

This item is the archived peer-reviewed author-version of:

Renegotiating PPP contracts : reinforcing the P' in partnership

Reference:

Domingues Sérgio, Zlatkovic Dejan.- Renegotiating PPP contracts : reinforcing the P' in partnership
Transport reviews - ISSN 0144-1647 - 35:2(2015), p. 204-225
Full text (Publishers DOI): <http://dx.doi.org/doi:10.1080/01441647.2014.992495>
To cite this reference: <http://hdl.handle.net/10067/1214540151162165141>

Renegotiating PPP Contracts: Reinforcing the “P” in Partnership

Abstract

The issue of renegotiation is becoming increasingly important as a tool to address uncertainty of public–private partnership (PPP) projects and as a mechanism to restore its economic and financial equilibrium. This paper aims to understand how and why renegotiations occur in long lasting PPP projects and what are the pros and cons of the renegotiation. We depart from a literature review on contract incompleteness and on the determinant factors for the renegotiation of infrastructure concessions. To illustrate the discussion, the case studies of nine European PPP projects are analysed by examining the specific exogenous and endogenous determinant factors that conduce to renegotiating contracts. The implications of contractual renegotiations are explained and summarized through a comparison of our case studies with literature. Although renegotiation, per se, is not a solution for the successful implementation of PPP projects, our findings reinforce the idea of contractual flexibility as a tool that allows adapting to uncertainty. Moreover, effective communication mechanisms allow to better respond to unforeseen events, reinforcing the partners’ commitment in delivering a win-win project.

1 Introduction

During the past few decades, public-private partnerships (PPP) have received increasing attention from academia and policymakers across the globe. A more or less worldwide tendency of governments to create and implement PPP policies and projects can be noticed (Dewulf *et al.*, 2011; Grimsey & Lewis, 2007; Hodge & Greve, 2007). Although there is no wide consensus on the definition, PPP is generally defined as a “risk-sharing relationship based on a shared aspiration between the public sector and one or more partners from the private and/or voluntary sectors to deliver a publicly agreed outcome and/or public service” (Grimsey & Lewis, 2007; Osborne, 2000).

The usage of the PPP model for project delivery, especially for transport infrastructure projects, has increased over the past decades (COST Action TU1001, 2013a, p. 11). In 2013, the aggregate PPP European market amounted to EUR 16.3 billion and, between 1990 and 2013, 80% of European Investment Bank loans directed to PPP schemes were absorbed by transport sector projects (EPEC, 2014a, 2014b).

Over the last years, PPP contracts have generally been vulnerable to contract rigidity. This rigidity alongside with the lack of provisions on how to act on unforeseen circumstances carries a high price. The long duration of such projects (over 25 years), the regulatory framework, their contractual set up, their capital-intensiveness, their dependence on economic and political stability and institutional capacities, and the issue of optimal risk allocation and management are some of the major factors that make PPP contracts fraught with complexity and uncertainties. During the contract’s term, unforeseeable events may occur (e.g. technical advances) and many of these

events will could be unverifiable (e.g. a contractor's effort to improve safety or quality cannot be easily verified). Comprehensibly, the issue of the degree of contract rigidity and probability of renegotiation is an inevitable part of almost all PPP arrangements nowadays.

PPP contracts are, in practice, incomplete to the extent that it is not possible to anticipate all future scenarios for any given contractual arrangement (Hart, 1995). Moreover, public contracts are generally inflexible when faced with unexpected circumstances, requiring formal renegotiation and having a higher tendency to litigate (Spiller, 2008). PPP contracts, in particular, have traditionally been made excessively rigid and highly prescriptive (e.g. long term traffic forecasts as basis for financial compensations), leading to situations where the public grantor is captured by contingency clauses he could have not foreseen. On the other hand, flexible contracts recognize and attempt to address such uncertainty by introducing ground rules on how and when to revisit the terms of trade. Both approaches try to address the contract's incompleteness in different ways.

The need for adjustment in response to unforeseen events and unexpected divergence in project performance introduces the necessity of renegotiation *a priori* stipulated in PPP contracts. While flexible contracts may contain contingency clauses that allow for contract renegotiations after investments have been made, they also leave "money in the table" which can induce more renegotiations. Rigid contracts on the other hand do not allow for modifications by setting fixed terms before investments are made or establishing the conditions for renegotiation based on forecasts of uncertain events such as traffic volumes. One way or the other, incomplete contracts typically incur in potential opportunistic behaviour (e.g. "price dumping" from bidders, contractual changes from public officials with electoral motivations), leading to undesirable renegotiations to take place.

The problem is that renegotiating incomplete contracts as the future unfolds imposes several costs (Hart, 1995). Soliño and Gago de Santos (2010) identifies a common two-fold classification for transaction costs measurement. The first are *ex-ante* transaction costs, comprising search and information costs (e.g. determining whether the required good is available on the market, its lowest price), and bargaining costs (e.g. time and effort in reaching an acceptable agreement among parties, drawing up an appropriate contract). The second are *ex-post* transaction costs consisting in monitoring and contract enforcement. Moreover, transaction costs are burdensome for both public and private partners, potentially compromising the initial decision to undertake the PPP mechanism and are ultimately transferred to the taxpayer (Albaladejo & Bel, 2009).

Hence, a balance needs to be met between excessively rigid contracts which reduce the freedom to act upon unforeseen events and flexible contracts which contain incentives to renegotiate, which can increase opportunistic behaviour and erode the benefits of competitive tendering (Athias & Saussier, 2010; Baeza & Vassallo, 2010; Huberman & Kahn, 1988). Furthermore, as renegotiations are an eventuality, identifying how they

may be used to allow for adapting to uncertainty is an important element in PPP implementation.

Focusing on renegotiations of transport infrastructure concessions, this review maps the potential of flexible contracts. Our methodology begins with a thorough literature review in order to summarise and group the determinant factors for renegotiations. It is then followed by a cross-country case-study analysis that focus on identifying the key aspects of PPPs that lead to renegotiation and comparing them with the proposed groups of factors. Renegotiations are then discussed as a tool that allows adapting to uncertainty. The benefits and pitfalls of renegotiating PPP contracts are explained and summarized under the Strengths/Weaknesses/Opportunities/Threats (SWOT) analysis. The paper concludes with suggestions for future research.

2 Contractual incompleteness, Renegotiations & PPP critical success factors

One of the main motivations for using PPP is that it cuts large, one-off capital expenditure into a series of smaller, annualized expenditures (Hodge & Greve, 2010). Others include, *inter alia*, better value for money and greater innovation and efficiency (Hodge & Greve, 2010; Petersen, 2010). Despite these promises, PPPs tend to have a rather weak record on performance. PPPs fall short in achieving value for money for two main reasons: (a) rigidity of PPP contracts which fail to account for uncertainties and needed changes and (b) limited knowledge on which critical success factors influence performance flexibilities (Bloomfield, 2006; Coghill & Woodward, 2005; Grimsey & Lewis, 2005).

There is a clear trade-off between the costs of specifying more flexible contracts with certain performance obligations in an uncertain environment and rigid contracts, which allow for lower transaction costs in the initial stage but incur in higher costs of establishing the terms of ex post trade. Moreover, such relational (i.e. flexible) contracts are also conditioned by environmental variables (e.g. institutional maturity, uncertainty of demand, and trust between partners). Bearing in mind a high degree of volatility of these variables, flexible contracts, in contrast to rigid ones, try to face uncertainty by containing clauses for renegotiation that not necessarily lead to change in the contract itself (“contractual renegotiation”) but by revising the terms of trade under the same contract. The design of long term contracts, as in the case of transport PPPs, must thus be done under an economic and political rationality (Athias & Saussier, 2007, 2010; Saussier, 2000).

On the one hand, contractual renegotiation has typically been seen as undesirable and reflecting the inefficiencies of contracts since it imposes high transaction and social costs and may induce opportunistic behaviour of both private and public parties. On the other hand, given the incomplete nature of long term contractual arrangements, a successful renegotiation (that leads to revising the terms of trade within the contract) can be welfare-enhancing, rather than welfare-reducing as typically perceived in the

standard bargaining theory (De Brux, 2008). The issue of trust and communication has been central in overcoming the setbacks of contract incompleteness.

Hart and Moore (1988) study the case in which two parties engage in an incomplete contract and explore whether the parties can make up for this incompleteness by introducing a mechanism for revising the terms of trade as the future unfolds. They conclude that the divisions of achieved *ex post* surplus are very sensitive to existing communication mechanisms and whether the parties' messages are verifiable or not. According to Athias and Saussier (2007) a flexible contract, in contrast to a rigid one, induces renegotiation costs that constitute deadweight losses. However, this does not imply that rigid contracts are always to be preferred to flexible ones since the global surplus is also a function of the investments made by private partners. More specifically, under rigid contracting, private operators might under invest for fear of contractual maladaptation, leading to a lower surplus compared to the flexible contracting case. Finally, Dassiou and Stern (2009) studied trustworthiness in hybrid infrastructure contracts where renegotiation is possible post-investment, but not pre-scheduled. A lack of trust between partners induces a reduction in welfare and suboptimal investments but expectations can be updated over time through experience. Legal, institutional and regulatory frameworks balance deficiency in “trust”.

The analysis of a database of over 1000 concessions awarded in Latin America from 1985 to 2000 covering the sectors of telecommunications, energy, transport and water by Guasch *et al.* (2007) on government-led renegotiations confirms some of the main insight that Guasch *et al.* (2003) presented with respect to firm-led renegotiation. Renegotiations are more likely whenever inadequate regulatory frameworks and deficient institutional environments are present. The private partner has typically been more prepared and eager to engage in concession renegotiations under strategic behaviour (Guasch, 2004). It recognized an opportunity in the fragilities of weak governmental institutions and “complete” contracts that wrongfully attempted to foresee the future. Strong institutions are therefore relevant for the quality of the partnership as well as deterring opportunistic renegotiations. The degree of institutional maturity can, nonetheless, be increased over time with experience and with the development of governance institutions (e.g. law courts, opposition parties) that operate to support the contracts. However, an important role remains on autonomous regulators capable of monitoring, enforcing and, when necessary, modifying infrastructure contracts under due process (Dassiou & Stern, 2009; Stern, 2012). Additionally, PPPs can be useful not only to provide state of the art infrastructure in a cost effective manner, but also to renew procedures, arrangements and institutions (Guasch *et al.*, 2003; Guasch *et al.*, 2008; Van Ham & Koppenjan, 2001). The existence of a regulator capable of supervising contract design and overseeing the renegotiation process is, therefore, essential to ensure that renegotiations result in economic and financial equilibrium of the project.

Notably, the essence of renegotiations centres on the allocation of risks. Risk management in PPPs should be dynamic so as to address the evolution of risks over

time (Pellegrino *et al.*, 2013). Moreover, the scarcity of public budgets has typically conduced to private investment obligations or governmental guarantees, which created pernicious incentives for opportunistic behaviour (Guasch *et al.*, 2003; Guasch *et al.*, 2008). Academia has recently devoted considerable attention on how to cope with uncertainty, by protecting from downside scenarios and sharing benefits from mechanisms (e.g. variable term contracts, contract transparency, dynamic revenue insurances) which allow extracting value from upside circumstances (Chiara & Kokkaew, 2013; Cruz & Marques, 2012, 2013; Dong & Chiara, 2010; Vassallo, 2006). Hence, a key aspect of these contractual arrangements lies on their ability to accommodate adaptation and creating a trade-off between transaction costs that are due to changes and incentives to reduce costs (Bajari & Tadelis, 2001). Renegotiating contracts can be a win-win situation for all stakeholders involved. As Bitran *et al.* (2013) suggest, contract renegotiations are more often induced by an inadequate contract set-up or opportunistic behaviour rather than the assumptions behind the incomplete contract theory.

Cost overruns of 50-100% are common for large transport infrastructure projects, with overly optimistic traffic forecasts out by 20-60% compared with actual development. This optimism bias results in misleading decisions to parliaments, misallocation of funds and project's underperformance during construction and operation. Despite the inherent difficulty in predicting the future, cost overruns and optimism bias are too consistent and too one-sided for this to be the case. The same happens with cost benefit analyses into which traffic demand are fed in order to calculate the projects' economic feasibility. Obviously, this is not "optimism", but instead deliberate deception (Flyvbjerg *et al.*, 2002, 2003, 2005; Skamris & Flyvbjerg, 1997). There are two main reasons behind this behaviour. First, scarce public budgets find in PPPs the ideal mechanism to deliver transport infrastructure by avoiding large lump sum investments and giving them an off-balance sheet treatment. Second, electoral cycles may induce incumbents to invest in order to guarantee their re-election (Engel *et al.*, 2006, 2009). Moreover, depending on whether it is the incumbent or newly elected politician, renegotiations also tend to occur in the first year after elections, which can be explained by institutional factors related to corruption or lack of social acceptability of the project's characteristics (Guasch *et al.*, 2007). Finally, PPP projects may also find in users and communities low acceptability, either by their unwillingness to pay to use the new infrastructures or simply because it affects them directly in a negative way (e.g. noise, pollution, no direct benefits).

Furthermore, optimism bias adds to the vulnerability of economic cycles. Transport PPP contracts, given their inherent dependence, are highly exposed to exogenous risks (Nikolaidis & Roumboutsos, 2013c). Fluctuations of few percentage points in macroeconomic growth, interest or exchange rates can have important impact on a project, moving from success into failure (Guasch *et al.*, 2007, 2008). Although both public and private partners have little control over macro-economic shocks, understanding the degree of volatility of the uncertainty around these shocks may help

limiting the downside and benefit from the upside in case those risks materialize. For instance, the effects of the recent economic and financial crisis have already been felt in such contractual arrangements, leading to renegotiations between national governments and concessionaires. Also, projects already at the best and final offer (BAFO) were postponed due governmental incapacity to compromise with further budgetary burden (COST Action TU1001, 2013b, p. 150). Cruz and Marques (2013) argue that there are several characteristics affecting the economic value of PPP projects which make them particularly sensitive to uncertainty namely: i) large sunk investments, meaning large construction costs and large debts (public and/or private), ii) high sensitivity to demand variations/estimations iii) great exposure to financial markets (due to the large debts), and iv) vulnerability to political instability. The authors claim that the complexity of risk sharing is the key reason for contractual renegotiations and emphasize three main sources of uncertainty: cost overruns, demand forecasting and capital costs.

Given the above, it is not surprising that Guasch (2004) found that renegotiation is especially common in transportation concessions (occurring in 55 % of the concessions) with the private operator being the initiator of renegotiations in 61 % of all cases. In summary, factors leading to contract renegotiation may be grouped as: i) Inadequate institutional and regulatory frameworks, ii) Contract design, iii) Macro-economic shocks and iv) Political and social environment (see Table 1).

Table 1: Determinant factors for contract renegotiations from literature

Determinant factors for concession renegotiations	1	2	3	4	5	6	7
Inadequate regulatory frameworks / Type of regulation	✓		✓	✓		✓	
Contract design (Misallocation of risks including revenue guarantees, Investment requirements / Exclusive private financing)	✓		✓	✓		✓	✓
Macro-economic shocks	✓		✓	✓			
Political and social environment (Political cycles, Optimism bias in demand forecasts, Budgetary purposes)	✓	✓	✓	✓	✓	✓	✓

Note: 1) Guasch et al. (2003); 2) Engel et al. (2006); 3) Guasch et al. (2007); 4) Guasch et al. (2008); 5) Engel et al. (2009); 6) Baeza and Vassallo (2010); 7) Bitran et al. (2013)

These same factors constitute “*the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization*”, i.e., the original definition of critical success factors (CSF) (Rockart, 1978, 1982). Considering PPP performance, Mladenovic *et al.* (2013) conducted a literature review on transport PPP projects and evaluation of available CSF, aggregating them in public (socio-economic and project related) and private sector perspectives. Departing from their work, we analyse CSF under a perspective related to four factors found determinant to contractual renegotiations.

Table 2: CSF according to determinant factors for renegotiation

	Institutional and regulatory frameworks	Contract design	Macro-economic environment	Political and social environment
Public: Socio-economic	Transparent and predictable legal framework	Transportation infrastructure needs	Favourable investment climate; Stable macroeconomic environment	Stable political and social environment
Public: Project-related	Transparent, competitive and efficient procurement process	Detailed project planning and evaluation; Appropriate risk allocation		Project economic efficiency
Private	Transparency	Appropriate risk allocation; Implementation of innovative technologies		Faster project completion

Source: Adapted from Mladenovic *et al.* (2013)

The remaining CSF identified by Mladenovic *et al.* (2013) include at project level, “capable public and private partners” and “professional relationship between stakeholders”, and from the private sector perspective, “partnership and communication between public and private partners”. This can be translated into an expectation from both parties for effective partnerships. In practice however, communication mechanisms are seldom present, with private and public sectors finding themselves more often in adversarial positions than cooperating.

3 Case studies: renegotiation in transport PPPs

The experience in PPP project implementation differ significantly from country to country.

Following on the key issues described in the previous section, nine case studies from Portugal, Spain, Greece, Cyprus and the Netherlands (Table 3) were studied with an aim to conduct a **cross-country analysis** on identifying the PPPs’ features that lead to renegotiation.

Table 3: PPP Case studies brief description

LUSOPONTE* (Portugal, Miranda Sarmiento (2014))	Concession agreement was signed in 1993 and consisted in the construction of the new “Vasco da Gama” bridge and maintain the existing “25 de Abril” bridge. Contract was renegotiated.
FERTAGUS** (Portugal, Macário <i>et al.</i> (2013b))	Supply of equipment and rolling stock, operation and maintenance of the railway connection between the left and right banks of the Tagus River. Two series of renegotiations took place.

METRO SUL TEJO (MST)** (Portugal, Macário <i>et al.</i> (2013c))	Public light rail transportation system project to provide surface light rail transport system on south bank of Tagus river in Portugal. The concession consisted in the design, construction, equipment supply, rolling stock, financing, operation, maintenance and conservation of the MST (TC, 2011). Renegotiation process completed.
A22 & A23 highways* (Portugal, (Costa <i>et al.</i>, 2014a, 2014b))	A22 and A23 highways contracts were signed 2000 and 1999 respectively and were part of a shadow toll concession model launched in 1997 in order to accelerate the execution of the planned national road network.
Radial 2 highway* (Spain, Villalba-Romero and Liyanage (2014))	Alternative toll road in the northeast area of Madrid. EUR 500 million, 25 years concession awarded in 2003 to HENARSA, SACE. This contract is currently being renegotiated.
C16 highway* (Spain, Cabrera and Suárez-Alemán (2014))	C-16 highway originally designed as a 30 years construction, operation and maintenance concession project. Contractual renegotiations took place within the first 10 years of the concession period.
Ionia Odos & Olympia Odos highways** (Greece, (Nikolaidis & Rouboutsos, 2013a, 2013b))	Toll highway concession projects granted to two consortia. "Ionia Odos" consists in a greenfield section in the west (Ioannina to Antirrio) and a brownfield section in the Athens-Thessaloniki axis. The brownfield sections of "Olympia Odos" amount to 200km (Elefessina-Korinthos-Patra) adding to a new 163 km section in the south (Patras to Tsakona). Both contracts were renegotiated.
Larnaca and Paphos airports** (Cyprus, Christodoulou and Efstathiades (2013a))	25 years concession project to develop new infrastructures and improve existing ones at Larnaca and Paphos airports in Cyprus at a global cost of EUR 640 million. Project has not been renegotiated.
Coen Tunnel project** (Netherlands, Voordijk (2013))	Design-Build-Finance-Maintain project for the construction of an eight-lane underwater tunnel, the renovation of the existing Coen Tunnel and extensions to create direct connections with the A8 and the A10 as well as the maintenance of the 'twin Coen brothers'.

Source: (*)COST Action TU1001 (2014); (**)COST Action TU1001 (2013a)

Portugal initiated railways concessions in the early 1990s and has been one of the most active European countries in the PPP market. Nonetheless, the first PPP-specific legislation was only adopted in 2003 and there is still no standardized PPP procedure or robust performance pressure (Macário *et al.*, 2013a).

Contrastively the first set of toll concessions in **Spain** were awarded through specific legislation approved by the government for each project. The legal framework was established in 1972, and up to now it has suffered significant changes by introducing new risk sharing approaches and certain quality criteria standards. Since 1996, local and regional governments were given greater power and opportunity to start managing and using the concession models for the development of regional infrastructure (Villalba-Romero, 2014).

In **Greece**, two major elements are predominant in setting the framework for PPP policy: the EU Cohesion Policy and the Eurostat accounting treatment for PPPs allowing the classification of PPPs as non-government assets. In 2004 the Expert Committee on PPPs reported a number of issues regarding PPP implementation, such as support to public authorities, absence of a PPP taskforce, procedures for the execution of guarantees, the definition of responsibilities between the various authorities, project maturity process, budgeting of contracts, financing provisions, taxation, return on equity, capital security and legal framework. Following these suggestions a new PPP Law in 2005 (Bill Law 3389/2005) aimed at small to medium-sized projects with a maximum construction value of less than EUR 200 million (today 500 million), while larger projects are managed by the central government (Roumboutsos, 2013).

Cyprus has started developing PPP projects in the 1990s and, despite the country's small size, it has engaged in a relative big variety of projects (e.g. desalination plants, airports, marinas, solid waste plants, etc.). Although the government recognizes deficits on institutional and regulatory frameworks (e.g. PPP special legislation, PPP support units), measures such as the adoption of international best practices are being undertaken (Christodoulou & Efstathiades, 2013b).

Netherlands recognized that the early experiences in the late 80s were not successful. For that reason, they adapted PPP procedures (e.g. public/private-sector comparator, PPP knowledge unit, competitive dialogue, etc.) to the Dutch context in order to deliver value for money through PPPs. This in return translates into political consensus on this form of procurement (Dewulf & Castaño, 2013). It resulted in the establishment of a PPP unit at the national level (PPP Knowledge Centre) as a platform for communication and development of trust-based relations, and a mechanism to increase confidence in PPPs.

3.1 Institutional and regulatory frameworks

Lusoponte's initial contract was rather flexible by indexing the concession period to traffic volumes or revenues and would not go beyond 2028. On the other hand, it established that the tolls of the existing bridge would increase as from 1994 in order to meet the values set for the new bridge's tolls. Also, tolls exemption in the existing bridge in August would no longer continue. The non-compliance of the former situations entitled the concessionaire to request contract renegotiation. The Court of Accounts audit to the concession renegotiation in 2000 found that the public side was not able to protect the best interest of tax-payers (TC, 2001). Regarding the MST project, the Court of Accounts pointed out that despite the numerous public entities present in the concession none had an overarching vision of contract monitoring, illustrated by the fact that by 2010 the regulator was still producing a concession compliance roadmap. Furthermore, it recommended more credible and rigorous feasibility studies as well as the reinforcement of public entities with capable technical and human resources (TC, 2011). On the road sector, the public partner did not have in place the adequate regulatory framework, nor the necessary technical and human resources to monitor and enforce contracts' compliance (TC, 2003; Vaz, 2012).

The use of standard contracts in Spain allows for a reduction in transaction costs in comparison with other countries and enables many companies to take part in the tender, which enhances competition and efficiency (Soliño & Gago de Santos, 2010; Vassallo *et al.*, 2012). However, contract renegotiations have been common in Spain, with up to 55% of toll highway concession contracts being renegotiated, half of which were at an initial stage. Moreover, 50% of the renegotiations ended up with toll rises and 24% extended the concession period (Baeza, 2008).

In Greece, both concessions are included in the sector wave of large PPP projects. More specifically, they are part of the so-called “axis of development”. Following on the procedure implemented for large infrastructure PPPs, the entire tendering activity was monitored and ratified by parliament.

The Larnaca and Paphos concession was tendered simultaneously with Cyprus accession to the EU, allowing the government to get acquainted with EU laws and attract international companies. Moreover, it provides a clear dual-till economic regulation (i.e. aeronautical revenues are regulated as opposed to non-aeronautical ones) and has a profit-sharing arrangement when the IRR exceeds 12%. Despite being similar to standard practices in providing guarantees to the concessionaire in terms of contract termination, this contract stands out with the creation of a “Liaison Committee” responsible for the regular contract monitoring. This allows for strategic discussions on variations in market conditions as well as the efficient operation of the two airports, increasing the dialogue between partners.

3.2 Contract design

The demand risk in the Lusoponte concession was initially allocated to the private sector but after renegotiations was shared with the public sector. In the renegotiation process, the concessionaire directly benefited from reduced maintenance obligations and annual compensations until the end of the extended concession (in at least seven years) until 2030 independent of traffic volumes and tax benefits (Cardoso, 2011; TC, 2001). In the MST project, demand risks were assumed by the Portuguese State who must compensate MST whenever passenger traffic is below the lower limit of the reference traffic. On the other hand, MST bears most of the commercial and revenue risks. Construction delays and unforeseen tasks initiated in 2004 a renegotiation process completed in 2008 and resulted in a financial rebalance agreement (FRA) of EUR 77.5 million in favour of MST. On the road sector, the Court of Accounts alerted society in 2003 to issues such as risks taken by the public side that were initially allocated with the private side and choosing bids less advantageous in terms of FRAs. Although in 2007 the A22 concessionaire had received a EUR 3,25 million compensation for expropriations delays, the same court had also identified a positive evolution from the public partner in managing the FRA processes (TC, 2008).

The guarantee provided by the Spanish government in case of bankruptcy has two effects. It induces renegotiations since triggering the guarantee would be more costly and provides the private sector the incentive to bid opportunistically since the

government will not allow the project to go bankrupt (Baeza, 2008; Vassallo *et al.*, 2012).

The two Greek concessions had two major pit-falls. One consisted of the fact that construction was greatly co-financed through toll collection on existing sections of the motorway delivered through public funding. The severity of the economic and financial crisis affected negatively traffic volumes, meaning less than expected toll revenues that were to be used solely for the construction funding. The other disregarded past experience with respect to delays due to archaeological findings and land acquisition (Nikolaidis & Roumboutsos, 2013a, 2013b, 2013c).

In the Cypriot case, the contract provides a clear output specification of both parties' duties and rights and a performance measurement system which if not met, can trigger contract termination. In particular, this system creates two categories of performance indicators which are controlled either by the concessionaire (e.g. security check equipment, luggage trolleys, customs, cleanliness) or by a third-party (e.g. check-in for scheduled flights and charter flights, baggage delivery of first and last bag to reach carousel) and provides incentives and penalties based on annual gross revenues (Christodoulou & Efstathiades, 2013a).

In order to push the Coen Tunnel project forward, the public sector was compelled to assume part of construction risks (e.g. responsibility in case of tunnel collapse during construction). Whilst the public partner was allocated most of the risks in the agreement, exploitation risks were transferred to the private partner, where serious problems could lead to renegotiation (Voordijk, 2013).

3.3 Macro-economic environment

The original repayment mechanism of the A22 and A23 highways consisted in availability fees and shadow tolls according to traffic intervals. The financial and economic crisis was the determinant factor for the introduction of electronic toll collecting systems in late 2011. This also led to user protests and big drops in traffic of highways that were subject to optimism bias in the first place. In the Lusoponte case, the concessionaire directly benefited from more favourable conditions on interest rates derived from Portugal entrance in the Eurozone (Cardoso, 2011).

Greece was also severely affected by the global financial and economic recession which negatively influenced the highway concessions decreasing the traffic revenues necessary to fund its construction resulting in ceasing the project in early 2010 and engaging renegotiations. The impact has been greater for projects under construction, as a significant share of the construction cost was to be provided by brownfield toll revenues. In April 2013, the government announced the terms of agreement which included an increase of public financial contribution, a decrease in scope, and the payment of claims (Nikolaidis & Roumboutsos, 2013b).

The economic recession in the early 1990's, together with over optimistic demand forecasts, led the Spanish Government to extend the C-16 contract duration in order to

assure the economic viability of the project from 35 to 50 years (Cabrera & Suárez-Alemán, 2014).

In Cyprus, the combined airports' traffic in 2012 was inferior to the low case scenario forecasts (i.e. 7.5 vs. 8.5 million) to which the concessionaire responded with increased fees and there are concerns that both the financial crisis and increased airport fees could offset Cyprus's tourists (Christodoulou & Efstathiades, 2013a).

The exogenous economic environment influenced directly the negotiation process of the Coen Tunnel project, with both parties demonstrating risk aversion (Voordijk, 2013). However, this chain of events had the advantage of making both partners aware of the importance that extreme circumstances may have on the project's success. This was reflected in the final flexible contract which contains re-negotiation clauses where partners recognize that some future outcomes cannot be written down on the contract and must therefore be negotiated in good-faith when and if that time comes.

3.4 Political and social environment

In the Lusoponte case, changes on toll policy were not socially acceptable, leading to a bridge blockage and civil protests. Consequently, the public partner was forced to pay annual compensations to the concessionaire in the form of FRAs. Within the first three years of operation of FERTAGUS it was observed that demand forecasts had been highly overestimated, compromising the project's commercial feasibility. This translated in less than 33% forecasted passenger-km's in the first year and, by 2004, earnings before taxes represented a loss of EUR 28,4M in contrast to the expected profit of EUR 5,7M, i.e., a negative deviation of nearly 600% from the financial base case (Macário *et al.*, 2013b; TC, 2005, p. 45; 2012). The first renegotiation was completed in 2005 and foresaw a second renegotiation in 2010. Between the two renegotiations, the operator was compensated up to EUR 102.8M for financial imbalances and public service provision. In return, the concession period was substantially reduced to 6 years, a reduction of the operator's IRR from 10.89% to 7.76%, the re-allocation of demand and commercial risk towards the private operator and the possibility to share any profits. Moreover, compensation clauses from exclusivity in the Tagus crossing were removed whilst a certain degree of freedom was granted to the operator to fix the tariffs (TC, 2012). The key goals of A22 and A23 highways shadow toll model revolved around reducing regional imbalances through an improved road network while minimizing pressure on state budget.

The most common trigger for renegotiation in Spanish road PPPs was a change in transport policy prompted by the government and a shortage of revenues caused by overoptimistic traffic forecasts. In the first year of operation of the C-16 project, there was a 20% increase on tolls due to the insufficient traffic level. Traffic forecasts also did not match actual traffic in the first seven years, triggering contractual renegotiations at an early stage of the concession. In the Radial 2 project traffic in the first year was down by 63% from initial forecasts. This is also common in other Spanish highway concessions, with real traffic down by 83% from initial forecasts (Vassallo *et al.*, 2012).

In Greece, the need for a modern transport infrastructure system over-ruled political cycles. This is evidenced by the fact that the tendering and award procedure as well as renegotiations continued along similar lines over changes in government. A decrease exceeding 50% of the initial traffic envisaged in the “Olympia Odos” concession, as well as land acquisition and environmental issues were the main triggers for the project renegotiation that started in 2010 in order to restructure the project’s financing and restart construction works. Amplified by the effects of a severe economic downturn, optimism bias in traffic forecasts and neglecting the impact of social risks at a critical stage has likely conditioned the project’s success.

Table 4 summarizes below which determinant factors were found present in each case study, and the respective consequences of contract renegotiation:

Table 4: Triggers and consequences of PPP renegotiations

PPP	Determinant factors for contract renegotiations				Consequences
	Institutional and regulatory frameworks	Contract design	Macro-economic environment	Political and social environment	
LUSOPONTE (PT)	<ul style="list-style-type: none"> - Public sector deprived of capable technical and human resources; - Initial contract flexible in terms of concession duration; - Specified in which scenarios renegotiation could occur; 	<ul style="list-style-type: none"> - Inexistent credible and rigorous feasibility studies; - Demand risk initially private, but partially transferred to the public partner after first renegotiation; - Public partner was forced to pay annual compensations to the concessionaire. 	<ul style="list-style-type: none"> - Public sector unable to benefit from the positive changes in the macro-economic environment 	<ul style="list-style-type: none"> - Changes on toll policy were socially unacceptable 	<ul style="list-style-type: none"> - Changes in the risk allocation matrix, more favourable to the concessionaire; - Increase of concession period; - Reduction of concessionaire maintenance costs;
FERTAGUS (PT)	<ul style="list-style-type: none"> - No specific clauses on contract renegotiation - Public sector deprived of capable technical and human resources; 	<ul style="list-style-type: none"> - Full demand risk initially public; - Operator can be compensated for financial imbalances. 	<ul style="list-style-type: none"> - Indirect influence on project performance 	<ul style="list-style-type: none"> - Optimism bias on demand forecasts 	<p>1st renegotiation:</p> <ul style="list-style-type: none"> - Update of demand forecasts <p>2nd renegotiation:</p> <ul style="list-style-type: none"> - Reduction of concession period - Reduction of the operator's IRR with contract renegotiation - Introduction of Claw-Back mechanism - Introduction of new revenues sources
METRO SUL TEJO (PT)	<ul style="list-style-type: none"> - No specific clauses on contract renegotiation; - Public sector deprived of capable technical and human resources; 	<ul style="list-style-type: none"> - Demand and financial risks totally public; - Commercial and revenue risks mostly private. - Minimum revenue guarantees for private partner; 	<ul style="list-style-type: none"> - Indirect influence on project performance 	<ul style="list-style-type: none"> - Optimism bias on demand forecasts 	<ul style="list-style-type: none"> - Change in repayment methods (extension of concession period) - Compensation for financial imbalances to the private partner
A22 & A23 highways (PT)	<ul style="list-style-type: none"> - Inadequate regulatory framework; - Renegotiation clause in high-demand scenarios to increase the number of lanes on given sections. 	<ul style="list-style-type: none"> - Demand risk mostly public 	<ul style="list-style-type: none"> - Introduction of electronic toll collecting systems - Further reduction of traffic; 	<ul style="list-style-type: none"> - Optimism bias on demand forecasts; - Social unwillingness to pay for tolls; 	<ul style="list-style-type: none"> - Change in repayment methods (from shadow tolls to availability plus tolls charged) - Financial compensation for expropriations delays

PPP	Determinant factors for contract renegotiations				Consequences
	Institutional and regulatory frameworks	Contract design	Macro-economic environment	Political and social environment	
Radial 2 highway (SP)	- No specific clauses on contract renegotiation	- Bankruptcy guarantee provided by government induces opportunistic behaviour from bidders	- Indirect influence on project performance	- Optimism bias on demand forecasts	- Extension of concession period - New traffic projection included as reference for renegotiations
C16 highway (SP)	- No specific clauses on contract renegotiation	- Risk allocation not clearly stated in the contract. - Bankruptcy guarantee provided by government induces opportunistic behavior from bidders	- Direct influence on the project performance, extending contract duration	- Optimism bias on demand forecasts, induced a toll increase of 20% in the first year;	- Project redesigned with additional connection; - Extension of concession period; - 50% discount for regular users
Olympia Odos & Ionia Odos highways (GR)	- Ad hoc and highly complex legal framework;	- Financing and traffic risks were mostly transferred to the private sector. - Delays in land acquisition were also a subject of negotiations	- Financial crisis negatively influenced the project decreasing the traffic revenues necessary to fund its construction	- Underestimation of delays due to archaeological findings and land acquisition - Risky financing model	- Project postponed; - Change on SPV shareholder's structure - State participation in the construction financing - Amendments of the toll revenue sharing mechanism during the operational period
LARNACA PAPHOS (CY)	- "Liaison Committee" responsible for the quotidian contract monitoring; - Clear dual-till economic regulation;	- Contract provides a clear output specification of both parties' duties and rights and performance indicators; - Profit-sharing arrangement	- Financial crisis	- Partial optimism bias on demand forecasts	Not renegotiated
COEN Tunnel (NL)	- Competitive dialogue process allowed for proper risk allocation; - Recognition that uncertain events must be negotiated in good-faith when and if that time comes.	- Public sector assumed part of construction risks. - Exploitation risks transferred to the private, where serious problems could trigger to renegotiation.	- Both parties demonstrated strong risk aversion, influenced by the financial crisis		Not renegotiated, but: - Transfer of certain construction risks to public sector; - Introduction of renegotiation clauses

4 Discussion

In principle, renegotiation clauses can be an important tool for PPP's contractual management, allowing them to better cope with uncertainty and adapt to reality. However, based on the cases studies, one could not be aware of the existence or not of renegotiation clauses, due to omission of relevant parts or annexes of the contracts made available. From those contracts where it can be observed, the majority either does not contain such clauses or, when it does, they are either meaningless (e.g. where dispute takes place, obvious reasons for contract termination) or commit the grantor with unforeseeable situations (e.g. social acceptance, traffic demand). Only a small minority of contractual arrangements provide guidelines on how and when should renegotiations take place (e.g. demand rises to a threshold where capacity expansion is required, commercial feasibility triggers financial rebalances, willingness or inability to manage unforeseen risks). The later practices however seem to be associated with recently renegotiated contracts as in the case of former shadow toll highways in Portugal, projects developed under a mature institutional framework, or on the learning curve to create one, as in the case of the Coen Tunnel in the Netherlands and Larnaca and Paphos airports in Cyprus.

Notably, the proposed group of determinant factors for renegotiations identified from literature is consistent with our case studies analysis. Firstly, the dominance of evidence of optimism bias in our case studies is overwhelming. Be it by political opportunism or by inadequate contractual set-ups, inflated traffic demand forecasts provide the wrong incentives for infrastructure investment and therefore constitute a severe misallocation of governmental funds which could be used elsewhere. Perhaps more interesting than highly frequent cases of optimism bias is the persistence of institutions in not learning from previous experiences which brings us to the second factor. Adequate institutional and regulatory frameworks are fundamental to support the successful implementation of infrastructure projects which is corroborated by both literature and our case studies. It is nonetheless interesting to observe the different levels of institutional maturity of early-runners in PPPs such as Portugal and the Netherlands or Cyprus, that unlike the former, were able to create PPP specific legislation and adopt international best practices to develop their projects. Third, it is also evident from the case studies analysis and literature how highly exposed PPPs are to exogenous risks. Although this had stronger repercussions in southern European countries, it also conditioned better structured PPPs.

Moreover, the CSFs affecting transport PPPs reinforce our proposed group of factors for contract renegotiation. First, both private and public partners find important transparent, predictable and efficient institutional-regulatory frameworks. Second, adequate contract design requires an appropriate risk allocation that fits the public's transportations needs while leaving room for the private partner to innovate. Third, public sector recognizes the importance of favourable and stable investment climates. Fourth, faster project completion of economically efficient projects are relevant for a stable political and social environment. And finally, but of no less importance, the expectations of professionalism and effective communication between partners strengthen our vision that the uncertainties in long term

contracts will be better managed through strong partnerships rather than rigid and over prescriptive contracts.

Vassallo *et al.* (2012) argue that governments must concentrate efforts in accurate estimates and to draft contracts that cover all eventualities in order to avoid renegotiations. In fact, one frequently observes excessively prescriptive contracts in terms of demand or product specifications in an attempt to balance out the inherent incompleteness nature of the contract. The reasons behind such behaviour range from political concern of passing on the image of a demanding negotiator to the lack of capacity in learning with previous experiences. This has effectively been the Iberian experience in the past twenty years, relying on PPPs as an off-budget mechanism to provide for transport infrastructures without a proper of assessment on the usefulness of both the infrastructures and the procurement method.

Contrarily, we follow the view of Guasch and Straub (2006) in that renegotiation can be seen as “*a possibility of Pareto improving deals to account for changes in the environment or in agents’ preferences*”. For this purpose, effective contractual agreements must provide strategic goals and the tools to achieve them. This is possible through mature institutional frameworks that provide strong regulatory mechanisms to monitor and enforce contract compliance. The Dutch and Cyprian cases provide food for thought on practices to follow with regard to contract renegotiation. The Liaison Committee of Larnaca and Paphos Airports for instance, on top of ensuring contract compliance, has the added advantage of fostering dialogue between partners, thus creating the foundations for an effective partnership.

Based on the previous case studies analysis, Table 5 presents potential benefits that could be captured and pitfalls to be avoided in PPP contractual arrangements. The SWOT analysis serves both as a summary of the identified trade-offs on our case studies and literature as well as identifying best-practices on PPP contractual frameworks with regard to contractual flexibility.

Table 5: SWOT analysis on contractual flexibility

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> - Possibility to build trust-based relations - Possibility to identify and define triggers for renegotiations beforehand - Chance to prevent opportunistic behaviour and hold up problems - Improved communication between public and private partners 	<ul style="list-style-type: none"> - Higher transaction costs - Possibility of opportunistic behaviour induced by not well-defined contracts (e.g. price dumping)
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> - Ability to better cope with unforeseen events - Possibility to make Pareto-improving adjustments - Proper risk allocation based on real case scenario - Introduction of new methods of payment - Ability to create supervising mechanism for better quality of project delivery - Enable learning on previous experience 	<ul style="list-style-type: none"> - Provide incentive to bid opportunistically - Higher possibility of contract termination - High transaction costs borne by society - Negative perception of the PPP model - Weak legal framework and institutional setting not capable to cope with renegotiation - Unstable political and social environment

5 Conclusions and topics for future research

The needs and specificities of PPPs necessarily change between projects, modes and countries. Best practices must be assimilated and implemented in order to ensure an innovative infrastructure provision. The critical success factors previously mentioned must be taken into account in order to derive added value from infrastructure delivered by means of PPP. Transparency and effective communication do not occur naturally, especially in millionaire projects. They are, however, part of a learning process and, as shown in the Cyprian and Dutch cases, crucial elements for successful project implementation. On the other hand, there are several strengths and opportunities arising from renegotiations and may outweigh its threats and weaknesses. This is particularly true if the way has been paved for an effective dialogue to take place and renegotiations occur in good-faith. Without the proper incentives and effective political and regulatory frameworks, both partners will inevitably enter in a lose-lose situation. Transparency and trust-based relationships effectively contribute to a smoother renegotiation process, reinforcing the “P” in Partnership. It also allows better managing the uncertainty which will inevitably affect the long term relationship between public and private partners. Higher contract rigidity or merely poor contractual design has so far provided the incentive for opportunistic behaviour from the part of private concessionaires. There is thus the need for stronger governance institutions in order to prevent such behaviour and potential hold-up problems.

In spite of the recent work developed on trust relations and more dynamic contracts, it is still not clear which is the desirable degree of contractual flexibility on infrastructure provision and in which aspects of the contract it should focus. Consequently, it would be worth investigating the consequences of less rigid contractual frameworks to the current tendering procedures and whether the incentives for opportunistic behaviour would be eliminated. Finally, it would also be interesting to understand the social-economic impact of communication mechanisms and contracts’ flexibility with more frequent renegotiations taking place. Similarly to the European need of improving transportation infrastructures and its delivery methods, the scope for future research on contractual renegotiations is quite large, with many gaps to fill.

References

- Albalade, D., & Bel, G. (2009). Regulating concessions of toll motorways: An empirical study on fixed vs. variable term contracts. *Transportation Research Part A: Policy and Practice*, 43(2), 219-229. doi: <http://dx.doi.org/10.1016/j.tra.2008.11.008>
- Athias, L., & Saussier, S. (2007). Un partenariat public-privé rigide ou flexible? *Revue économique*, 58(3), 565-576.
- Athias, L., & Saussier, S. (2010). Contractual flexibility or rigidity for public private partnerships? Theory and evidence from infrastructure concession contracts. Paris: Chaire EPPP.
- Baeza, M. d. I. Á. (2008). *Planificación económico-financiera de las concesiones de autopistas de peaje: un estudio empírico del caso español*. Editorial de la Universidad de Granada.
- Baeza, M. d. I. Á., & Vassallo, J. M. (2010). Private concession contracts for toll roads in Spain: analysis and recommendations. *Public Money & Management*, 30(5), 299-304.
- Bajari, P., & Tadelis, S. (2001). Incentives versus Transaction Costs: A Theory of Procurement Contracts. *The RAND Journal of Economics*, 32(3), 387-407. doi: 10.2307/2696361

- Bitran, E., Nieto-Parra, S., & Robledo, J. S. (2013). Opening the black box of contract renegotiations: An analysis of road concessions in Chile, Colombia and Peru: OECD Publishing.
- Bloomfield, P. (2006). The challenging business of long-term public-private partnerships: reflections on local experience. *Public Administration Review*, 66(3), 400-411.
- Cabrera, M., & Suárez-Alemán, A. (2014). C-16 Terrassa-Manresa Toll Motorway. In A. Roumboutsos, S. Farrell & K. Verhoest (Eds.), *COST Action TU1001 – Public Private Partnerships in Transport: Trends & Theory: 2014 Discussion Series: Country Profiles & Case Studies*. ISBN 978-88-6922-009-8.
- Cardoso, P. M. P. C. (2011). *Renegociação contratual de parcerias público-privadas no sector rodoviário*. (Master Dissertation), Instituto Superior Técnico. Universidade Técnica de Lisboa, Lisboa. Retrieved from <https://fenix.ist.utl.pt/dissertacoes/254634>
- Chiara, N., & Kokkaew, N. (2013). Alternative to Government Revenue Guarantees: Dynamic Revenue Insurance Contracts. *Journal of Infrastructure Systems*, 19(3), 287-296.
- Christodoulou, C., & Efstathiades, C. (2013a). Larnaca and Paphos International Airports. In A. Roumboutsos, S. Farrell, C. L. Liyanage & R. Macário (Eds.), *COST Action TU1001 Public Private Partnerships in Transport: Trends & Theory P3T3, 2013 Discussion Papers Part II Case Studies*. ISBN 978-88-97781-61-5.
- Christodoulou, C. A., & Efstathiades, C. O. (2013b). Cyprus. In K. Verhoest, N. Carbonara, V. Lember, O. H. Petersen, W. Scherrer & V. d. Hurk (Eds.), *COST Action TU1001 Public Private Partnerships in Transport: Trends & Theory P3T3, 2013 Discussion Papers Part I Country Profiles*. ISBN: 978-88-97781-60-8.
- Coghill, K., & Woodward, D. (2005). Political issues of public-private partnerships. In G. Hodge & C. Greve (Eds.), *The Challenge of Public-Private Partnerships: Learning from International Experience* (pp. 81-94). Cheltenham: Edward Elgar.
- COST Action TU1001. (2013a). *2013 Discussion Papers Part II Case Studies* (A. Roumboutsos, S. Farrell, C. L. Liyanage & R. Macário Eds.).
- COST Action TU1001. (2013b). *2013 Discussion Papers: Part I Country Profiles* (K. Verhoest, N. Carbonara, V. Lember, O. H. Petersen, W. Scherrer & V. d. Hurk Eds.).
- COST Action TU1001. (2014). *2014 Discussion Series: Country Profiles & Case Studies* (A. Roumboutsos, S. Farrell & K. Verhoest Eds.).
- Costa, J., Couchinho, R., Ribeiro, J., & Macário, R. (2014a). A22 – Algarve. In A. Roumboutsos, S. Farrell & K. Verhoest (Eds.), *COST Action TU1001 – Public Private Partnerships in Transport: Trends & Theory: 2014 Discussion Series: Country Profiles & Case Studies*. ISBN 978-88-6922-009-8.
- Costa, J., Couchinho, R., Ribeiro, J., & Macário, R. (2014b). A23- Beira Interior. In A. Roumboutsos, S. Farrell & K. Verhoest (Eds.), *COST Action TU1001 – Public Private Partnerships in Transport: Trends & Theory: 2014 Discussion Series: Country Profiles & Case Studies*. ISBN 978-88-6922-009-8.
- Cruz, C. O., & Marques, R. C. (2012). Risk-Sharing in Seaport Terminal Concessions. *Transport Reviews*, 32(4), 455-471. doi: 10.1080/01441647.2012.664576
- Cruz, C. O., & Marques, R. C. (2013). Flexible contracts to cope with uncertainty in public-private partnerships. *International Journal of Project Management*, 31(3), 473-483. doi: 10.1016/j.ijproman.2012.09.006
- Dassiou, X., & Stern, J. (2009). Infrastructure Contracts: Trust and Institutional Updating. *Review of Industrial Organization*, 35(1-2), 171-216. doi: 10.1007/s11151-009-9221-4
- De Brux, J. (2008). *The dark and blue sides of renegotiation: An application to transport concession contracts*. Paper presented at the Centre d' Economie de la Sorbonne, Université Paris 1 Pantheon Sorbonne.
- Dewulf, G., & Castaño, J. M. (2013). The Netherlands. In K. Verhoest, N. Carbonara, V. Lember, O. H. Petersen, W. Scherrer & V. d. Hurk (Eds.), *COST Action TU1001 Public Private Partnerships in Transport: Trends & Theory P3T3, 2013 Discussion Papers Part I Country Profiles*. ISBN: 978-88-97781-60-8.
- Dewulf, G., Garvin, M., & Duffield, C. (2011). *What are the benefits of standardised PPP procurement processes? Working paper proceedings*. Paper presented at the Engineering Project Organizations Conference, August 9-11, Estes Park, CO.

- Dong, F., & Chiara, N. (2010). Improving Economic Efficiency of Public-Private Partnerships for Infrastructure Development by Contractual Flexibility Analysis in a Highly Uncertain Context. *The Journal of Structured Finance*, 16(1), 87-99.
- Engel, E. M. R. A., Fischer, R., & Galetovic, A. (2006). Renegotiation without holdup: Anticipating spending and infrastructure concessions: National Bureau of Economic Research.
- Engel, E. M. R. A., Fischer, R., & Galetovic, A. (2009). Soft Budgets and Renegotiations in Public-Private Partnerships. *National Bureau of Economic Research Working Paper Series, No. 15300*.
- EPEC. (2014a). Market Update: Review of the European PPP Market in 2013. Luxembourg: European PPP Expertise Centre.
- EPEC. (2014b). PPPs Financed by the European Investment Bank since 1990. Luxembourg: European PPP Expertise Centre.
- Flyvbjerg, B., Skamris, M. K., & Buhl, S. L. (2002). Underestimating costs in public works projects: Error or lie? *Journal of the American Planning Association*, 68(3), 279-295.
- Flyvbjerg, B., Skamris, M. K., & Buhl, S. L. (2003). How common and how large are cost overruns in transport infrastructure projects? *Transport Reviews*, 23(1), 71-88.
- Flyvbjerg, B., Skamris, M. K., & Buhl, S. L. (2005). How (in) accurate are demand forecasts in public works projects?: The case of transportation. *Journal of the American Planning Association*, 71(2), 131-146.
- Grimsey, D., & Lewis, M. K. (2005). Are public-private partnerships value for money? Evaluating alternative approaches and comparing academic and practitioner views. *Accounting Forum*, 29, 345-378.
- Grimsey, D., & Lewis, M. K. (2007). *Public Private Partnerships: The Worldwide Revolution in Infrastructure Provision and Project Finance*. Cheltenham: Edward Elgar.
- Guasch, J. L. (2004). Granting and renegotiating infrastructure concession: doing it right. The World. Washington, DC: World Bank.
- Guasch, J. L., Laffont, J.-J., & Straub, S. (2003). *Renegotiation of concession contracts in Latin America* (Vol. 3011): World Bank Publications.
- Guasch, J. L., Laffont, J.-J., & Straub, S. (2007). Concessions of infrastructure in Latin America: Government-led renegotiation. *Journal of Applied Econometrics*, 22(7), 1267-1294. doi: 10.1002/jae.987
- Guasch, J. L., Laffont, J.-J., & Straub, S. (2008). Renegotiation of concession contracts in Latin America: Evidence from the water and transport sectors. *International Journal of Industrial Organization*, 26(2), 421-442. doi: <http://dx.doi.org/10.1016/j.ijindorg.2007.05.003>
- Guasch, J. L., & Straub, S. (2006). Renegotiation of infrastructure concessions: An overview. *Annals of Public and Cooperative Economics*, 77(4), 479-493.
- Hart, O. (1995). *Firms, contracts, and financial structure*: Oxford University Press.
- Hart, O., & Moore, J. (1988). Incomplete Contracts and Renegotiation. *Econometrica*, 56(4), 755-785. doi: Doi 10.2307/1912698
- Hodge, G., & Greve, C. (2010). Public-Private Partnerships: Governance Scheme or Language Game? *Australian Journal of Public Administration*, 69, S8-S22. doi: DOI 10.1111/j.1467-8500.2009.00659.x
- Hodge, G. A., & Greve, C. (2007). Public-private partnerships: An international performance review. *Public Administration Review*, 67(3), 545-558. doi: DOI 10.1111/j.1540-6210.2007.00736.x
- Huberman, G., & Kahn, C. M. (1988). Strategic renegotiation. *Economics Letters*, 28(2), 117-121. doi: [http://dx.doi.org/10.1016/0165-1765\(88\)90100-0](http://dx.doi.org/10.1016/0165-1765(88)90100-0)
- Macário, R., Couchinho, R., & Ribeiro, J. (2013a). Portugal. In K. Verhoest, N. Carbonara, V. Lember, O. H. Petersen, W. Scherrer & V. d. Hurk (Eds.), *COST Action TU1001 Public Private Partnerships in Transport: Trends & Theory P3T3, 2013 Discussion Papers Part I Country Profiles*. ISBN: 978-88-97781-60-8.
- Macário, R., Ribeiro, J., & Couchinho, R. (2013b). FERTAGUS Train. In A. Roumboutsos, S. Farrell, C. L. Liyanage & R. Macário (Eds.), *COST Action TU1001 Public Private Partnerships in Transport: Trends & Theory P3T3, 2013 Discussion Papers Part II Case Studies*. ISBN 978-88-97781-61-5.

- Macário, R., Ribeiro, J., & Couchinho, R. (2013c). Metro Sul do Tejo. In A. Roumboutsos, S. Farrell, C. L. Liyanage & R. Macário (Eds.), *COST Action TU1001 Public Private Partnerships in Transport: Trends & Theory P3T3, 2013 Discussion Papers Part II Case Studies*. ISBN 978-88-97781-61-5.
- Miranda Sarmiento, J. (2014). Lusoponte Bridge. In A. Roumboutsos, S. Farrell & K. Verhoest (Eds.), *COST Action TU1001 – Public Private Partnerships in Transport: Trends & Theory: 2014 Discussion Series: Country Profiles & Case Studies*. ISBN 978-88-6922-009-8.
- Mladenovic, G., Vajdic, N., Wündsche, B., & Temeljotov-Salaj, A. (2013). Use of key performance indicators for PPP transport projects to meet stakeholders' performance objectives. *Built Environment Project and Asset Management*, 3(2), 228-249. doi: 10.1108/BEPAM-05-2012-0026
- Nikolaidis, N., & Roumboutsos, A. (2013a). Ionia Odos Motorway. In A. Roumboutsos, S. Farrell, C. L. Liyanage & R. Macário (Eds.), *COST Action TU1001 Public Private Partnerships in Transport: Trends & Theory P3T3, 2013 Discussion Papers Part II Case Studies*. ISBN 978-88-97781-61-5.
- Nikolaidis, N., & Roumboutsos, A. (2013b). Olympia Odos Motorway. In A. Roumboutsos, S. Farrell, C. L. Liyanage & R. Macário (Eds.), *COST Action TU1001 Public Private Partnerships in Transport: Trends & Theory P3T3, 2013 Discussion Papers Part II Case Studies*. ISBN 978-88-97781-61-5.
- Nikolaidis, N., & Roumboutsos, A. (2013c). A PPP renegotiation framework: a road concession in Greece. *Built Environment Project and Asset Management*, 3(2), 264-278. doi: 10.1108/BEPAM-05-2012-0031
- Osborne, S. P. (2000). *Public-Private Partnerships: Theory and Practice in International Perspective*. London/New York: Routledge.
- Pellegrino, R., Vajdic, N., & Carbonara, N. (2013). Real option theory for risk mitigation in transport PPPs. *Built Environment Project and Asset Management*, 3(2), 4-4.
- Petersen, O. H. (2010). Emerging meta-governance as a regulation framework for public-private partnerships: an examination of the European Union's approach. *International Public Management Review*, 11(3), 1-23.
- Rockart, J. F. (1978). Chief executives define their own data needs. *Harv Bus Rev*, 57(2), 81-93.
- Rockart, J. F. (1982). *The changing role of the information systems executive: a critical success factors perspective*: Massachusetts Institute of Technology.
- Roumboutsos, A. (2013). Greece. In K. Verhoest, N. Carbonara, V. Lember, O. H. Petersen, W. Scherrer & V. d. Hurk (Eds.), *COST Action TU1001 Public Private Partnerships in Transport: Trends & Theory P3T3, 2013 Discussion Papers Part I Country Profiles*. ISBN: 978-88-97781-60-8.
- Saussier, S. (2000). Transaction costs and contractual incompleteness: the case of Électricité de France. *Journal of Economic Behavior & Organization*, 42(2), 189-206.
- Skamris, M. K., & Flyvbjerg, B. (1997). Inaccuracy of traffic forecasts and cost estimates on large transport projects. *Transport Policy*, 4(3), 141-146.
- Soliño, A. S., & Gago de Santos, P. (2010). Transaction costs in transport public-private partnerships: comparing procurement procedures. *Transport Reviews*, 30(3), 389-406.
- Spiller, P. T. (2008). An institutional theory of public contracts: Regulatory implications: National Bureau of Economic Research.
- Stern, J. (2012). The relationship between regulation and contracts in infrastructure industries: Regulation as ordered renegotiation. *Regulation & Governance*, 6(4), 474-498. doi: 10.1111/j.1748-5991.2012.01141.x
- TC. (2001). Relatório de Auditoria nº 47/2001 - 2ª Secção (Vol I: Introdução, Conclusões, Desenvolvimento e Observações de Auditoria). Lisboa: Tribunal de Contas.
- TC. (2003). Relatório de Auditoria nº 14/2003 - 2ª Secção: Auditoria às concessões rodoviárias em regime de portagem SCUT. . Lisboa: Tribunal de Contas.
- TC. (2005). Relatório de Auditoria nº 31/2005 - 2ª Secção: Follow-up da concessão FERTAGUS Lisboa: Tribunal de Contas.
- TC. (2008). Relatório de Auditoria nº 10/2008 - 2ª Secção: Auditoria à Gestão das Parcerias Público-Privadas – Concessões Rodoviárias. Lisboa: Tribunal de Contas.

- TC. (2011). Relatório de Auditoria nº 22/2011 - 2ª Secção: Metro Sul do Tejo. Auditoria de seguimento. Lisboa: Tribunal de Contas.
- TC. (2012). Relatório de Auditoria nº 11/2012 - 2ª Secção: Auditoria ao contrato de concessão FERTAGUS. Lisboa: Tribunal de Contas.
- Van Ham, H., & Koppenjan, J. (2001). BUILDING PUBLIC-PRIVATE PARTNERSHIPS: Assessing and managing risks in port development. *Public Management Review*, 3(4), 593-616. doi: 10.1080/14616670110070622
- Vassallo, J. M. (2006). Traffic risk mitigation in highway concession projects: the experience of Chile. *Journal of Transport Economics and Policy*, 359-381.
- Vassallo, J. M., Ortega, A., & Baeza, M. d. l. Á. (2012). Impact of the Economic Recession on Toll Highway Concessions in Spain. *Journal of Management in Engineering* 28(4), 398-406. doi: doi:10.1061/(ASCE)ME.1943-5479.0000108
- Vaz, I. A. S. (2012). *As parcerias público-privadas: o caso da SCUTVIAS*. (Master Dissertation), ISCTE, Lisboa. Retrieved from <https://repositorio.iscte-iul.pt/handle/10071/4086>
- Villalba-Romero, F. J. (2014). Spain. In A. Roumboutsos, S. Farrell & K. Verhoest (Eds.), *COST Action TU1001 – Public Private Partnerships in Transport: Trends & Theory: 2014 Discussion Series: Country Profiles & Case Studies*. ISBN 978-88-6922-009-8.
- Villalba-Romero, F. J., & Liyanage, C. L. (2014). Radial 2 (R-2) Toll Motorway. In A. Roumboutsos, S. Farrell & K. Verhoest (Eds.), *COST Action TU1001 – Public Private Partnerships in Transport: Trends & Theory: 2014 Discussion Series: Country Profiles & Case Studies*. ISBN 978-88-6922-009-8.
- Voordijk, J. T. (2013). Coen Tunnel. In A. Roumboutsos, S. Farrell, C. L. Liyanage & R. Macário (Eds.), *COST Action TU1001 Public Private Partnerships in Transport: Trends & Theory P3T3, 2013 Discussion Papers Part II Case Studies*. ISBN 978-88-97781-61-5.