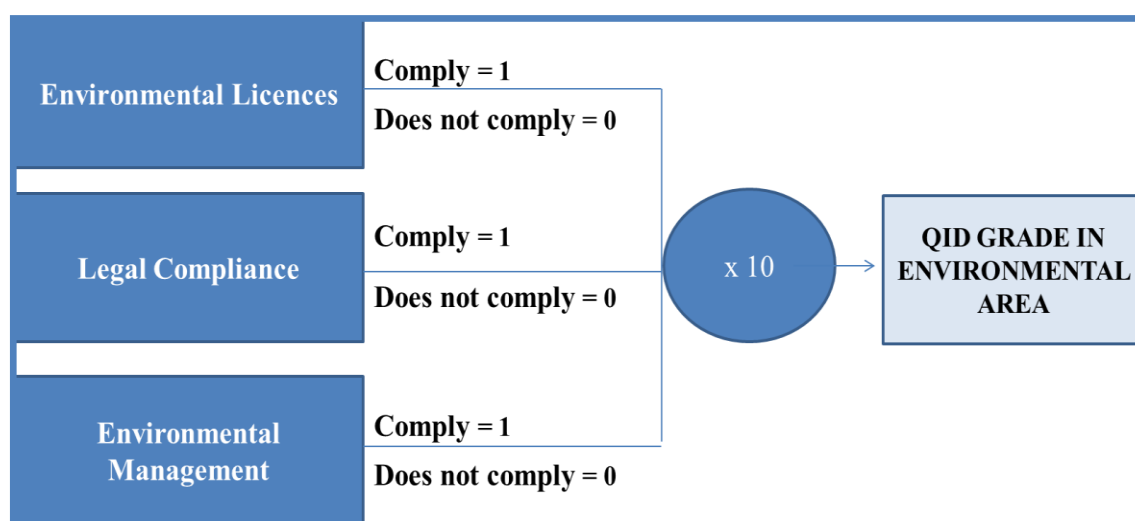
According to clause 22⁷⁷ (Contrato PPP MG-050, 2007), the SPV is responsible for all the waste management resulting from works. As a result, the SPV needs to bear the potential cost of decontamination for example.

As Figure 6.4 below shows, the QID grade in the environmental category is the result of the performance level of the SPV in the 3 following indicators:

- Environmental licenses
- Legal compliance
- Environmental management

As in the operational category, each indicator is made of different indexes. If only one of the indexes is not complied, the total grade for each indicator is 0. Given the weight of the environmental category within the QID system, the SPV can lose up to 20% of the value of the CP by not complying with the indicators.

Figure 6.4: Environmental Indicators of the QID



Source: The author based on Contrato PPP MG-050 (2007)

⁷⁶ Cf appendix 3

⁷⁷ Cf appendix 6

6.1.3.3. Contractual Responsibilities and Incentives of the SPV in the Financial Category

The contract underlined five main types of financial risks and incentives:

1. According to clause 30⁷⁸ (Contrato PPP MG-050, 2007), if the toll revenue decreases more than 10%, the economic and financial balance of the contract is reviewed in favor of the SPV.
2. According to clause 49⁷⁹ (Contrato PPP MG-050, 2007), the SPV is responsible for the legal costs due to lawsuits⁸⁰ from parties claiming damage due to the defects of the highway (such as neighbors or victims of accidents).
3. According to clause 18.1⁸¹ (Contrato PPP MG-050, 2007), the SPV is exposed to the volatility of interest rates of its debt⁸².
4. According to clause 32.1⁸³ (Contrato PPP MG-050, 2007), if the SPV manages well the credit risk, it can benefit from 50% of the gains of productivity (50%-50%).
5. According to clause 39.6.1⁸⁴ (Contrato PPP MG-050, 2007), the SPV can be exposed to the free-rider behavior of users⁸⁵. Indeed, if users used alternative ways to avoid toll collection points, this behavior would reduce traffic volume and revenue for the SPV.

As in the other categories, each indicator is made of different indexes. If only one of the indexes is not complied, the total grade for each indicator is 0. Given the weight of the financial category within the QID system, the SPV can lose up to 10% of the value of the CP by not complying with the indicators.

⁷⁸ Cf appendix 8

⁷⁹ Cf appendix 16

⁸⁰ Because this risk is significant, the SPV contracted an insurance plan for the risk of lawsuits.

⁸¹ Cf appendix 5

⁸² To avoid the volatility of interest rates, the SPV is incentivized to choose financing based on local currency

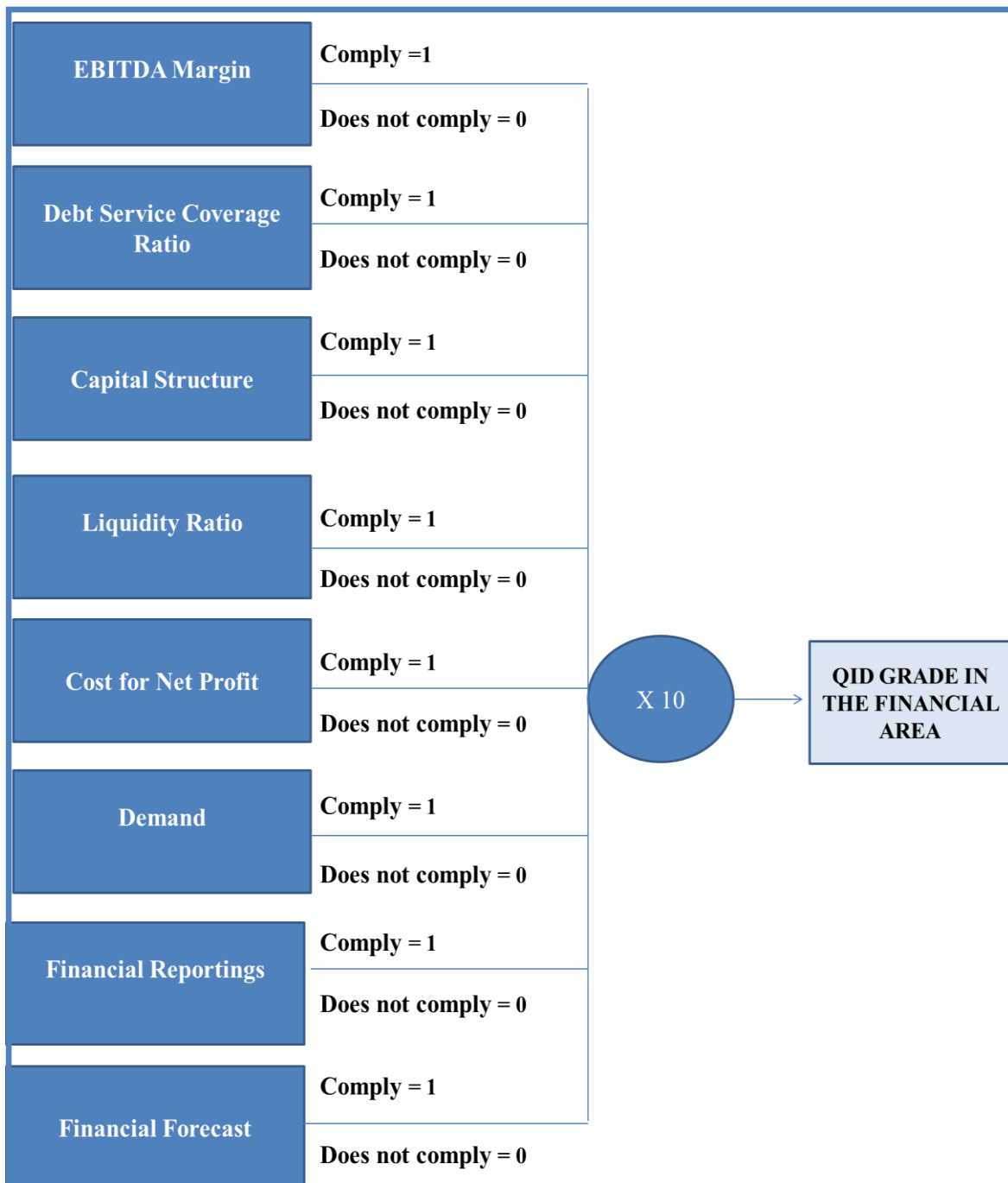
⁸³ Cf appendix 9

⁸⁴ Cf appendix 13

⁸⁵ Regarding the free rider problem, the SPV is allowed to change the location of the toll collection points (Cf appendix 14).

As Figure 6.5 below shows, the QID grade in the financial category is the result of the performance level of the SPV in the 8 following indicators:

Figure 6.5: Financial Indicators of the QID



Source: The author based on Contrato PPP MG-050 (2007)

6.1.3.4. Contractual Responsibilities and Incentives of the SPV in the Social Category

According to clause 15⁸⁶ (Contrato PPP MG-050, 2007), the SPV must undertake actions promoting education and protection of the environment, targeting the direct and indirect users of the highway. These communication campaigns need to be participative and involve topics such as traffic education and environment. In other words, the SPV must organize face-to-face events with users of the highway to teach them and transmit the principles of exemplary driving behaviors and environment-friendly practices. The SPV must also organize surveys to measure the satisfaction level among highway users.

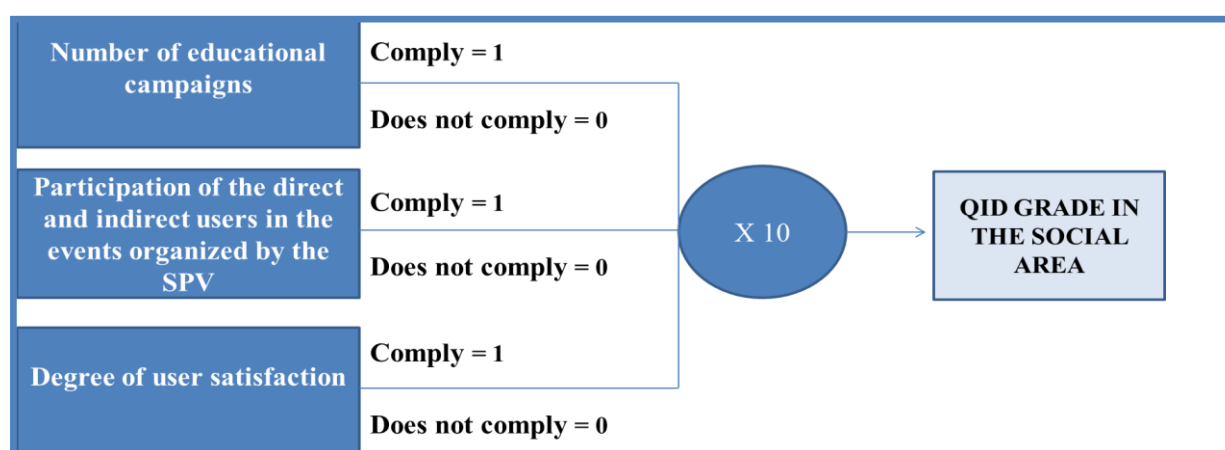
According to clause 19⁸⁷ (Contrato PPP MG-050, 2007), the SPV needs to carry out expropriations and bears all the costs related to it. It is a risk for the SPV because the delay in expropriations can cause additional costs to the SPV. Nevertheless, the public partner also shares this risk because it must support the private partner in the negotiations for indemnities.

As Figure 6.6 below shows, the QID grade in the social category is the result of the performance level of the SPV in the 3 following indicators:

- Number of educational campaigns
- Participation of the direct and indirect users in the events organized by the SPV
- Degree of user satisfaction

As in the other categories, each indicator is made of different indexes. If only one of the indexes is not complied, the total grade for each indicator is 0. Given the weight of the social category within the QID system, the SPV can lose up to 10% of the value of the CP by not complying with the indicators.

Figure 6.6: Social Indicators of the QID



Source: The author based on Contrato PPP MG-050 (2007)

⁸⁶ Cf appendix 4

⁸⁷ Cf appendix 6

6.1.4. Positive and Negative Sanctions

The payment of the SPV is based on a pro-rotta basis and the level of its QID grade. The total value of the CP is contractually set at R\$ 658.000 million per month in nominal terms of 2007. If the SPV complied with all indicators in all the 4 categories, it receives 100% of the CP value. If it partially complies with the QID indicators, it will get the associated value of the CP according to the weight of the specific indicators in each category. For example, if all the operational indicators were not met and given that the operational category accounts for 60% of the total QID grade, the CP will be reduced from 60% and the SP will only receive 40% of the total CP value.

The two essential clauses demonstrating that the contract is based on incentives are clauses 59⁸⁸ and 60⁸⁹ (Contrato PPP MG-050, 2007) that respectively detail penalties and retributions sanctioning the performance of the SPV.

According to clause 59 (Contrato PPP MG-050, 2007), the payment of the SPV is based on compliance with the indicators that compose the QID for each of the four categories. The level of incentives is high because if the SPV does not meet the indicators it will risk not receiving a part of the CP.

On top of CP reduction, the other sanctions detailed in clause 59 (Contrato PPP MG-050, 2007) are fines, warnings and suspensions in participating in future tenders. Figure 6.7 thereafter details the amount of fines for each indicator.

Figure 6.7: Table of Fines for Each QID Indicator

AREA	FINE PER INFRACTION ⁹⁰
SOCIAL	R\$20.000 per infraction
ENVIRONMENTAL	R\$40.000 per infraction
FINANCIAL	R\$20.000 per infraction
OPERATIONAL	-0, 2% of the value of the works per day of delay -From R\$ 300 to R\$ 11.700 per investment operation -Risk of loss of property rights that would be transferred to the debt holders of the SPV, ie the so-called step in rights ⁹¹ .

Source: Contrato PPP M-050 (2007)

⁸⁸ Cf appendix 17

⁸⁹ Cf appendix 18

⁹⁰ The values of fines and warnings are set in nominal terms of 2007.

⁹¹ Cf appendix 16

Concerning the social, environmental and financial categories, the values of the fines are not set very high compared to the value of the monthly CP (R\$ 658.000 million). However, these financial sanctions can be considered very harsh for the operational category since delays in infrastructure operation are commonly registered.

On the contrary, if the SPV scores an excellent QID grade, it can reap the benefits of clause 60 (Contrato PPP MG-050, 2007). According to this clause, if the QID grade is superior to 90% during more than one year the SPV can benefit from a 5% monthly increase in revenue of the CP, the equivalent of R\$ 3.290 million in real terms of 2007 per month.

The description of the general incentive framework of the contract identified so far two mechanisms: the CP reduction based on the monthly QID grade and the mechanism of positive and negative sanctions described in clause 59 and 60⁹² (Contrato PPP MG-050, 2007). The following section will assess the effectiveness of these incentive mechanisms based on the theory of incentive contracts.

6.2. Application of the Theoretical Framework to the Main Contractual Responsibilities of the SPV

6.2.1. Theoretical Framework for Assessing the Incentive Level

To assess the intensity of the incentives given by the contract to the SPV, the four principles previously identified in section 2.2.1 of Milgrom and Robert (1992) framework will be used. They are summarized below:

a) The Principle of Incentive Intensity

Even if the evolution of the remuneration cannot only depend on elements that can be observed by the public partner, the performance of the SPV is the best element to base the payment of the CP. The principle of incentive intensity says that the more the SPV increases its effort level per unit, the more the remuneration increases. Therefore, the level of effort that the public partner is asking needs to be compatible with the level of incentives that it gives to the SPV. The SPV will select its effort level so that the marginal gain of efforts (increase of the CP) will be equal to the marginal cost of the effort.

b) The Principle of Informativeness

The remuneration of the SPV needs to be based on performance. The measure of the performance needs to present a low error variance. The methodology used to measure performance needs to exclude elements that increase the probability to include hazard factors. These hazard factors would interfere with the assessment of the performance level. If the principle of

⁹² Cf appendix 17

informativeness is not respected, the increase of the performance level observed could be due to good or bad luck rather than the increase of the effort level.

c) The Principle of Monitoring Intensity

Although a part of the effort of the SPV cannot be measured, the public partner can improve its knowledge of the performance level of the SPV by allocating resources for that goal. For example, the public partner can hire auditors to conduct quality tests. These measures are costly but since the goal is to pay the SPV based on performance, they help to improve the information that the public partner has about the performance level of the SPV. Therefore, the principles of incentive intensity and intensity of control are complementary.

d) The Principle of Equal Compensation

The public partner does not have the means to control how the SPV spends its effort and time on the different tasks. Yet, the marginal yield of the SPV in all activities needs to be equal. If the public partner offers more incentives for a specific activity than others, the SPV risks focusing on the activities with more incentives and spending less time on the others.

The following tables will summarize the level of incentives present in the contract for the SPV in the four aspects of performance.

6.2.2. Incentives are Fuzzy due to Low Monitoring Intensity

(i) The level of incentives for the operational responsibilities are summarized below:

PRINCIPLES	OPERATIONAL AREA
INCENTIVE INTENSITY	The incentive intensity is high because the operational indicators of the QID account for more than 60% of the QID grade. By not respecting these indicators, the SPV can lose up to 60% of its remuneration.
INFORMATIVENESS	Informativeness is high since each category is detailed with many indicators that are quantitative. Indicators measure specific targets with figures and this demonstrates a low error variance.
MONITORING INTENSITY	Monitoring intensity should be high thanks to the implementation of the QID system and the enforcement roles of the independent controller and the State Auditor (AUGE).
EQUAL COMPENSATION	The equal compensation principle is respected since for each area of the operational category (safety, surface and maintenance), all effort are compensated by financial rewards.

Source: the author based on Contrato PPP MG-050 (2007)

Regarding operational responsibilities, the level of incentives of the contract is low. In fact, the SPV did not respect the investment levels required by the contract because monitoring intensity was very low. The role of the institutions put in place to monitor the SPV effort was not enough high to enforce the contractual obligations of the SPV.

(ii) The level of incentives for the environmental responsibilities are summarized below:

PRINCIPLES	ENVIRONMENTAL AREA
INCENTIVE INTENSITY	The incentive intensity is low due to the impact of the environment of asymmetric information that can make the SPV non accountable.
INFORMATIVENESS	Informativeness is low since the SPV efforts in minimizing the environmental costs are very difficult to measure due to a context of asymmetric information.
MONITORING INTENSITY	Monitoring intensity should be high with the existence of the QID system, the role of the independent controller and the State Auditor.
EQUAL COMPENSATION	The equal compensation principle is not respected since there is an incentive for the SPV to focus less on the management of environmental licenses because it is a shared risk with the public partner.

Source: the author based on Contrato PPP MG-050 (2007)

The level of incentives is not high due to the high impact of information asymmetry that makes difficult to gauge the actual effort of the SPV. The principle of equal compensation is also not respected. Indeed, the acquisition of environmental licenses could be less of a focus for the SPV. Given that the effort to obtain the licenses does not only depend on the SPV but also on the productivity of the approval from the public partner, the SPV could be incentivized to delay the acquisition of environmental licenses to not start construction and accuse the public partner's bureaucracy. Furthermore, auditing the effort of the SPV on the environmental area is not frequently done and the vague definition of performance does not help the efficiency of controls. Means allocated to check the performance are scarce and they cannot be efficient because informativeness is low.

(iii) The level of incentives for the financial responsibilities are summarized below:

PRINCIPLES	FINANCIAL AREA
INCENTIVE INTENSITY	The incentive intensity is low due to the impact of the environment of asymmetric information that can make the SPV non accountable.
INFORMATIVENESS	Informativeness is high since the evolution of financial costs can be measured via quantitative metrics.
MONITORING INTENSITY	Monitoring intensity should be high with the existence of the QID system and the other incentive structures previously described.
EQUAL COMPENSATION	The equal compensation principle is respected since for each area of the financial category, all effort are compensated by financial rewards

Source: the author based on Contrato PPP MG-050 (2007)

In the financial area, such as in the operational area, monitoring intensity should increase in order to measure the SPV performance and sanction it in case of non-compliance that is due to a lack of effort.

(iv) The level of incentives for the social responsibilities are summarized below:

PRINCIPLES	SOCIAL AREA
LEVEL OF INCENTIVES	<p>The incentive intensity is low because the payment of the CP is not tightened to specific tasks. Effort of the SPV can be minimal and payment will not vary.</p>
INFORMATIVENESS	<p>Informativeness is low. The content of the social actions is very vague, the SPV is only asked to organize events that are related to 3 pillars: participation of the society, education for traffic and environment. Therefore, the level of the effort of the SPV is difficult to gauge.</p>
CONTROL INTENSITY	<p>There are means for the monitoring intensity (the independent controller and the State Auditor (AUGE) but since the informativeness is low, the monitoring intensity cannot be entirely effective.</p>
EQUAL COMPENSATION	<p>The principle of equal compensation is not respected because the values of the expropriations were budgeted and paid by the public partner whereas the cost of the social programs is entirely borne by the SPV.</p>

Source: the author based on Contrato PPP MG-050 (2007)

Although there is a direct impact on remuneration, the incentive intensity is not high for the SPV because of the monitoring intensity that is too low. The lack of control does not create incentives for the SPV to increase the level of effort dedicated to social responsibilities. Informativeness could be improved to capture more of the result of the social programs organized by the SPV.

In brief, the analysis of the incentive levels of the contract showed that contract design was poor and created the occasion of opportunistic behavior from the SPV.

In the PPP MG-050 contract, incentives would be aligned between the two partners if higher performance meant higher payment. Public partner would get a better service and the SPV would receive more money. Sanctions such as the CP reduction and fines would play as powerful means to incentive the SPV.

However, the analysis of the PPP MG-050 contract showed that incentives between the public and private partner are not aligned. Informativeness of the contract is very low since the effort of the SPV can be complex to measure which limits monitoring intensity. In fact, means are allocated to check the performance of the SPV (mainly QID system, action of the independent controller and the State Auditor). Yet, these means may not be efficient since they cannot always capture the effort of the SPV due to vague definitions of indicators and/or the impact of asymmetric information that prevent the efficient measure of the performance of the SPV. On top of being inefficient, the monitoring intensity was scarce in all the categories of the QID areas: operational, environmental, financial and social.

The fact that incentives are not always aligned has implications on the performance of the SPV. The next section will explain how the design of the contract was not suited to align the interests of both partners in the PPP.

6.3. Reasons for Misaligned Incentives

This section intends explain what lacked in the contract to align both interests of the SPV and the public partner. The goal is to make a bridge between the contractual aspects of the PPP with the economic aspects that should be associated with the design of incentive contracts.

The contractual incentives between the two partners were not aligned due to the existence of informational rents and transaction costs that can lead to opportunistic behavior from the SPV.

6.3.1. Existence of Informational Rents

There is a part of the cost to provide the PPP service that the public partner knows and there is a non-observable amount of effort of the SPV. Compared to the public partner, the SPV knows more about the cost attribute that measures how efficient it is and its proper behavior. In other words, in a context of information asymmetry, the public partner does not know about how much the SPV is dedicating itself to reduce the production costs. The situation where the SPV knows about this cost attribute is called an informational rent. In case of informational rents, the SPV receives profit superior than if costs were totally observed.

In a context of informational rents, the public partner has to make a trade-off between two conflicting goals: reduce the profit of the SPV (due to the informational rents) and induce the lower costs for the production of the service. On one hand, if the public partner gives the SPV less informational rents, it will not have incentives to reduce costs because the SPV would not be able to appropriate the gains of cost reduction. In this case, the profit of the SPV is reduced but the cost of the service is high as well. On the other hand, if the public partner aims at reducing the costs of the service, it will have to increase the SPV profit because the cost reduction asked to the SPV induces more effort from her and it will require thus the increase of informational rents. In the case of the PPP MG-050, the public partner goal was to reduce the price of the service to the user (i.e. the toll price⁹³) and therefore informational rents of the SPV were increased.

The public partner gave informational rents to the SPV so that it would invest voluntarily. By giving these rents, the public partner wanted the SPV to appropriate the results of these investments as the residual claimant of a highway of better quality. Yet, the efficiency of informational rents did not work because all investment operation was not contractable. Investment is referred as non-contractable, if informativeness and monitoring intensity of these operations are low. The moral hazard problem is harder to control for tasks that are non-contractable. In this sense, even if the public partner gave additional rents to the SPV, it will not solve the problem of lack of investment for non-contractable tasks. Furthermore, construction can be a contractable task that depends on un-contractable tasks. For example, the SPV needs to get the environmental licenses from the Brazilian Institute of Environment and Natural Resources (IBAMA). The SPV has an alibi to not implement the works, as long it does not have the environmental licenses. Therefore, since it is very difficult for the public partner to observe and gauge the effort of the SPV in obtaining the environmental licenses, the agent still perceived the CP remuneration.

In brief, when signing the PPP contract, it is costly for the public partner to give informational rents to the SPV. Because the public partner does not know about the behavior and effort level of the SPV, it must give 100% of the rights to operate the highway to the SPV. Otherwise, the SPV will not have a lot of incentive to have a behavior that reduces costs.

⁹³ The toll price should be reduced to the minimum by the SPV because the public partner established the level of the toll price at a fixed price in the contract.

Aggregating risks and costs of the PPPs in one partner create more incentives. Yet, this incentive from the public partner may not be sufficient because there are situations where the public partner cannot observe the effort for the reduction of costs by the SPV. Because the SPV effort is partly non-observable, all measures of controlling the SPV are imperfect.

6.3.2. Existence of High Transaction Costs

It is possible that at the time of tendering procedure, the SPV offered a low CP to win the tender procedure and the contract although it already knew that it was not possible to meet investment levels and other contractual obligations. The SPV may have wanted to show that it was the most efficient candidate by offering a low CP. In this sense, the public partner was victim of adverse selection.

Moreover, the SPV may have been confident with its renegotiation capacity of the contract. Nevertheless, there is a reputation cost for the SPV to opt for renegotiations of the contract. This reputation cost is only low when the SPV knows that it will not participate in future tenders.

Furthermore, the SPV expected that after signing the contract, the public partner did not have the regulatory capacity to change the provider due to high transaction costs. In other words, the SPV could have expected that the public partner would not have the capacity to switch to another provider in case of non-compliance with contractual clauses.

The public partner will lack capacity to not cede to the SPV demands due to the existence of transaction costs. Indeed, changing the provider of the service ex-post rapidly and at a low cost is difficult due to the existence of sunk costs. If the public partner decides to change the provider, it will probably have to pay the sunk costs⁹⁴ already paid by the SPV and all the costs related to organize a new tender⁹⁵. If the public partner does not want to renegotiate with the SPV, the contract is terminated, thereby creating a situation of “take it or leave it”. Indeed, if the public partner refuses to negotiate with the SPV, the contract is terminated and the implementation of the works is cancelled.

The time lost with the new tender could have a negative impact on reelection of the government in charge of managing the PPPs. Indeed, any delay in the schedule of investment is costly for the public partner that promised the delivery of the infrastructure to the user and taxpayer. In this sense, the non-implementation of the works has a high political cost.

In case of non-compliance with the contract, the credibility of threats of termination of contract may have been low for the SPV. In fact, in Brazil, history of contracts shows that the delay

⁹⁴ Including high legal costs to compensate expropriations

⁹⁵ Sunk costs are high in case of a PPP contract because the tendering procedure involves many institution approvals. The minimum length to organize a new tender is 2 years.

in works never resulted in the termination of the contract for the provider.⁹⁶ The low credibility of such threats opens the door for opportunistic behavior for the SPV.

6.3.3. Opportunistic Behavior from the SPV

In the best scenario, the contract should align incentives between the private and the public partner. The SPV implements the investment on time and with the quality required by the public partner that will in exchange pay the corresponding amount of CP. Yet, incentives between both partners are not always aligned in the sense that even if the SPV wanted to increase the quality of the investment, the amount of its remuneration would not be increased since both the CP and the toll price are regulated to a maximum.

In other words, if the SPV does not apply the required quality and quantity of investment, it will be paid less⁹⁷ but if it does deliver more, it will be paid the same. Because the toll price is regulated, the incentive to increase the quality of the service by the increase of the price does not work. The incentive based on the increase of the quantity is the only one left. This generates a natural tendency toward a lack of investment in quality from the SPV.

Due to the lack of contractual incentives on quality, the fact that the toll price and CP are limited will increase the likeliness of renegotiations on the quantity of works from the SPV. The public partner favored a low toll price because users and voters are firstly sensitive to a low toll price. They are then sensitive to the quality of the highway that is less visible than the toll price. Therefore, the public partner made a choice in the trade-off between a low toll price and the flexibility of the schedule of works.

It is expected that the public partner will have to make renegotiations with the SPV on the schedule of works due to the informational rents. Indeed, the program of investments is decided by the public partner at the time of the tendering procedure, i.e., that is way before the implementation of the works. At that time, the public partner does not have all the information and above all, it has less information than the SPV that is more skilled to implement the PPP.

⁹⁶ The only threat for the federal highways sector has been the reduction of the toll price. Nevertheless, it is not widely used.

⁹⁷ As the analysis of the contract showed, the SPV is subject to two main sanctions: the CP retention and the payment of fines.

Highway contracts are incomplete by nature especially in the writing of the program of investments and they will be renegotiated at some point in time. It is difficult for the public partner to describe everything in the contract. The initial description cannot be complete especially considering the lack of experience of the Brazilian regulatory agencies in these contracts. The ANTT, which is in charge of the Federal Highway Program, was only created in 2001. For the MG state, institutions described in Chapter 4 are also recent and date from 2007. At the start of the PPP design when the contract is written, the number of contingencies is high and difficult to predict for the institutions.

In brief, when the PPP contract is signed, it is probable that the SPV has more information about the cost of procurement of the service. The SPV also has more information about the contingencies that impact the cost of the service during the time frame of the contract. By signing a PPP contract, such as the PPP MG-050, the public partner is subject to the classical trade-off between the incentive for more productivity (via cost reduction) and investment that requires the liberation of rents to the SPV.

6.4. Recommendations

In order to better design the PPP MG-050 contract, an analysis should be made about how the asymmetry of information between the public partner and SPV will be taken into consideration during the time frame of the contract. Given the existence of informational rents, renegotiations cannot be avoided between the public and private partner. Yet, the conditions of such renegotiations should be clearly specified and related to (i) clauses that are auditable and that relate to contractable investment. Enforcement of such clauses should be supported by (ii) a strong institutional capacity for the regulatory agencies and (iii) an attractive remuneration system.

6.4.1. The Need of Clauses that are Related to Contractable Tasks and Auditable to the Maximum

There are contingencies that are predictable and they should be included in the contract. For contingencies that are both unpredictable and have a considerable impact on the SPV, negotiations should happen. In these circumstances, the schedule of works needs to be revised because the initial planning from the public partner is not perfect and this is the very reason that we need the private participation, the SPV is supposed to find more efficient solutions to the problems of the highway. With the implementation of the works, knowledge of the SPV about the problems of the SPV increases. The schedule of works in the business plan has the role to be a basis for renegotiations. Renegotiation is essential in the sense that without the possibility of renegotiations, the SPV would bear too many risks and might not be incentivized to invest.

On one hand, the possibility to have renegotiations is essential because PPPs are complex and by definition contracts are incomplete. On the other hand, the SPV can communicate non-realistic costs to win the contract and because of the sunk costs, the public partner will accept the renegotiations. The SPV used a form of renegotiation based on remotion, meaning that the SPV did

not look at changing the toll price (due to high political costs), but rather at not including some investment works. Therefore, even if contracts are incomplete, the clauses need to refer to contractable tasks to the maximum and auditable clauses. It is of utmost importance to have auditable clauses because it will enable having a high informativeness and monitoring intensity and thus opportunistic behaviors from the SPV will be minimized. When there are factors independent from the SPV, the conditions of the renegotiations for the economic and financial balance need to be explicit.

6.4.2. A Strong Institutional Capacity for the Regulatory Agencies

Auditable or contractable clauses need to be accompanied by a strong regulatory capacity. If the SPV does not respect the contractual clauses, the public partner should have the capacity to lead the end of the PPP contract at a reasonable cost and time. The lack of effort from the SPV would then be sanctioned by a more rigid enforcement system. Strong institutions could make the enforcement of incentive measures stronger, reduce transaction costs and lead to a better commitment to the contract from the SPV.

Strong money incentives that are actually enforced could make the SPV comply to the schedule of works. Empirical data showed that the SPV did not implement a lot of investment but this non-compliance with the contract only led to the decrease of the CP and not the one of the toll price. The non-execution of the works should automatically lead to the reduction of the toll price. Moreover, fines should systematically be applied and the current process is slow. It takes about two years from the notification of the fine to its payment from the SPV (Ministry of Transportation, 2012).

Regulatory agencies play an essential role in regulating and enforcing the PPP contracts. Their management of the PPP contracts enables the reduction of risk and therefore the cost of capital. Yet, in Brazil, the federal and the state regulatory agencies only have a minimal structure to monitor PPP contract compliance. They lack financial and technical resources and their budget is limited.

In these agencies, there is also a human resource problem regarding the difficulty in hiring consultants and specialists to plan PPP projects that are much needed. Because PPPs projects are complex, the regulatory agencies need to have technical support. For instance, the Management Board of Minas Gerais and the Reference Center of PPP are only additional organs of approval instead of acting as coordinators and promoting the use of PPPs. Because PPPs can be used in different sectors, these institutions do not always have the knowledge of the specific sector of the PPP to implement projects that all have their specificities according to sector and type of project.

It is recommended to provide a better training to the staff in the regulatory agencies by giving people a technical background in the project and the sector they are dealing with. Gaps in the management positions should be prevented by only letting people leave if they can be replaced. Furthermore, being able to employ consultants that have technical knowledge is very important to increase the enforcement capacity of contracts.

6.4.3. An Attractive Remuneration System

For the SPV, the toll price is an exogenous factor decided by the public partner. Based on the contractual terms, it is fixed by the public partner and only changes due to the inflation indexation and *force majeure*. Toll price should be flexible in order to enable the SPV to pass on the increase of costs to the toll price and give incentives to the SPV to voluntarily invest and increase the quality of the service. Yet, the inconvenience of flexible toll prices is that prices may be more expensive and this opens the door to opportunistic behavior.

Indeed, the SPV could be tempted to offer works that are not necessary in order to make the toll price increase. The increase in toll prices will be higher than the costs of the investment. If the public partner does make variable part of the toll price, it will incentivize under-investment in quality. However, given the state of investment in the Brazilian highways, the goal of investment should be the priority even if the drawback is that informational rents of the SPV are higher.

Nevertheless, if the toll price is fixed, moral hazard problem remains. Indeed, when the toll price is fixed, the best strategy for the SPV is to hide the true investment requirements of the highway to the maximum. The main argument is that the SPV will be more motivated if it gets the total share of the benefits of the reduction of costs it is implementing.

In brief, despite the presence of incentive mechanisms in the contract, mainly the CP reduction and the system of fines, the contract did not present enough incentives for the SPV. The main problem is that monitoring intensity was low. Yet, incentives are useless if they only stay theoretical. The public partner should have allocated more means to assess the level of the SPV in order to be able to sanction in case of non-compliance of its contractual obligations.

Conclusion

“Motivation problems arise only because some plans cannot be described in a complete, enforceable contract.” Milgrom and Roberts (1992; p. 127).

Brazil is an emerging country that lacks infrastructure. In the context of improvement of access to information and economic conditions, infrastructure needs will only increase. Due to the scarcity of public resources, governments that traditionally provided infrastructure need to find new forms of procurement methods. Regarding infrastructure transportation where the highway mode is dominant, the major part of the network is not financially viable for private investment. To face the infrastructure challenge, cooperative frameworks between the public and private sector will be increasingly used including Public Private Partnerships. According to the Federal Law of 2004, a PPP is a contractual form that enables to fund infrastructure projects that have significant social returns with subsidies.

Literature review showed that for an efficient PPP contract design, contractual parties should clearly define their goals during the negotiation phase so that measurable tasks and strong incentives can be planned. Research also shed light on essential aspects of the partner's interests. In Brazil, the public partner goal is to increase investment levels and quality, while the private partner seeks financial guarantees for subsidy payment. Moreover, the tendering procedure has been identified as strategic in PPP contract design although this procedure is often affected by asymmetry of information. Management of risks and cultural differences during this tendering procedure are essential to ensure the economic and financial equilibrium of the contract.

The research question was to analyze how both contractual parties (the private and public partner) can align their interests in a PPP because their interests may differ. Indeed, by signing a PPP, contractual parties enter in a principal-agent relationship characterized by information asymmetry and where the agent has more information about its costs attributes and behavior. In this context, the willingness of the private partner to dedicate effort and share information with the public partner can be limited. Even if incentive measures cannot be perfect, being the principal, the public partner has to give incentives to the agent to reduce the occurrence of moral hazard.

To answer this research question, a qualitative approach was adopted. After identifying the principles that frame an efficient incentive contract through the literature review, the framework of Milgrom and Roberts (1992) was selected to assess incentive mechanisms in contracts in an asymmetric information environment. Empirical evidence was gathered from the case study of the PPP MG-050. Signed in 2007, this is the first and only PPP signed in the highway sector by a state after the Federal Law on PPPs (N^o 11.079/04). The level of compliance with the contract from the private partner was then described. The case study analysis permitted to evaluate the applicability of the incentive concepts that were

exposed in the literature review. The factors impacting highway management in Brazil were also described because they reflect the interests of private and public parties and influence thus the design of incentive contracts for PPPs. Eventually, the level of incentives given in the PPP MG-050 contract was analyzed and allowed to explicit how the interests of both partners were aligned in contractual aspects.

The main conclusion is that the incentives between the public and private partner were not aligned in the contract. The private partner was not given proper contractual incentives. The PPP MG-050 contract envisaged two strong incentives mechanisms that are the CP retention based on the QID grade and the establishment of positive and negative sanctions such as fines. However, in all areas of performance of the private partner, monitoring intensity was low. However, sanctions written in the contract are pointless if they are not applied. This lack of control did not create incentives for the private partner to increase its level of effort. Likewise, the definition of vague indicators does not allow for high informativeness.

Interests between the public and private partner were not aligned due to the existence of informational rents of the private partner and high transaction costs for the public partner. These two elements and the incompleteness of the contract enabled opportunistic behavior from the part of the SPV. Empirical data showed that from the signature of the contract in 2007 to 2013, the SPV did not respect the investment levels prescribed by the contract. The quality and safety levels have been also deteriorating while the CP and toll price have been increasing. The auditing role of the contract-enforcing institutions in Minas Gerais should be improved. Moreover, in order to improve the design of the contract, clauses should be auditable and relate to contractable investment to the maximum. Enforcement of such clauses should be supported by a stronger institutional capacity for the regulatory agencies.

Eventually, the recommendations of this study are partly limited to the Brazilian environment of PPPs. On one hand, the contextual nature of PPPs is due to the specificity of national legal frameworks and the level of maturity of institutions. On the other hand, the study showed that the applicability of the hypothesis that a strong intensity control is more likely to be associated with a high level effort for the agent can be true in any contractual relationship.

This study contributed to the understanding of how PPP incentive contracts have been designed so far in Brazil. PPP is a peculiar type of contracting and the increase of relevant studies about this topic will help to improve the use of this procurement contract in the future. Moreover, ideological debates about the PPP contractual method are numerous due to the hybrid nature of the partnership. By adopting a fact-based view, this study tried to stay away from direct political debates related to PPPs. The PPP was assumed as given. Future research should forward the study of the principal and agent problem in PPP contractual relationships by and contribute to improve contract design.

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Appendix

Appendix 1: PPP Federal Law 11.079/04 (Chapter 1)

Capítulo I

DISPOSIÇÕES PRELIMINARES

Art. 1o Esta Lei institui normas gerais para licitação e contratação de parceria público-privada no âmbito dos Poderes da União, dos Estados, do Distrito Federal e dos Municípios.

Parágrafo único. Esta Lei se aplica aos órgãos da Administração Pública direta, aos fundos especiais, às autarquias, às fundações públicas, às empresas públicas, às sociedades de economia mista e às demais entidades controladas direta ou indiretamente pela União, Estados, Distrito Federal e Municípios.

Art. 2o Parceria público-privada é o contrato administrativo de concessão, na modalidade patrocinada ou administrativa.

§ 1o Concessão patrocinada é a concessão de serviços públicos ou de obras públicas de que trata a Lei no 8.987, de 13 de fevereiro de 1995, quando envolver, adicionalmente à tarifa cobrada dos usuários contraprestação pecuniária do parceiro público ao parceiro privado.

§ 2o Concessão administrativa é o contrato de prestação de serviços de que a Administração Pública seja a usuária direta ou indireta, ainda que envolva execução de obra ou fornecimento e instalação de bens.

§ 3o Não constitui parceria público-privada a concessão comum, assim entendida a concessão de serviços públicos ou de obras públicas de que trata a Lei no 8.987, de 13 de fevereiro de 1995, quando não envolver contraprestação pecuniária do parceiro público ao parceiro privado.

§ 4o É vedada a celebração de contrato de parceria público-privada:

I – cujo valor do contrato seja inferior a R\$ 20.000.000,00 (vinte milhões de reais);

II – cujo período de prestação do serviço seja inferior a 5 (cinco) anos; ou

III – que tenha como objeto único o fornecimento de mão-de-obra, o fornecimento e instalação de equipamentos ou a execução de obra pública.

Art. 3o As concessões administrativas regem-se por esta Lei, aplicando-se-lhes adicionalmente o disposto nos arts. 21, 23, 25 e 27 a 39 da Lei no 8.987, de 13 de fevereiro de 1995, e no art. 31 da Lei no 9.074, de 7 de julho de 1995. (Regulamento)

§ 1o As concessões patrocinadas regem-se por esta Lei, aplicando-se-lhes subsidiariamente o disposto na Lei no 8.987, de 13 de fevereiro de 1995, e nas leis que lhe são correlatas.(Regulamento)

§ 2o As concessões comuns continuam regidas pela Lei no 8.987, de 13 de fevereiro de 1995, e pelas leis que lhe são correlatas, não se lhes aplicando o disposto nesta Lei.

§ 3o Continuam regidos exclusivamente pela Lei no 8.666, de 21 de junho de 1993, e pelas leis que lhe são correlatas os contratos administrativos que não caracterizem concessão comum, patrocinada ou administrativa.

Art. 4o Na contratação de parceria público-privada serão observadas as seguintes diretrizes:

I – eficiência no cumprimento das missões de Estado e no emprego dos recursos da sociedade;

II – respeito aos interesses e direitos dos destinatários dos serviços e dos entes privados incumbidos da sua execução;

III – indelegabilidade das funções de regulação, jurisdicional, do exercício do poder de polícia e de outras atividades exclusivas do Estado;

IV – responsabilidade fiscal na celebração e execução das parcerias;

V – transparência dos procedimentos e das decisões;

VI – repartição objetiva de riscos entre as partes;

VII – sustentabilidade financeira e vantagens socioeconômicas dos projetos de parceria.

Source: Unidade PPP MG-050 (2007)

Appendix 2: PPP Federal Law 8.987/95 (Chapter 1)

Capítulo I

DAS DISPOSIÇÕES PRELIMINARES

Art. 1º As concessões de serviços públicos e de obras públicas e as permissões de serviços públicos reger-se-ão pelos termos do [art. 175 da Constituição Federal](#), por esta Lei, pelas normas legais pertinentes e pelas cláusulas dos indispensáveis contratos.

Parágrafo único. A União, os Estados, o Distrito Federal e os Municípios promoverão a revisão e as adaptações necessárias de sua legislação às prescrições desta Lei, buscando atender as peculiaridades das diversas modalidades dos seus serviços.

Art. 2º Para os fins do disposto nesta Lei, considera-se:

I - poder concedente: a União, o Estado, o Distrito Federal ou o Município, em cuja competência se encontre o serviço público, precedido ou não da execução de obra pública, objeto de concessão ou permissão;

II - concessão de serviço público: a delegação de sua prestação, feita pelo poder concedente, mediante licitação, na modalidade de concorrência, à pessoa jurídica ou consórcio de empresas que demonstre capacidade para seu desempenho, por sua conta e risco e por prazo determinado;

III - concessão de serviço público precedida da execução de obra pública: a construção, total ou parcial, conservação, reforma, ampliação ou melhoramento de quaisquer obras de interesse público, delegada pelo poder concedente, mediante licitação, na modalidade de concorrência, à pessoa jurídica ou consórcio de empresas que demonstre capacidade para a sua realização, por sua conta e risco, de forma que o investimento da concessionária seja remunerado e amortizado mediante a exploração do serviço ou da obra por prazo determinado;

IV - permissão de serviço público: a delegação, a título precário, mediante licitação, da prestação de serviços públicos, feita pelo poder concedente à pessoa física ou jurídica que demonstre capacidade para seu desempenho, por sua conta e risco.

Art. 3º As concessões e permissões sujeitar-se-ão à fiscalização pelo poder concedente responsável pela delegação, com a cooperação dos usuários.

Art. 4º A concessão de serviço público, precedida ou não da execução de obra pública, será formalizada mediante contrato, que deverá observar os termos desta Lei, das normas pertinentes e do edital de licitação.

Art. 5º O poder concedente publicará, previamente ao edital de licitação, ato justificando a conveniência da outorga de concessão ou permissão, caracterizando seu objeto, área e prazo.

Appendix 3: Contrato PPP-MG 050 (2007) - Clause 14

CLÁUSULA 14 – DO PLANO DE GESTÃO AMBIENTAL

14.1. É de responsabilidade da Concessionária requerer, custear e obter, em tempo hábil, todas as licenças e autorizações necessárias ao exercício de todos os programas e subprogramas ambientais contidos no PLANO DE GESTÃO AMBIENTAL, estruturado nos termos do Anexo 1 do PLANO DE NEGÓCIOS DA RODOVIA. (...)

Appendix 4: Contract PPP-MG 050 (2007) - Clause 15

CLÁUSULA 15 – DO PLANO DE GESTÃO SOCIAL

15.1. Caberá à Concessionária implementar o PLANO DE GESTÃO SOCIAL, conforme indicado no PLANO DE NEGÓCIOS DA RODOVIA.

Appendix 5: Contract PPP-MG 050 (2007) - Clause 18.1

CLÁUSULA 18 - DO FINANCIAMENTO

18.1. A Concessionária é responsável pela obtenção dos financiamentos necessários ao normal desenvolvimento do serviço abrangido pela CONCESSÃO PATROCINADA, de modo que se cumpram, total e tempestivamente, todas as obrigações assumidas neste Contrato.

Appendix 6: Contract PPP-MG 050 (2007) - Clause 19

CLÁUSULA 19 – DA RESPONSABILIDADE DA CONCESSIONÁRIA

19.1. As desapropriações e a instituição de servidões administrativas, quando

necessárias à prestação do serviço objeto da CONCESSÃO PATROCINADA, exceto aquelas em andamento na data de apresentação da proposta, serão efetuadas pela Concessionária, às suas expensas e sob sua responsabilidade, com obediência às disposições da legislação aplicável.

Appendix 7: Contract PPP-MG 050 (2007) - Clause 22

CLÁUSULA 22 – DAS CONDIÇÕES DE FUNCIONAMENTO DA RODOVIA

22.1. Constitui estrita e essencial obrigação da Concessionária, nos termos do presente Contrato, manter em funcionamento permanente a rodovia, atendendo às CONDIÇÕES OPERACIONAIS MÍNIMAS DA RODOVIA, às atividades de OPERAÇÃO DA RODOVIA e de conservação da rodovia previstas no Anexo VI do Edital e aos indicadores constantes do Anexo V do Edital, devendo ainda executar as INTERVENÇÕES OBRIGATÓRIAS constantes do Anexo VI do Edital, nos prazos estabelecidos.

Appendix 8: Contract PPP-MG 050 (2007) - Clause 30

CLÁUSULA 30 – DO RISCO DO VOLUME DE TRÁFEGO NA RODOVIA

30.1. Os riscos relacionados à demanda de tráfego na rodovia53, em relação ao volume projetado no estudo de tráfego do DER/MG constante do Anexo XVI do Edital, serão compartilhados entre as partes, conforme previsto nesta cláusula, na proporção de 50% (cinquenta por cento) para a Concessionária e de 50% (cinquenta por cento) para a SETOP, com as eventuais alterações decorrentes da aplicação do disposto na Cláusula 60.

Appendix 9: Contract PPP-MG 050 (2007) - Clause 32.1

CLÁUSULA 32 – DO COMPARTILHAMENTO DE GANHOS

32.1. Os ganhos econômicos efetivos resultantes para a Concessionária, decorrentes da redução do risco de crédito dos financiamentos utilizados para a prestação do SERVIÇO ADEQUADO, serão compartilhados entre as partes na proporção de 50% (cinquenta por cento) para a Concessionária e de 50% (cinquenta por cento) para a SETOP.

Appendix 10: Contract PPP-MG 050 (2007) - Clause 34

CLÁUSULA 34 – DO VERIFICADOR INDEPENDENTE

34.1 O VERIFICADOR INDEPENDENTE, contratado pela SETOP, nos termos da legislação vigente, será responsável pela aferição do desempenho da Concessionária, conforme previsto nas Cláusulas 33 e 35.

Appendix 11: Contract PPP-MG 050 (2007) - Clause 35.3

CLÁUSULA 35 – DO MECANISMO DE AFERIÇÃO E PAGAMENTO DA CONTRAPRESTAÇÃO PECUNIÁRIA

35.3. A aferição dos índices do QID será feita mensalmente pelo VERIFICADOR INDEPENDENTE, utilizando sistema especialmente desenvolvido para este fim.

Appendix 12: Contract PPP-MG 050 (2007) - Clause 38

CLÁUSULA 38 – DA GARANTIA DE PAGAMENTO DA CONTRAPRESTAÇÃO PECUNIÁRIA

38.1. A garantia para o cumprimento das obrigações assumidas pela SETOP neste Contrato será prestada pela Companhia de Desenvolvimento Econômico de Minas Gerais – CODEMIG.

Appendix 13: Contract PPP-MG 050 (2007) - Clause 39.6.1

CLÁUSULA 39 – DA COBRANÇA DE PEDÁGIO

39.6.1. Caberá à Concessionária adotar, por sua conta e risco, mecanismos contra a utilização de rotas de fuga pelos usuários que objetivam evitar o pagamento da TARIFA DE PEDÁGIO cobrada nas praças de pedágio.

Appendix 14: Contract PPP-MG 050 (2007) - Clause 40

CLÁUSULA 40 – DO REAJUSTE DA TARIFA BÁSICA DE PEDÁGIO

40.1. O valor da TARIFA BÁSICA DE PEDÁGIO será reajustado automaticamente em periodicidade anual, exceto o primeiro reajustamento, de modo a refletir a inflação medida pelo IPCA- IBGE (...)

Appendix 15: Contract PPP-MG 050 (2007) - Clause 46.2

CLÁUSULA 46 – DA FISCALIZAÇÃO

46.1. A fiscalização da CONCESSÃO PATROCINADA, abrangendo todas as atividades da Concessionária, durante todo o prazo do Contrato, será executada pela fiscalização do DER-MG e pelo VERIFICADOR INDEPENDENTE, nas situações previstas no Contrato.

Appendix 16: Contract PPP-MG 050 (2007) - Clause 49

CLÁUSULA 49 – DOS CONTRATOS COM TERCEIROS

49.1. Sem prejuízo de suas responsabilidades e dos riscos previstos neste Contrato, a Concessionária poderá contratar com terceiros o desenvolvimento de atividades inerentes, acessórias ou complementares à CONCESSÃO PATROCINADA, bem como a implantação de projetos associados, desde que previamente autorizada pela SETOP e respeitado o prazo da CONCESSÃO PATROCINADA.

Appendix 17: Contract PPP-MG 050 (2007) - Clause 59

CLÁUSULA 59 - DAS SANÇÕES E PENALIDADES

59.1. Pela inexecução total ou parcial das obrigações assumidas pela Concessionária em decorrência deste Contrato, poderão ser aplicadas as seguintes sanções:

I – advertência formal sobre o descumprimento das obrigações assumidas e a determinação da

adoção das necessárias medidas de correção;

II – multa, nos termos e condições previstos no Anexo XI do Edital – TABELA DE MULTAS, para o caso de atraso no cumprimento das condições estabelecidas na METODOLOGIA DE EXECUÇÃO apresentada pela Concessionária;

III – multa de 10% (dez por cento) do montante da CONTRAPRESTAÇÃO PECUNIÁRIA e da receita de pedágio, calculado com base na média dos últimos 6 (seis) meses, multiplicado pelo número de meses que a Concessionária estiver inadimplente, nas hipóteses previstas no item 44.7.3, ou nas demais hipóteses de descumprimento de quaisquer cláusulas deste Contrato, não contempladas no Anexo XI – TABELA DE MULTAS;

IV – multa de 10% (dez por cento) do montante da CONTRAPRESTAÇÃO PECUNIÁRIA e da receita de pedágio, calculado com base na média dos últimos 6 (seis) meses, multiplicado pelo número de meses remanescentes da CONCESSÃO PATROCINADA, para o caso de inexecução total;

V – suspensão temporária de participação em licitação e impedimento de contratar com a Administração, por prazo definido no art. 6º, da Lei Estadual nº 13.994, de 2001 e no art. 24, do Decreto Estadual nº 43.701, de 15 de dezembro de 2003;

VI – declaração de inidoneidade para licitar ou contratar com a Administração Pública, enquanto perdurarem os motivos determinantes da punição ou até que seja promovida a reabilitação perante a própria autoridade que aplicou a penalidade, que será concedida sempre que a Concessionária ressarcir a Administração pelos prejuízos resultantes e após decorrido o

prazo da sanção aplicada;

VII – declaração de caducidade da CONCESSÃO PATROCINADA.

Appendix 18: Contract PPP-MG 050 (2007) - Clause 60

CLÁUSULA 60 – DO PRÊMIO POR DESEMPENHO EXCEPCIONAL

60.1. Caso, no curso da execução do Contrato, a Concessionária antecipe o nível de Índice Crítico (IC) indicado como “Bom” em, pelo menos, 1 (um) ano, e a NOTA DO QID média dos últimos 12 (doze) meses consecutivos for superior a 9.0 (nove), a Concessionária fará jus a prêmio por desempenho excepcional. O Índice Crítico (IC) será aferido conforme previsto no Anexo V do Edital.