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Politics, Risk, and White Elephants in Infrastructure PPPs

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ABSTRACT

Theoretical research on cooperation between public and private partners in infrastructure projects suggests that they can be a tool for preventing white elephants. However, various case studies suggest that actual outcomes are largely dependent on the effective transfer of operational risk to the private partner. This paper explores policy and planning dysfunction, and the idea that private entities that participate in public-private partnerships (PPPs) with no substantial risk transfer, and under heavily subsidized schemes, may engage in lobbying and exert pressure to develop white elephant projects.

Keywords: PPP; political favoritism; infrastructure;

Declarations of interest: None

1 Introduction

In the social sciences, a ‘white elephant’ has been defined by Robinson and Torvik (2005) as an investment project that results in negative social outcomes and inefficient redistribution of wealth. Politicians may be drawn to these projects, and the idea that their inefficiency makes them attractive politically is gaining increasing attention in the economics literature (see Ganuza and Llobet, 2018). In practice, Spain stands very high (if not first) in the ranking of countries in which white elephants have been promoted and implemented by different governments of different ideological orientation and for transportation and other infrastructure projects (Bel, 2010; Albaladejo, Bel, and Fageda, 2015; Rodríguez-Pose, Crescenzi, and Casaldo, 2018).¹

Although public-private partnerships (PPPs) have long been seen as a potential filter for white elephants, warnings regarding the strict conditions for them to be effective have been voiced. Engel, Fischer, and Galetovic (2011:16) warn that “PPPs will not filter such projects out if they are financed with subsidies or if there is an implicit guarantee that the government will bail out a troubled concessionaire” (see also Iossa and Martimort, 2013:208).

In this regard, Bel, Bel-Piñaña, and Rosell (2017) actually show that Spanish governments have used not only public-only projects, but also PPPs to promote white elephants, using them to avoid short-term budgetary restrictions. The authors show that governments

¹ Occasionally, but less frequently, private investors have also promoted white elephants in Spain. In this regard, the provision of financial support by public financial entities has been a key factor in project development. The best-known case is that of the airport of Ciudad Real, where 1,100 million euros were invested, most of them financed by Caja Castilla-La Mancha (a regional savings bank of public ownership). The failure of the airport investment (together with failed housing loans) was the main factor leading to the Caja Castilla-La Mancha bankruptcy in 2009.

provide wide guarantees in case of concession failure, and illustrate the mechanism employed in cases involving toll motorways, a high-speed rail segment between Spain and France, and a natural gas storage facility. Several studies for other countries have shown how PPPs have been primarily used for financial motivations, and have frequently delivered unsatisfactory results (for instance, Shaoul, Stafford and Stapleton (2006, 2010) for the United Kingdom; Reeves (2013, 2015) for Ireland; Da Cruz and Marques (2012a), Da Cruz, Simões and Marques (2013), Macário, Ribeiro, and Duarte Costa (2015), and Oliveira, Ribeiro and Macário (2016) for Portugal; and Hellowell and Vecchi (2015) for Italy)

While studies of financial motivations and disappointing results are increasingly available in the literature, much less attention has been paid to the issue of private interests promoting privatization without regard of collective interests. However, as noted by Feigenbaum and Henig (1994: 191) privatization “often takes the form of a strategy to realign institutions and decision-making processes so as to privilege the goals of some groups over the competing aspirations of other groups”. On the empirical side, Miralles (2006) provides some evidence of private industrial interests promoting privatization in water distribution to transfer price burden to residential consumers. Overall, there is a lack of in-depth analysis of how and why political processes and lobbying combine to promote white elephants.²

In this paper, we contribute to the literature by showing that private partners in PPPs can lobby governments and the media to promote certain projects resulting in white elephants. Indeed, this is merely a logical consequence of PPPs not being able to filter out white elephants. If PPPs are financed with subsidies and/or the government provides a bail-out guarantee in case of trouble, obtaining such contracts can only yield profits.

². Dysfunctional planning, with accommodating strategies, satisfies the will of politicians by neglecting the objective welfare contribution of an infrastructure project.

We illustrate this claim by undertaking a study of the light rail (or fast tram) project implemented in the city of Barcelona. Barcelona's light rail system is arguably the infrastructure project that has generated most technical studies and attracted most media coverage in the metropolitan area in recent decades.³The project has elicited considerable sentiment both in favor and against its implementation, while confronting substantially different ideological views of just how the city should address mobility challenges. It is a project that has mobilized all major interest groups concerned with lobbying for a specific future vision of urban mobility and for transport investment decisions that favor their interests, while at the same time it holds up a mirror to the dysfunction that can characterize policy evaluation and decision-making processes.

The remainder of the paper is organized as follows. We next briefly review the literature on institutional PPPs, the organizational form taken by the public-private partnership of Barcelona's light rail system. We then document the context and implementation of the system's first lines. From there, we analyze the planning of the 'connection project' (*Tram-Diagonal*) to link these lines, and discuss the roles, incentives, and actions of the relevant actors in this process. Finally, we draw our main conclusions and policy implications.

2 Institutional PPPs. Related literature

There is much scholarly debate as to whether a collaborative partnership between the government and private actors can be considered a PPP or not. For instance, in the domain of industrial organization, the bundling of construction and operation phases and a substantial risk

³ Several studies on PPP and tramways are available in the literature (i.e. Carpintero and Petersen, 2014, 2015; Cruz, Marques and Pereira, 2015; Carpintero and Siemiatycki, 2016; Zheng and Phang, 2017, among others).

transfer to the private partner are common (see Albalate, Bel, and Geddes, 2017). One of the problems with applying a narrow definition is, for instance, that countries such as Spain would appear as not having recorded a single PPP since 1965, when the legislation instituted state financial liability for all concessions awarded (see, Albalate et al., 2016). In reality, daily business cannot be fitted to such narrow definitions. The European Union distinguishes three types of PPP: contract PPPs, concession PPPs, and institutional PPPs (European Commission, 2004). The latter include the shared public-private ownership of an organization or asset, with government and private partners each holding shares (Petersen, 2010).⁴

Institutional PPPs used to be referred to as partial privatizations,⁵ and continue to be referred to in this way (Bel and Fageda, 2010; Albalate, Bel, and Fageda, 2013). Such partnerships operate via mixed firms, partly government-owned and partly privately owned. Mixed firms operate under different legal frameworks in the European countries, and in the case of Spain, they operate under commercial law. As such, these firms lie outside the purely public or private dichotomy.⁶ In contrast to the contracts and concessions awarded to private firms, in mixed firms governments retain property rights over the company, so that they can exert ownership control (besides the control exerted by means of regulatory tools). Matsumura (1998) and Matsumura and Kanda (2005) stress that when a mixed company is under effective

⁴ Institutional PPPs can also appear as public partnership joint ventures (PPJV) in British scholarly studies (i.e., Andrews, Esteve and Ysa, 2014).

⁵ Indeed, collaborative agreements referred to today as PPPs have been conducted for many centuries (see Hodge and Greve, 2007)

⁶ In the United States, mixed public-private arrangements, both pure private firms and pure public units produce the service within a single jurisdiction (Warner and Bel, 2008). Mixed delivery is also found in Europe, but to a much more limited degree than in the US, and it is not comparable to the partially privatized firms that are more common in Europe.

government control, its managers are expected to pay more attention to the government's objectives and less to profit maximization. In a similar vein, mixed firms can provide a more adequate combination of incentives for cost reduction and quality enhancement compared to purely public or private firms (Schmitz, 2000).

A few multivariate empirical studies have analyzed the factors influencing the creation of mixed firms, and, as with full privatization, financial constraints appear to be of primary relevance (Albalade and Fageda, 2010; Albalade, Bel, and Fageda, 2014). However, the available evidence on the comparative performance of mixed firms is scant. In their seminal study, Boardman and Vining (1989:26) found that "partial privatization may be worse, especially in terms of profitability, than complete privatization or continued state ownership". In a more recent study, Boggio (2016) reported that mixed firms in Italy are less profitable but more technically efficient, than their public counterparts.⁷ Some evidence supports the argument that mixed firms actually combine the worst incentives of public and private ownership rather than the best, as suggested in Eckel and Vining (1985), and more recently (with specific reference to institutional PPPs) by Da Cruz and Marques (2012b) and Andrews, Esteve, and Ysa (2014).

Somewhat surprisingly, research on PPPs has paid little attention to issues related to political favoritism and the exploitation of political connections, perhaps because there is a belief that PPPs limit informal lobbying activities given the interests of the private parties (Koppenjam 2008). This view might be rooted in the idea that PPPs typically involve substantial risk transfers to the private actor. However, this neglects the possibility that private parties can lobby the government to reduce the amount of project risk transferred.

⁷ While the Boardman and Vining (1989) study dealt with all type of firms, Boggio (2016) dealt with firms delivering local public services.

More generally, awarding contracts or concessions to private actors is an area in which rent-seeking can take place because, according to Hart, Shleifer, and Vishny (1997), corruption and related rent-seeking forms are more closely related to the private production of services, while public production is more strongly associated with over-employment. Several practices might promote political connections and favoritism in the design and award of contracts and concessions, such as the 'revolving doors' between politics and big business, a fairly common phenomenon in Spain, as documented by Castell and Trillas (2013), whereby politicians holding high office are subsequently appointed to executive positions in large firms with government dealings (whether contractual or regulatory). In fact, Albalade et al. (2017) present evidence of favoritism and the exploitation of political connections in the awarding of urban water contracts in Spain. This practice is of particular interest in our research because in institutional PPPs private partners bear a much more limited degree of risk than in other types of PPP.

3 Barcelona's tramway: Context and building of first lines

The reintroduction of a modern light rail system, following the suppression of its predecessor in the 1970s (to provide more space for cars), can be traced to the end of the 1980s, when it emerged as a less expensive option (compared to extending the underground) for alleviating the growing congestion caused by an excessive dependence on motor vehicles. It was first mentioned in the strategic plan of the *Transport Metropolitans de Barcelona* (TMB) and in pre-feasibility studies for its implementation in the Diagonal-Baix Llobregat corridor (today known as *Trambaix*) drawn up by the now extinct *Entitat Metropolitana del Transport* (EMT). At the beginning of the 1990s, various studies were conducted that were integrated into a previous version of the Intermodal Transport Plan for Barcelona (PIT), which never gained official approval. Despite this, in 1997 the Barcelona City Council and EMT launched a pilot project for the construction of 600 meters of light rail infrastructure along Diagonal Avenue

(between Maria Cristina and Francesc Macià) in order to test various vehicle units developed by different rolling stock companies.

In that same year, studies for the extension of this new light rail network from Francesc Macià to Sant Adrià de Besòs and Badalona (today known as *Trambesòs*) were made and the project was awarded to the same group. The merger between the two mercantile corporations which, in fact, included the same group of companies, resulted in the creation of TRAM. Below, we report details regarding the shareholding structure of this firm.

Subsequently, both light rail networks were included in the Public Transport Infrastructure Plan (PDI) for 2001-2010 conducted by the *Autoritat del Transport Metropolità* (ATM), approved in April 2002.⁸ The *Trambaix* (AX12a) was incorporated within the construction process initiated in 2001, while *Trambesòs* and the connection between both networks along Diagonal Avenue (AX12b) formed part of the public tendering process already initiated by that date and the construction of which was initiated in 2003. No socioeconomic impact evaluation was included for the two interventions in the 2001-2010 PDI, while all other proposed interventions included their corresponding evaluation.

In fact, even ATM states that cost-benefit analysis provides the main criteria to prioritize investments, the decision for project inclusion is not conditional on any socioeconomic evaluation.⁹ Table 1 shows that 93% of the total budget assigned to the investment plan 2001-2010 and the 80% of the one for 2011-2020 were evaluated as welfare detrimental by the own

⁸ PDI 2001-2010 (https://doc.atm.cat/ca/_dir_pdi/PDI200110_julio2009/files/assets/basic-html/page-1.html).

⁹ ATM used a multi-criteria decision process to prioritize interventions; CBA places about 80% weight on the final score, which also includes financial results for the transit operator, potential accessibility gains, transit supply improvement, and equity considerations (see PDI 2001-2010 pp. 87-91).

promoting entity (Social Internal Rate of Return < Discount Rate), yet those interventions were included in the investment plan, and most of them have been built or are under construction.

Table 1. Socioeconomic ex-ante evaluation in the investment plans conducted by ATM

Interventions	Demand (pax/day)	Cost (M€)	IRRs*
<u>PDI 2001-2010</u>			
L1 El Prat	13,825	296.1	1.1%
L1 Montigalà-Badalona Centre	19,500	402.4	0.5%
L2 Sant Antoni - Parc Logístic	64,703	659.5	1.1%
L2 Pep Ventura - B. Centre	13,490	69.5	8.9%
L3 Canyelles - Trinitat Nova	22,797	140.5	3.6%
L4 La Pau - La Sagrera	37,990	277.6	4.8%
L5 Horta - Vall Hebron	36,687	286.3	3.8%
L9 Aeroport - Gorg / Can Zam	392,850	5,610.10	2.6%
FGC Pl. Espanya – Gràcia	60,000	294.8	7.4%
FGC Terrassa Rambla - Can Roca	19,630	294.3	1.8%
FGC Sabadell Rambla- Ca n’Oriac	19,041	384.5	1.1%
Funicular Esparreguera – Olesa	1,000	4.5	1.8%
L3 Zona Universitària - Sant Feliu	56,633	1,055.30	0.6%
L6 Reina Elisenda-S. Joan de Déu	11,598	187	1.8%
SAG Ciutat Meridiana	5,800	49	3.5%
TPC corredor de Caldes	16,202	120.7	3.3%
<u>PDI 2011-2020</u>			
L3 Zona Universitària - Esplugues	24,500	160.5	1.3%
L3 Trinitat Nova – Trinitat Vella	14,135	81	8.4%
L4 La Pau – La Sagrera	43,690	277.6	5.7%
L9/L10 Aerop./Z.F. – La Sagrera	335,950	2,721.2	3.0%
L8 Pl. Espanya – Gràcia	60,000	270	8.0%
FGC Terrassa Rambla–Nac. Uni.	21,985	302.6	2.2%
FGC Can Feu – Ca n’Oriac	21,325	322.4	1.5%
FGC Cua maniobres Pl. Catalunya	22,700	75	5.6%
Connexió Tramvia Diagonal	117,365	168.1	44.4%
T3 Laureà Miró	4,600	17.3	4.6%
* Note: All interventions showing a Social Internal Rate of Returns (IRRs) below 4% (equivalent to the discount rate assumed) are welfare detrimental based on ATM computations. Source: excerpt of tables 5.1 and 5.2 for PDI 2001-2010; 12.1 and 12.2 for PDI 2011-2020.			

This suggests that socioeconomic evaluation is perceived as a superfluous element in the planning process. The procedures adopted serve to reinforce the idea that planning instruments may, on occasions, be used simply to formalize predetermined political decisions.¹⁰

The political debate at that time records that the building of the light rail system in the Baix Llobregat area was born out of the refusal to extend the Metro (subway) to municipalities neighboring Barcelona because of the high costs and lower levels of demand. Specifically, the 2001-2010 PDI justified the introduction of light rail on the grounds that Barcelona's metropolitan area required a new transportation mode that offered a capacity somewhere between that of the subway and the bus lines in order to structure the territory and provide higher transit supply levels in corridors along which standard buses were deemed insufficient. In short, a complete disregard was shown for any operational or prioritizing interventions before investing in the transport infrastructure.

During the corresponding construction works, a number of contingencies emerged that resulted in project modifications and complementary works that caused the total investment to rise to a total of 300.4M€ for *Trambaix* and 264.5M€ for *Trambesòs*, that is, cost overruns of 38 and 32%, respectively. As shown in Table 2, the ex-post socioeconomic impact evaluations conducted for the new infrastructure plan (PDI 2011-2020) assigned a Social Internal Rate of Return (IRRs) of 11.9% to *Trambaix* and 0.2% to *Trambesòs*, based on a simplified cost-benefit

¹⁰ To the best of our knowledge, only Trambesòs included some form of evaluation as part of study entitled "Projecte de traçat del tramvia Glòries – Besòs. Estació del Nord / Vila Olímpica – Glòries – Fòrum 2004 – Sant Adrià de Besòs /Badalona", conducted by SENER in 2001. This study assigned the project an internal rate of return of 4.5%, which highlights the risk associated with the intervention should deviations in inputs or other expectations occur.

analysis method that failed to include all relevant social costs correctly.¹¹ That this evaluation also failed to include ex-ante figures for purposes of comparison, as it did for other interventions implemented under PDI 2001-2010, adds further weight to the conclusion that the decision-making process lacked adequate policy evaluation.

Table 2. Socioeconomic ex-post evaluation of the PDI 2001-2011 investment plan conducted by ATM

	Investment cost (M€)		Operation cost (M€)		Demand (pax/day)		IRRs	
	Initial	Actual	Initial	Actual	Initial	Actual	Initial	Actual
L11 Trinitat Nova – Can Cuiàs.	33,7	49	0,64	2,22	5.800	7.850	9,1%	3,7%
Trambaix	<i>n/a</i>	300,4	<i>n/a</i>	11,4	<i>n/a</i>	55.932	<i>n/a</i>	11,9%
Trambesòs	<i>n/a</i>	264,5	<i>n/a</i>	11,1	<i>n/a</i>	23.364	<i>n/a</i>	0,2%
Aeri Olesa Montserrat – Esparreguera	3,1	4,5	0,17	0,16	1.000	324	8,2%	-2,1%
L3 Canyelles – Trinitat Nova	<i>n/a</i>	140,4	<i>n/a</i>	1,9	<i>n/a</i>	13.200	6,6%	2,5%
Tram 4 línies L9 / L10	434	1266,6	10,4	10,9	89.000	28.930	10,8%	2,0%
L2 Pep Ventura – BDN Pompeu Fabra	103,6	62,4	5	1	16.100	15.370	9,0%	14,2%
L5 Horta - Vall d’Hebron	119,4	311,4	2,38	2,7	33.250	31.200	17,0%	3,5%

* Note: All interventions showing a Social Internal Rate of Returns (IRRs) below 4% (equivalent to the discount rate assumed) are welfare detrimental based on ATM computations. Data described as not available by the project promoter is marked as “*n/a*”.

Source: Constructed from the data available in section 4 of the PDI 2011-2020 (p.21-24).

Both *Trambaix* and *Trambesòs* began operating in 2004 (and both full lines are in operation since 2008), while the connection along Diagonal Avenue was proposed in PDI 2001-2010 together with various extensions out into the metropolitan area. The current Tramway network in Barcelona consists of six operating lines (three in each side of the separated networks) adding up 29.1Km and carrying 28M passengers in 2017 (18.2M the *Trambaix* and 9.7M the *Trambesòs*). Ridership just reached demand levels forecast in post-construction updates of the contract, progressively closing in over time from the initial deviations between 15% and 5% during the ramp-up phase (2004-2010). The fact that ex-ante demand forecasts are

¹¹ PDI 2011-2020 https://doc.atm.cat/ca/dir_pdi/PDI201120_pdi_novembre2013/files/assets/basic-html/index.html#1

not available to the project's own promoter (see rows Trambaix and Trambesòs in table 2) makes it impossible to give any insight on true expected demand deviations from the moment the decision to greenlight the project was made.

Regarding financial data, that information is not publicly provided by the operator or the regulator (ATM). However, the annual report *Observatorio de la Movilidad Metropolitana* (Ministerio de Fomento, the Spanish Ministry of Public Works and Transportation) provides some data on revenues from passengers, subsidies and operational costs, which we have used to build the table below. The last annual report was published in 2017, and financial data have a two-year lag, so that last figures we have available are for 2015. Table 3 presents financial data on the Barcelona Tramway since 2008, the first year of full operation of both concessions.

Table 3. Financial data of Barcelona Tramway (2008-2010)

	2008	2009	2010	2011	2012	2013	2014	2015
Revenues from passengers (M€)	10.60	11.43	11.77	11.88	12.44	12.53	13.07	13.35
Subsidies (M€)	44.75	46.98	46.45	48.46	49.05	45.06	53.18	51.78
Operational cost (M€)	25.20	26.73	27.29	29.48	30.71	29.35	29.52	<i>n/a</i>
Revenues from PAX/OpCost (%)	42	43	43	40	41	43	44	<i>n/a</i>
Revenues PAX/ (Rev+Subsidies) (%)	19	20	20	20	20	22	20	20
Subsidies/OpCost (%)	178	176	170	164	160	154	180	<i>n/a</i>
Passengers (M)	23.2	23.9	23.8	24.2	23.7	23.8	24.5	25.4
Subsidies/Passenger (€)	1.9	2.0	2.0	2.0	2.1	1.9	2.2	2.0

Notes: Rev + Subsidies does not include other minor revenues (i.e. advertising), for which data are never provided. Data for Operational Costs are not provided for 2015. Not available data is described as “*n/a*”. Source: Ministerio de Fomento (several years) for financial data. ATM for passenger data.

Data in Table 3 show that revenues from tariffs are much lower than subsidies, and its rate of recovery (with respect to operational costs) is low and stable. The ratio of subsidies to operational costs is substantial, and several times higher than that of other metropolitan mass transportation services in the metro area of Barcelona, such as urban bus and subway. Furthermore, the subsidy per passenger in the tramway is around two euro (twice the price per

trip in the tariff most frequently used by passengers -T10-), and stable; that is, subsidy per passenger in the tramway is several times higher than that in urban bus and subway [financial data for urban bus and subway in Barcelona can be also found in the annual reports of the *Observatorio de la Movilidad Metropolitana* (Ministerio de Fomento, several years)].

4 The Connection project (*Tram-Diagonal*): planning process

In 2005, a cost-effectiveness study of the connection of the two networks along Diagonal Avenue was presented by an NGO (*Plataforma pel Transport Públic – PTP*) devoted to the defense of public transport. This self-denominated public transit lobby, which had supported the implementation of the light rail network from the outset, actively engaged with civic actors, policymakers, and other institutional representatives in its promotion.

In 2008, different public bodies, in the face of opposition from groups of Barcelona residents and commercial associations, reactivated the connection project by conducting studies to determine an alternative route to that of the Diagonal Avenue. In 2009, the City Council (led by the Socialist Party of Catalonia-PSC) initiated a participative process culminating in a referendum the following year to determine the preferred solution. The referendum included different street reform layout configurations as shown in Figure 1: (a) a boulevard, (b) a *rambla*, or (c) neither of the two (keep it as it is), where options ‘a’ and ‘b’ implicitly associated the implementation of the light rail with a specific configuration, while option ‘c’ made no explicit reference to tramway implementation and was demanded by the parties opposing to the tramway connection. Option ‘c’ received almost 80% of the votes (with a little less than a 12% turnout), in what was a resounding defeat for the city government, who had actively sponsored the connection project. The local government crisis led to the resignation of the councilor in charge of the referendum (Carles Martí) and the manager of information systems (Pilar Conesa).

It also led to political and media backlash at a time of economic recession. The PSC lost the mayoral seat against CiU in the 2011 local election.

Figure 1. Example of the options (a) and (b) included in the referendum for Diagonal Avenue's reform

OPTION (a) : Boulevard

OPTION (b) : *Rambla*



After the referendum, many more studies of possible connections were undertaken, each of them involving an analysis of the socioeconomic impact of the light rail intervention. These highlight the continued dysfunctionality. On the one hand, the policy evaluation was conducted after the planning process. On the other, its focus was limited to the alternative layouts, following the backlash faced in the referendum and the opposition of the new Mayor (2011-2015).

The figures generated (investment, demand, travel time savings and CBA estimates) were repeatedly used in the public debate by the different project promoters as support for the suitability of given interventions. Table 4 summarizes the main inputs and results of the various

studies undertaken. It also names the entities that commissioned the studies and the study authors. All of these studies shared both the inputs and demand modeling methodologies provided by ATM. Substantial discrepancies in the welfare outcome of the connections result from altering the underlying assumptions and the specific reference values applied. By way of example, all the evaluations disregard the potential increase in traffic congestion resulting from the allocation of road lanes to the light rail system.

Table 4. Summary of the cost-benefit analysis studies for the connection of Trambaix and Trambesòs.

Study	Investment (M€)	Demand (pax/day)	Demand shift (cars)	Travel time savings (h/day)	IRRs (%)	Author
TRAM (2011)	175.8	140,000	3,780	9,678	17%	MCRIT
ATM (2013) – PDI	168.1	190,000	10,800	9,585	44%	ATM
ATM-DTES (2012/14)						IDOM TYPESA
(central s/c.bus)	142.3	177,857	13,318	8,570	56%	
(lateral)	181.8	213,216	13,318	8,570	47%	
Aj.BCN (2016) Preliminary study	175.0	222,000	12,500	3,416	11%	MCRIT
ATM-BIMSA (2017). Informative Study	414.1	227,394	12,475	5,552	10%	GPO SENER TYPESA

Note: Only studies made by the public administration and by concessionaires are included.

In 2015, with a new municipal government in office, led by *Barcelona en Comú* (BenC, post-communist left), the City Council resumed the project to connect both light rail networks (*Trambaix* and *Trambesòs*), with Diagonal Avenue as its preferred route. The first step in this new procedure was to commission twelve new studies of different dimensions of the project, including transit demand modeling (IDOM–ATM), a traffic assignment model (DOYMO), an environmental impact study (BR) and a socioeconomic impact evaluation (MCRIT). All of these studies went under the general heading of ‘Preliminary Study’, representing the first official project milestone in the process from planning to execution. To coordinate this work, the Council appointed a specific team led by the Coordinator of the Tramway Network Connection Project (TNCP). Later in 2016, the City Council signed a cooperation protocol with the Regional Government for the development of the light rail network connection. The Council also appointed a Strategic Director of TNCP to head up dialog and coordination between the

different public administration bodies (including the aforementioned government bodies and respective public entities, such as ATM and TMB).

The cooperation protocol led to an agreement between ATM and the City Council to commission an 'informative study' of the connection, a legal requirement prior to initiating any construction project. The informative study included an analysis of different layout proposals and their corresponding socioeconomic impact evaluations in order to help decision-makers identify the best alternative. The study was undertaken by a group of companies that included GPO, SENER, and TYPESA, and that had participated in studies in previous planning stages. The informative study relied fully on data from preliminary studies as inputs for its socioeconomic impact evaluation and reported quite similar findings since only slight changes were made to the original hypothesis.¹² The study was made public in June 2017; a time period was initiated for the public to raise any objections while the Council awaited approval from the Regional Government with regard to its environmental impact evaluation.

In that period, a review of the study's socioeconomic impact evaluation was made public (see Albalade & Gragera, 2017). This revealed a number of significant methodological flaws and errors of the input data that seriously compromised the validity of the study's welfare impact evaluations. These were the outcome of a peer-review process of studies conducted in 2016 by various academic researchers and commissioned by the Economics Department of the Regional Government, later enhanced with the access to further data details not facilitated during the first peer review.¹³ Both external evaluations were later submitted to ATM and DTES at the end of

¹² Interestingly, investment costs doubled as did the saving in transit users' travel times. No major changes were made in the light rail layout or in its operational services.

¹³ Some of the main criticisms raised were: (1) it only considered layout options and disregarded any potential improvements in the bus network's operational management (even the transit demand model

that same year before the informative project was concluded. Those criticisms would later constitute formal objections to the informative study raised during the public information process by the political parties and civil sector organizations, but all objections were dismissed, and no changes were made.

5 The connection project: relevant players, incentives, and actions

The construction of Barcelona's light rail network was promoted by the Catalan Regional Government in the late 1990s, led by the political party *Convergència Democràtica de Catalunya* (CDC). Two figures played an important role here: Mr. Pere Macias (CDC), regional minister for Public Works and Transportation during the period of project promotion, and his successor Mr. Felip Puig (CDC), regional minister during the period in which most of the construction work was completed (2001-2003).

Tramvia Metropolità was awarded the contract for the first light rail line in Barcelona, that of *Trambaix*, and later it would be awarded the contract for the second line, *Trambesòs*. This single purpose vehicle was originally constituted by a large number of shareholders, the main ones being three construction companies owning more than 40% of the firm's shares (FCC: 19.3%, Comsa: 12.4%, and Acciona: 10.5%), and a rolling stock company, Alstom, that

showed that increasing the commercial speed could yield far greater travel savings than the light rail connection); (2) it included spurious travel savings accounting for 94% of total social benefits (70% of total savings are below 1 minute); (3) no investment cost overruns or full project life-cycle emissions were taken into account; (4) it disregarded any potential increases in traffic congestion due to road allocation to the light rail; (5) car travel reduction was wrongly computed disregarding new transit network time savings spatial distribution; and (6) many inputs were matched to non-binding Urban Mobility Plan objectives, as if these were a direct result of a valid forecasting process (self-fulfillment of transit and traffic demand trends).

owned 25%. Among the minor shareholders were two banks (Banc Sabadell: 5%, and Société Générale: 1%), two public firms that operate surface transportation services (TMB and *Ferrocarrils de la Generalitat* (FGC), both with 2.5%), and a private bus service operator (Soler & Sauret: c. 20%).¹⁴

Carpintero and Petersen (2015:39, Table 1) show how the contracts for construction and operation might be articulated. In the case of the Barcelona light rail, construction companies undertook the building of the infrastructure; the rolling stock company provided the trams and was responsible for their maintenance; operation companies were in charge of running the tramline.¹⁵ Overall, the contracts specified a rate of return for investment in *Trambaix* and *Trambesòs* of 6.54 and 6.84%, respectively, as indicated in clause 3.2 of the final version of their contracts, and a rate of return of 10% was granted for operational expenses incurred by the concessionaire (Bel, Bel-Piñaña, and Rosell, 2017:154).

The first president of *Tramvia Metropolità* was Mr. Albert Vilalta, who had been the regional minister of environmental affairs (CDC) until 1996, and later Vice-Minister of Public Works in the Spanish Government (until 2000). During his presidency (2000-2011), the tram company was active during the campaign for the referendum held in 2010. The concessionaire funded trips to visit cities with similar tram systems and produced a video in favor of the

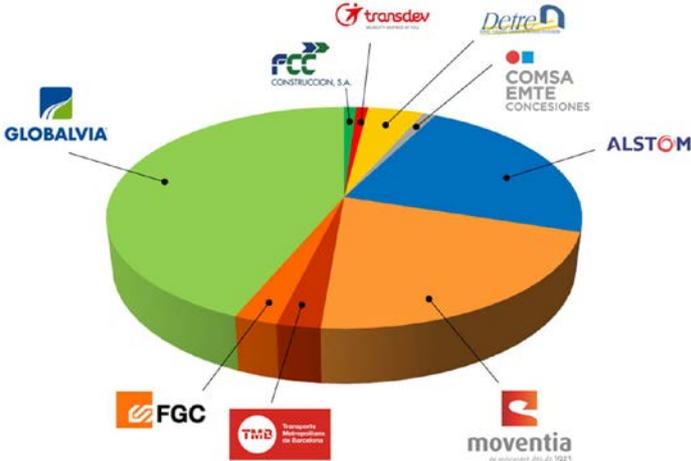
¹⁴ Shareholding percentages may have undergone marginal changes because of the sequential process of concessions, and the way in which the shareholding (with identical members in both) was structured.

¹⁵ Carpintero and Petersen (2015) define such contracts as ‘unbundled’. However, the way in which they are structured and the way they operate in practice means they could also be categorized as ‘bundled’ contracts, insofar as the concessionaire was responsible for making decisions with regard to construction and operation.

connection options to the tune of 200,000 euros. The tramway CEO justified the company's involvement based on that it “has the right to improve its business”.¹⁶

Vilalta was replaced in 2011 as president by Mr. Josep Maria Culell (CDC), who had formerly been the regional minister of Public Works and Transportation (1980-83; 1993-94) and regional minister of Finance (1983-87). His mandate extended until 2014, and in this period, in 2013, a major change took place in the shareholding structure. As a result,¹⁷ the main shareholders became Globalvia, Moventia, Alstom, Detre, FCC Construcción, COMSA EMTE, and Transdev, while the two public firms, TMB and FGC, retained their minor ownership share of 5% in total. While the ownership of the construction companies appeared to have fallen sharply, this was not, in fact, the case as FCC owned 50% of Globalvia. Figure 2 shows the current shareholder distribution.

Figure 2. TRAM Company ownership share structure (source: www.tram.cat)



¹⁶ See <https://www.elperiodico.com/es/barcelona/20100415/el-tranvia-paga-la-campana-de-herreu-sobre-la-diagonal-262666> (retrieved July 24, 2018).

¹⁷ See https://elpais.com/ccaa/2013/09/26/catalunya/1380222950_994613.html (retrieved July 24, 2018)

As mentioned, the city government elected in 2015 was heavily committed to the connection and one of the first steps it took was to appoint Mr. Oriol Altisench as Coordinator of the TNCP. At that time, Altisench also held the post of Dean of the Civil Engineers Association, a professional organization and influential lobby in the infrastructure sector and extremely active in promoting public works. Later, in 2016, the City Council appointed Mr. Pere Macias as Strategic Director of the TNCP. Macias, who had been the regional minister that promoted the tramway in the late 1990s, is also President of the *Cercle d'Infrastructures* Foundation (an interest group that lobbies in favor of the promotion of infrastructure projects). His appointment was seen as a strategy for influencing the position of Macias' party (CDC, later re-named PDeCAT) in the City Council, which had been strongly opposed to the connection project.

Other changes were made to the tramway company. In late 2016, Mr. Felip Puig was appointed as president. He had been the regional minister under whom work on the tramway had been completed in 2001-2003, and again he was a member of the regional government (CDC) between late 2010 and early 2016, less than a year before his appointment to the presidency of the firm (of which the regional government is the regulator).¹⁸

Once again, the tramway company appeared active in the political process that took place in spring 2018 in relation to the tramway connection, in a race promoted by the city mayor to obtain a majority in the city council in favor of the connection. The city government used different tools to publicize the project, among them a city-wide survey paid for by the tramway firm¹⁹, here again on the assumption that it was entitled to foster its business, as it had argued

¹⁸ See: <http://elvigia.com/felip-puig-nuevo-presidente-de-tram/> (retrieved July 24, 2018)

¹⁹ See: <https://www.naciodigital.cat/noticia/150772/enquesta/tramvia/difosa/ajuntament/va/pagar/empresa/tram> (retrieved July 24, 2018)

in the 2010 referendum campaign. However, in April 2018 a majority of city council members rejected the project; which seemed to put an end to the debate.... but on February 2019 a new decision was taken by the city council, now with a majority of councilors in favor of the tram connection. This decision has been made conditional to a set of conditions that had not been met when the previous negative decision had been taken (April 2018). The practical concretion and development of the new agreement have been postponed at least until 2020, which means that the tramway connection will keep being an issue in the municipal agenda of Barcelona after the next local election on 26 May 2019.

6 Discussion

Despite the various studies and reports published, proof of the positive social returns of the tramway connection is unconvincing. Indeed, many doubts remain about the viability of the project and numerous reasons can be identified to question the outcomes reached by the reports: not least because of design faults in the planning process, the technical quality of the studies themselves, and the private interests represented by lobbyists promoting the project.

Indeed, the tramway network has apparently been subject to all manner of political favoritism, a trend that has been exacerbated in recent years both at the city government level and at that of the firms involved. The city council considered the project an important milestone in its urban mobility mandate, while the private company saw an opportunity to extend its network and business without having to take on any significant risk. Thus, both parties to the PPP agreement pushed hard to remove the obstacles hampering approval of the new tramway connection. Clearly, the contractual conditions guarantee the profits of the concessionaire, a mixed firm with only residual government ownership. Indeed, little was to be changed with the enlargement of the network, as it would provide additional profits at no risk to the private party and little or no gain to the public administration's treasury. In fact, the investment would

generate an additional operational deficit. As such, it should come as little surprise that the concessionaire was highly active in promoting the connection project, both in the referendum process of 2010, as well as in the decision-making process played out in recent years.

The role of the revolving door between government and top executive positions in the mixed firm on favoritism is notable. From the outset, the presidents of the mixed firm had all previously served as prominent members of the regional government that pioneered the promotion of the project (CDC). Indeed, the current president was precisely the regional minister involved in the initial development of the network between 2001-2003, highlighting the fact that connections between the public institutions engaged in the project and the mixed firm have been the norm.

This case study illustrates the importance of risk transfer in the design of PPPs, an element that is incorporated precisely to create appropriate incentives to enhance efficiency gains and to avoid opportunistic behavior by the parties involved. To avoid these pitfalls, it is necessary to go back to the roots of PPPs as performance-based contracts. PPPs are typically defined as a long-term contracts between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance.²⁰ If the private initiative bears the risk, especially demand risk - and remuneration is effectively linked to performance (this is, the contract includes rewards and also penalties)-, it is highly unlikely they will want to get involved in white elephants.

However, if the project does not entail any significant demand risk for the private party, incentives will exist for it to promote any type of project, some of which can eventually become

²⁰ Definition obtained from the World Bank's Public-private-partnership legal resource center available at <https://ppp.worldbank.org/public-private-partnership/> For the relationship between risks and contracts, see also Marques and Berg (2011a, 2001b).

white elephants. These occur at the expense of the taxpayer and the user that ultimately bear these risks. For this reason, PPPs cannot be considered superior in terms of project evaluation or better filters of sound investments without an exhaustive analysis of and meaningful approach to risk allocation. Barcelona's tramway connection is an illustrative case of infrastructure planning dysfunction in which incentives were aligned for the active promotion of a white elephant project, to society's detriment, despite its being managed and governed by means of a PPP.

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