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"Privatization and PPPS in transportation infrastructure: Network effects of increasing user fees"

Daniel Albalate and Germà Bel

de Recerca en Economia Aplicada | *Research Institute of Applied Economics*

Institut de Recerca en Economia Aplicada Regional i Pública
Research Institute of Applied Economics
Universitat de Barcelona
Av. Diagonal, 690 • 08034 Barcelona

WEBSITE: www.ub.edu/irea/ • CONTACT: irea@ub.edu

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Abstract

Problem: Public-private-partnerships in transport infrastructure characteristically increase user-fees. PPP projects are usually considered as isolated facilities, even though in most cases they belong to a network. Hence, the network effects of the use of PPPs and increased tolls tend to be neglected.

Purpose: We aim to identify the network effects of the use of PPPs and increased user tolls in road infrastructure. We empirically examine and demonstrate network effects due to network infrastructure pricing, and draw lessons for users and planners. To do so, we focus on the effects of pricing on users of alternative roads, paying special attention to traffic composition and safety.

Methods: We study the increases in user tolls on motorways due to the use of PPPs in the US. To show the effects of user tolls, we also examine micro data for toll motorways in Spain and assess the consequences of pricing and PPP design for the Spanish road network.

Results and conclusions: Among other things, the monetization of motorways is associated with an increase in toll levels that has consequences for their users, and also for the rest of the sections of the network. We show that pricing high-quality roads without considering their role inside the road network increases volumes of heavy traffic and accidents on non-tolled lower-quality alternative roads. Analyzing the network as a whole, and not just the PPP section, we see that toll increases due to PPPs have negative consequences in terms of efficiency, traffic composition, and road safety.

Takeaway for practice: Policy makers who decide to impose tolls on the best roads should invest more in maintenance and quality elsewhere in the system in order to improve safety in the adjacent alternative routes which receive traffic diverted from the tolled motorway. An alternative for regulators is internalizing accident externalities by lowering tolls to improve safety in the corridor.

***Keywords*: Private-Public-Partnerships; Monetization; Toll Roads; Networks.**

Daniel Albalate (albalate@ub.edu) is assistant professor of economics at the University of Barcelona, Spain. His research focuses on Privatization and Regulation, and Transportation and Infrastructure. Mosher Award 2009 (American Society for Public Administration) for the Best Academic article.

Germà Bel (gbel@ub.edu) is professor of economics at the University of Barcelona, Spain. His research focuses on Privatization and Regulation, and Transportation and Infrastructure. Mosher Award 2009 (American Society for Public Administration) for the Best Academic article.

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1. Introduction

On June 2011 Goldman Sachs (55%) and Spain's largest toll road operator - Abertis (45%)- have won the bid to operate two Puerto Rico toll roads. The winning consortium will pay US$ 1.08 billion for the lease, which makes this deal the third largest public-private partnership involving existing toll roads in the US, after the Indiana Toll Road lease in 2006 (US$ 3.85 billion) and the Chicago Skyway lease in 2005 (US$ 1.83 billion). The concession length is for 40 years, and tolls are set to rise annually by Consumer Price Index plus 1.5%. Because of this, the real price (CPI adjusted) of those toll roads will increase by 79% by the end of the concession period (real price would double in 48 years).

Indeed, the fiscal restrictions that governments face are the leading drivers of privatization and public-private-partnerships worldwide. In the past, US local governments made extensive use of contracting out policies in order to ease fiscal constraints. Recently, public-private-partnership[1] contracts in state-wide transport infrastructure have been implemented, with the same aims in mind: to raise money, to undertake necessary investments, and to rely more on user fees than on budgetary funding.

However, policy makers usually make the assumption that PPP infrastructure projects are isolated facilities, when the fact is that they belong to a network. This myopic approach has important consequences for the management and planning of the network as a whole which must be borne in mind in order to make the appropriate decisions for PPP design.

This article reviews recent monetization operations in network infrastructure services in US, focusing in particular on transportation projects where PPP agreements have been used the most. We examine the effects and challenges for planners of these policies with regard to the design and management of contracts, equity impacts and the political acceptability of pricing, and the externalities generated and internalized by the user fee approach.

In the second part of the study we also examine the experience of Spain, a pioneering country in the world to privatize its road transport infrastructure network, in order to empirically examine the network effects of infrastructure pricing and its consequences for users and planners. To do so,

[1] See Siemiatycki (2010) for a detailed typology of PPPs

we use micro data for toll motorways in Spain and trace the consequences of their pricing and PPP design for the Spanish road network.

This exercise highlights the limitations of the current approach to PPP contracts for network infrastructure in the US and their potential consequences for planners and users. Among other things, monetization is associated with an increase of toll levels which has consequences not only for its users, but for the rest of the network sections as well. Equity considerations and political interests may also affect its implementation and its network effects. In fact, we show that pricing transport infrastructure such as roads without considering their network nature has negative consequences in terms of efficiency, traffic composition, and road safety when the whole network, not only the PPP section, is analyzed.

This article provides the necessary tools for understanding and deriving maximum benefit from private participation in infrastructure projects, while avoiding the common pitfalls that may undermine its success.

2. PPPs and monetization in the US

Toll roads represent a small fraction of all limited access roads (divided highways) in the US. Out of 68,000 miles of limited access roads US (of which 47,000 miles belong to the Interstate Highway System, or IHS), just over 8% are tolled (Cox and Love, 1996). Whereas most of the roads in the IHS were built and are maintained by gasoline taxes collected by the Federal and State governments, there are also around 3,000 miles of HIS tolled motorways, such as the Indiana Toll Road, the Pennsylvania Turnpike, the New Jersey Turnpike, and the Chicago Skyway. These motorways were built and financed by State and municipal governments and agencies. Only a very small number of toll roads in the US, such as the Dulles Greenway (connecting Washington DC, Dulles Airport and Leesburg, Virginia) have been built, owned, or operated by the private sector.

Public-private-partnerships have been increasingly used in recent years in many public services in the US, and particularly in transportation services (Albalate, Bel and Geddes, 2011). There are several reasons for the use of public-private-partnerships, the most important of which are the financial restrictions on State and local governments. Many governments have sought to obtain private funds (Hodge and Greve, 2007) either to undertake necessary investments or to use them for other purposes related to public finance. For their part, private investors have shown interest in transportation services, and in particular in toll motorways, which present desirable investment characteristics such as long-term deals and increasing revenues. Within this context, several privatizations of toll motorways have been implemented in the US. Two illustrative examples are the Chicago Skyway and the Indiana Toll Road.

The Chicago Skyway

The Chicago Skyway is a 7.8-mile long elevated roadway and ½ mile bridge facility that connects the western end of the Indiana Toll Road with the non-tolled Dan Ryan Expressway, which provides access to downtown Chicago. The City of Chicago built and financed the Chicago Skyway in the mid-1950s, at a cost of US$ 101 million (1958; US$ 764 million at 2010 prices). It was opened for traffic in 1958.

Between 2001 and 2004 the Chicago authorities spent US$ 250 million to rebuild much of the Skyway. In early 2004 the City government decided to lease the Skyway to a private operator, the main aim being to raise cash by means of an upfront concession rent, which was to be used by the City to fund various municipal needs. In March 2004 a Request of Concessionaire Qualifications was issued as the first step in the privatization process. Bids from several qualified bidders were received by the City in October 2004. The winning bid was made by the consortium formed by Cintra Concesiones de Infraestructuras de Transporte S.A. (a Spanish toll motorways operator) and Macquarie Investment Holdings (an Australian investment company).

The concession transaction was completed in January 2005. **Table 1** below presents financial and corporate information on the Chicago Skyway both before privatization and about privatization[2]. The Skyway concession was structured to maximize the concession price. The City of Chicago obtained US$ 1.83 billion; this amount was 63.1 times its EBITDA (earnings before interest, depreciation and amortization), a multiplier much larger than that obtained in contemporary motorway privatization in other countries such as France (Bel and Foote, 2009). After privatization, tolls on the Skyway will increase well above the CPI until 2017 according to the pre-established toll schedule, and after 2017 tolls can be adjusted annually by 2%, by the change in CPI, or by the change in nominal GDP per capita, whichever is the largest.

[*Insert table 1 about here*]

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[2] Detailed information and analysis on the Chicago Skyway privatization can be found in Enright (2006) and in Bel and Foote (2009).

The Indiana Toll Road

The State of Indiana built and financed the Indiana Toll Road (ITR) during the 1950s. The toll motorway opened for traffic in stages, east to west, between August and November 1956. It is 157 miles in length and runs across the northern part of Indiana between the borders with Ohio and Illinois. The toll motorway was operated by the Indiana Toll Road Commission between 1956 and 1981, and was then taken over by the Indiana Department of Transportation.

In 2005 the Indiana government decided to privatize the ITR and in September of that year a Request for Toll Road Concessionaire Proposals was issued. As in the case of Chicago Skyway, the State's main reason for privatizing the ITR was to obtain an upfront concession rent. In contrast to Chicago, though, the objective was to use the upfront payment to partially fund a ten-year statewide transportation improvement program. The State received four qualified bids in January 2006. As in the case of the Chicago Skyway, a consortium of Cintra Concesiones de Infraestructuras de Transporte S.A. and Macquarie Investment Holdings was the winning bidder, with a bid of US$ 3.85 billion.

In June 2006, the concession transaction was completed and full operating responsibility for the toll road was transferred to the concessionaire Indiana Toll Road Concession Company. The lease agreement included a non-compete clause whereby no 20-mile stretch of road within 10 miles of the Toll Road may be upgraded to a 4-lane divided highway for at least 55 years. The agreement also has a provision that allows Cintra-Macquarie to be compensated if other road upgrades or any action by the State reduces the income from the toll road. Table 1 presents financial and corporate information on the Indiana Toll Road both before privatization and about privatization. After privatization tolls can be adjusted annually by 2%, by the change in CPI, or by the change in nominal GDP per capita, whichever is the largest.

So both the Skyway and the Indiana Toll Road have this mechanism for adjusting the tolls annually by 2%, by the change in CPI or by the change in nominal GDP per capita. According to Bel and Foote (2009), this will imply an important increase of tolls in real terms in the future.[3] Concessionaires on both toll motorways enjoy strong monopolistic characteristics, which give them significant latitude to set tolls in order to maximize profits; they have no incentives to set tolls to optimize regional mobility or to internalize externalities. Consequently, diverting traffic to alternative routes is a likely outcome on both the Skyway (Bel and Foote, 2009) and the ITR

[3] Macroeconomic indicators in the US show that CPI growth is lower than nominal GDP/capita growth. In the 10 years before the Skyway privatization, CPI was higher than nominal GDP/capita only in 2002.

(Johnson, Luby and Kurbanov, 2007). Therefore, from the regional perspective and with regard to external effects, residents in the regions served by the roads are likely to lose out with toll motorway privatization.

3. Network externalities in parallel roads

Because roads are part of a network, it is not surprising that public intervention on traffic flows affects alternative routes. As an illustration, it has been shown that changes in speed limits on one set of roads affect the average speed not just on these roads but also on the surrounding roads (Richter et al., 2004; Friedman, Barach and Richter, 2007), as well as traffic distribution (McCarthy, 2003).

In turn, as is well known, tolls on high capacity roads shift road users who are not willing to pay for the use of the best road (the so-called 'rat-running' drivers). Even when the quality and safety standards of the toll motorway are higher, tolls encourage widespread diversion onto minor routes (May and Milne, 2000). According to Verhoef et al. (1996) this shift is positively related to the elasticity of demand and negatively related to the quality of the adjacent road.[4] Some road users, then, would have used the best road if it had been free (or less expensive) and consequently, price increases imply a higher use of low quality roads with relative time delays for road users and potential safety loss in the corridor. Several studies have estimated the price elasticity of demand. Although it is dependent on several route-specific features, **Table 2** (which displays some of the most relevant estimates in the literature) helps to identify a mean range of expected elasticities for toll motorway projects.

[Insert table 2 about here]

Because of the re-routing effect, some government reports and recent academic research have expressed concern about the safety consequences of charging or increasing tolls without high quality alternatives. For instance, the Department for Transportation Feasibility Study of Road Pricing in the UK stressed that "the impact of re-routing […] could in certain places and at certain times result in an increase in accident levels. This is due to the increased number of vehicles using smaller roads, not built for a high level demand, which could lead to higher accident rates" (Department for Transport, 2004; p.143). Broughton and Gower (1998) estimated that a 10 per

[4] As the quality gap between the two roads becomes greater, the more inelastic is the demand for the tolled motorway.

cent diversion of motorway traffic from the motorways in Kent (UK) would increase the number of injury accidents in the entire county by about 3½ per cent.[5]

In an empirical study, Albalate (2011) confirmed this concern for the Spanish motorway network, finding a price elasticity of accidents involving victims on substitute roads of 0.5. This result implies that we should expect higher numbers of road crashes in low quality alternative roads after toll increases, due to the shift of road users. Furthermore, traffic diversion seems to have a more pronounced effect in the case of commercial traffic, particularly heavy vehicles which are more sensitive to price increases. Rothengatter (2004) claims that after setting tolls for heavy vehicles in Austria, truck traffic was diverted onto streets and roads. This diversion of heavy vehicles is another source of concern if we consider that they heighten the risks for the rest of drivers on low quality roads adjacent to the tolled motorway.

Against this background, we would expect the increase of tolls associated with the monetization of a motorway to affect not only toll revenues in the sections in question but also traffic distribution across substitute roads, that is, alternative routes that belong to the same road network. These impacts can be summarized as the shift of a share of traffic onto alternative routes. The magnitude of this effect will depend on the quality gap between the toll motorway and the free alternative, but this re-routing is bound to increase the traffic on low quality alternative roads, with high percentages of heavy vehicles due to their higher price elasticity. The Spanish experience with motorway privatization which we describe in the following section can serve to illustrate this situation.

4. Illustration: Spain as the pioneer of motorway privatization

The Spanish transportation system is unique in the European context. Among its distinctive features are a mixed funding model for motorways, which implies the existence of a significant share of motorways that are tolled and operated by private concessionaires, and a significant share of free motorways under public responsibility and funding.[6] This mixed situation does not correspond to a unified, planned model, but reflects the various stages through which transport

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[5] A previous study by Gower et al. (1998) suggested that a toll of 2.5p per mile (at 1994 prices) would produce a 10% diversion level. Linked to this, Broughton and Gower (1998) estimated that this increase in the traffic flow would increase the number of injury accidents in the entire county by about 3.5 per cent, taking into account traffic flows and alternative road capacities.

[6] The presence of toll motorways is significant in other European countries such as France, Greece, Portugal and Italy. However, in these countries almost the whole the network is tolled, while in Spain we find significant shares of both funding models.

policy has passed in Spain.[7] The first motorways were awarded to the private sector by the dictatorship in the late 1960s and early 1970s due to the lack of public resources for funding the investments needed. A second stage began in the early 1980s when the first social-democratic governments launched a program for investing in a new network of free motorways, while maintaining the private concessions wherever they were in operation. These two periods gave shape to the current mixed funding network, together with a new-found enthusiasm for toll funding in the late 1990s and the new century, which implied the award of new toll motorways.

Because of this mixed funding network, the Spanish experience offers the variability necessary to illustrate the concerns related to the use of tolls in a motorway network with both toll and free alternatives. For this reason, in this section we compare parallel roads with one free or tolled motorway (a high capacity road) and a free low quality adjacent alternative (termed *national roads* in Spain) in order to illustrate network effects. In this way, we expect to identify traffic diversion patterns, particularly regarding heavy vehicles, and the consequences for safety outcomes. **Table 3** displays information for adjacent pairs of the control stations established by the Spanish General Traffic Directorate. These stations collect data on traffic volume (average daily traffic), their distribution (share of heavy vehicles) and safety outcomes in terms of accidents involving victims for a 14 km section (7 km before and after the location of the control station). The selection of these check points was based on the existence of adjacent alternatives for interurban motorways.[8]

[Insert table 3 about here]

This exercise provides interesting insights into the network effects described above. By comparing route level data, distinguishing by type of road, one can see that the average daily traffic distribution is highly dependent on the charging characteristic of the motorway (the best quality road). In this respect, free national roads adjacent to toll motorways enjoy (relatively) more traffic than free national roads adjacent to free motorways. This diversion is produced by the toll placement, given that the quality gap between the two types of road is significant. In some cases, for instance on the routes León-Astorga (AP-71), Lalín-Santiago (AP-53) and Fuengirola-San Roque (AP-7S), we even find more vehicles on the free low quality road than by the toll motorway. As can be seen in the fourth column, these toll motorways are the most expensive routes. We

[7] See Bel and Fageda (2005) for a fuller description of these stages in the Spanish motorway sector.

[8] Access and urban motorways were not considered in the sample because their urban features and traffic patterns could distort the effects we want to identify.

also observe that in the case of routes where there are no significant time savings, for instance in the case of the corridor Barcelona-Lleida (AP-2) with a time loss ratio (see the fifth column) of 1.06, the market share for both roads (tolled and untolled) is around 50% each.

As regards the distribution of heavy vehicles across both alternative roads, the data collected by the control stations provide a clear picture of how market share is determined by motorway pricing. While national roads adjacent to toll motorways receive more than 40% of the heavy vehicles driving in most of the corridors considered, when the motorway remains free of charge this share drops sharply, as these vehicles shift onto the high quality road. For the most expensive motorways the share between the two roads is close to a 50% split; this is also influenced by the time loss ratio, since values around 2.0 are correlated with larger percentages of traffic on the high quality motorway.

The final analysis facilitated by the data in **table 3** is that of safety outcomes by type of road. Once we correct the number of accidents involving victims per 14 km section by traffic (accidents with victims per section and corrected per thousand vehicles), we find that national roads always suffer more accidents per traffic received than toll and free motorways. Given the larger amount of traffic using these low quality alternatives, particularly heavy vehicles, it is easy to estimate the death or injury toll established on roads adjacent to toll motorways. Where free motorways are available, most drivers can avoid the most dangerous routes.

5. Conclusions and recommendations

PPPs are being increasingly used in transport infrastructure in the US. The cases of the Chicago Skyway and the Indiana Toll Road, together with the recent deal for two Puerto Rico's toll motorways – the three largest privatizations of government-owned motorways in the US–, show that monetization is usually linked to increased user fees. This may create negative external effects with regard to congestion and driver safety.

This article emphasizes the need to treat roads as network services in the design and management of PPP contracts. We provide the necessary tools for understanding and deriving maximum benefit from private participation in infrastructure projects, and highlights factors associated with the expected increase in tolls. This allows us to indicate ways of avoiding the most common pitfalls that can undermine the success of the project and the undesired consequences that can make the planners' work more difficult or even impossible. The Spanish experience, based on a mixed funding model with free and toll motorways, provides an illustration of how charging for the use of the best roads can affect traffic distribution, heavy vehicle route choice, and safety outcomes.

Our findings have important public policy implications in the field of transportation and infrastructure management. Policy makers deciding to make use of PPPs and increase tolls on the best roads should invest more in maintenance and quality in order to improve safety in the adjacent alternative routes which receive traffic diverted from the tolled motorway. In this regard, non-compete clauses usually embedded in PPP agreements should – at least – make an exception for improvements aimed at increasing safety in the alternative routes.

An alternative for regulators and transport managers is the internalization of accident externalities by lowering tolls so as to improve safety outcomes in the corridor. In our framework, priced-off drivers diverted onto lower quality roads are more likely to suffer accidents; the policy of imposing tolls on the best infrastructures without taking this effect into consideration may increase overall accident rates.

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TABLES

Table 1: Financial and Corporate pre-privatization and privatization information on Chicago Skyway (2004) and Indiana Toll Road (2005).

	Chicago Skyway 2004	Indiana Toll Road 2005
Established in	1958	1956
Network length (miles)	7.8	157
Ownership Structure	100% City of Chicago	100% State of Indiana
Workforce	130	590
Gross Revenues	US$ 41.1 million	USD 98.6 million
EBITDA	US$ 29 million	USD 64 million
EBITDA/Gross Revenues	70.5%	64.6%
Concession length	99 years	75 years
Concession price	US$ 1.83 billion	US$ 3.85 billion
Price as multiple of EBITDA	63.1	60.2
Tolls increase	Pre-scheduled until 2017. Thereafter, greater of 2%, change in CPI or change in nominal GDP per capita	Greater of 2%, change in CPI or change in nominal GDP per capita

Note: EBITDA: Earnings before interest, depreciation and amortization.

Sources: Bel and Foote (2009), City of Chicago Financial Reports, Indiana East-West Toll Road Financial Analysis (Crowe Chizek and Company LLC, March 7, 2006), and Indiana Toll Road Request for Toll Road Concessionaire Proposals.

Table 2. Toll elasticity of demand provided by relevant empirical studies

Study	Estimate	Motorways studied
Weustefield and Regan (1981)	-0.03 / -0.31	16 Toll Facilities in the US
Goodwin (1988) (quoted in May, 1992)	-0.45	Literature review
Jones and Hervik (1992)	-0.22 / -0.45	Ring roads in Norway
Harvey (1994)	-0.10	Toll Motorway Everett, New Hampshire, USA.
Mauchan and Bonsall (1995)	-0.25 / -0.40	Simulation West Yorkshire, UK
Wilbur Smith and Associates (1995)	-0.1 / -0.35	Toll Motorway Facilities, USA.
Hirschmann et al. (1995)	-0.09 / 0.50	Bridges and Tunnels NYC area, USA.
TRACE (1997)	-0.22 /-0.35	Frence Toll Motorways (>100 Km)
UTM (2000)	-0.20	Toll Motorway New Jersey, USA.
Burris et al. (2001)	-0.03 / 0.36	Lee County, Florida, USA
Matas and Raymond (2003)	-0.21 / -1.31	Interurban Toll Motorways, Spain
Asensio and Matas (2005)	-0.13 / -0.34	Urban Motorways in Barcelona
Álvarez, Cantos and Garcia (2007)	-0.54	Access Toll Motorways to Madrid, Spain
Odeck and Brathen (2008)	-0.45 / -0.82	19 Norwegian road projects

Table 3. Comparison between Motorways and their alternatives. Traffic, composition and safety outcomes by route

HIGH CAPACITY ROUTE	TRAFFIC (Average Daily Traffic)			PRICE (Cents €/Km)	TIME LOSS RATIO (Minutes Free/Minutes Tolled)
	Toll Motorway	Free National Road	Free Motorway		
Barcelona-La Jonquera (AP-7)	58.778	23.677	-	8.7	1.40
Barcelona-Valencia (AP-7)	41.433	20649	-	10.3	1.78
Valencia-Alacant (AP-7)	30.253	18.040	-	8.5	1.82
Barcelona-Lleida (AP-2)	44.314	39.707	-	8.6	1.06
Lleida-Zaragoza (AP-2)	14.538	12.683	-	8.6	1.66
León-Astorga (AP-71)	5.233	10.934	-	10.3	1.63
Lalin-Santiago (AP-53)	5.632	6.675	-	12.6	1.54
Fuengirola-San Roque (AP-7S)	18.024	32.432	-	11.1	1.40
Jerez-Dos Hermanas (AP-4)	26.464	12.029	-	6.2	1.70
Tui- A Coruña (AP-9)	31247	19.346	-	8.6	2.05
Murcia-Albacete (A-30)	-	1.247	14.335	0	1.67
Sevilla-Zamora (A-66)	-	3.763	11.293	0	1.72
Huelva-Ayamonte (A-49)	-	9.726	14.762	0	1.39
Valladolid-Portugal (A-62)	-	1.076	10.476	0	1.96
Benavente-Ourense (A-52)	-	2.793	10.446	0	1.74
Benavente-León (A-66)		3.549	10.964	0	1.24
Torrelavega-Santander (A-67)	-	13.825	68.662	0	2.04
Zamora-Valladolid (A-11)	-	2.183	6.946	0	1.37
Véjer-Chiclana (A-48)	-	13.507	12.912	0	1.32
Ourense-Ponteares	-	5.672	18.276	0	2.04
HIGH CAPACITY ROUTE	% HEAVY (Market share for heavy vehicles)			PRICE (Cents € /Km)	TIME LOSS RATIO (Minutes Free/Minutes Tolled)
	Toll Motorway	Free National Road	Free Motorway		
Barcelona-La Jonquera (AP-7)	85%	15%	-	8.7	1.40
Barcelona-Valencia (AP-7)	64%	36%	-	10.3	1.78
Valencia-Alacant (AP-7)	54%	46%	-	8.5	1.82
Barcelona-Lleida (AP-2)	44%	56%	-	8.6	1.06
Lleida-Zaragoza (AP-2)	36%	64%	-	8.6	1.66
León-Astorga (AP-71)	37%	63%	-	10.3	1.63
Lalin-Santiago (AP-53)	49%	51%	-	12.6	1.54
Fuengirola-San Roque (AP-7S)	49%	51%	-	11.1	1.40
Jerez-Dos Hermanas (AP-4)	42%	58%	-	6.2	1.70
Tui- A Coruña (AP-9)	71%	29%	-	8.6	2.05
Murcia-Albacete (A-30)	-	5%	95%	0	1.67
Sevilla-Zamora (A-66)	-	14%	86%	0	1.72
Huelva-Ayamonte (A-49)	-	23%	77%	0	1.39
Valladolid-Portugal (A-62)	-	8%	92%	0	1.96
Benavente-Ourense (A-52)	-	8%	92%	0	1.74
Benavente-León (A-66)		20%	80%	0	1.24
Torrelavega-Santander (A-67)	-	26%	74%	0	2.04
Zamora-Valladolid (A-11)	-	26%	74%	0	1.37
Véjer-Chiclana (A-48)	-	51%	49%	0	1.32
Ourense-Ponteares	-	15%	85%	0	2.04

HIGH CAPACITY ROUTE	ACCIDENTS (Number of accidents involving victims per section and corrected by 1,000 average daily traffic)			PRICE (Cents € /Km)	TIME LOSS RATIO (Minutes Free/Minutes Tolled)
	Toll Motorway	Free National Road	Free Motorway		
Barcelona-La Jonquera (AP-7)	0.03	0.10	-	8.7	1.40
Barcelona-Valencia (AP-7)	0.03	0.06	-	10.3	1.78
Valencia-Alacant (AP-7)	0.03	0.11	-	8.5	1.82
Barcelona-Lleida (AP-2)	0.03	0.03	-	8.6	1.06
Lleida-Zaragoza (AP-2)	0.02	0.04	-	8.6	1.66
León-Astorga (AP-71)	0.01	0.08	-	10.3	1.63
Lalin-Santiago (AP-53)	0.01	0.03	-	12.6	1.54
Fuengirola-San Roque (AP-7S)	0.02	0.04	-	11.1	1.40
Jerez-Dos Hermanas (AP-4)	0.01	0.05	-	6.2	1.70
Tui- A Coruña (AP-9)	0.02	0.05	-	8.6	2.05
Murcia-Albacete (A-30)	-	0.03	0.01	0	1.67
Sevilla-Zamora (A-66)	-	0.06	0.02	0	1.72
Huelva-Ayamonte (A-49)	-	0.06	0.02	0	1.39
Valladolid-Portugal (A-62)	-	0.12	0.03	0	1.96
Benavente-Ourense (A-52)	-	0.03	0.02	0	1.74
Benavente-León (A-66)		0.04	0.03	0	1.24
Torrelavega-Santander (A-67)	-	0.05	0.05	0	2.04
Zamora-Valladolid (A-11)	-	0.02	0.01	0	1.37
Véjer-Chiclana (A-48)		0.04	0.02	0	1.30
Ourense-Ponteares	-	0.04	0.01	0	2.04

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Institut de Recerca en Economia Aplicada Regional i Pública
Research Institute of Applied Economics

Universitat de Barcelona
Av. Diagonal, 690 • 08034 Barcelona

WEBSITE: www.ub.edu/irea/ • **CONTACT:** irea@ub.edu