TRAFFIC RISK IN TOLL MOTORWAY CONCESSIONS IN SPAIN: AN ANALYSIS OF THE RAMP-UP PERIOD

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Abstract

This paper analyzes the behaviour of actual traffic versus the traffic declared by the concessionaire in its offer in toll motorway concessions in Spain during the first few years of operation (ramp-up period). We obtain the result that, on average, there is a clear bias towards overestimation though the behaviour of any single concession may not have much to do with the average. In addition, we found that unlike what happens with annual traffic volumes, traffic growth rates are mostly underestimated by concessionaires in the ramp-up period. We explain this trend towards overestimation in the strategic behaviour of the bidders in the tender rather than in systematic modelling errors. The cause of this strategic behaviour lies in the willingness to renegotiate as shown by the government of Spain when actual traffic turns out to be lower than expected.

INTRODUCTION

Many governments are implementing new ways to encourage private participation in constructing, financing, and operating transport infrastructure. One of the most common ways to boost private participation is through the concession system, which consists basically of transferring construction, maintenance, and operation of the infrastructure to a private consortium, in exchange for which that consortium receives the right to charge a user fee, for a period of time, fixed or variable, as contractually agreed upon in advance (Vassallo, 2004). Concession contracts have a long tradition in some countries, such as the United Kingdom (Debande, 2005), Spain (Izquierdo and Vassallo, 2004), France (Fayard and Bousquet, 1998), Chile (Gómez-Lobo, 2000) and Mexico (Guasch, Laffont and Straub, 2003). Presently, the United States is testing the concession contract model to manage transport infrastructure and monetize valuable transport assets (Foote, 2006). According to Public Works Financing (2003), the number of public-private transport projects contracted in 2003 in the world totalled 1,137, which means an accumulated investment of US$351.6 billion.

Concessions are long-term contracts that are tendered on the basis of competition among several bidders. One of the main challenges of concessions contracts is to set up a correct risk-sharing framework between the private and the public sector. Concession contracts bear many risks, such as construction, expropriation, maintenance and operation, legal, political and so on (Flyvberg, Bruzelius and Rothengatter, 2003). Traffic risk resulted to be one of the most important risks as well as most difficult to manage. Although road traffic inaccuracy has been analyzed in several studies (Bain and Plantagie, 2004; Flyvbjerg, Skamris and Buhl, 2005); these studies put together in the same sample different kind of roads and motorways placed in different countries, which are granted and regulated under very different approaches.

The aim of this paper is to analyze the behaviour of actual traffic compared to the traffic declared by the concessionaire in the tender during the first few years of operation of the concession (ramp-up period) in order to explain the causes of the deviations. To that end, we have collected information about motorway concessions granted in Spain from the late 60s up to the present. This paper adds to the literature two issues; first, an analysis of the relationship between the government's willingness to renegotiate and the

overestimation of traffic in greenfield motorway concessions; and second, an analysis of traffic behaviour in the ramp-up period.

The first section of the paper analyzes the relationship between traffic risk allocation and renegotiation. The second section deals with toll motorway concessions in Spain, particularly regarding traffic risk and renegotiation. The third section deals with the research methodology, describes the empirical analysis, and presents the principal results. The fourth section discusses the main consequences stemming from the results. As a preliminary summary, we found that the traffic level declared by the concessionaire in the tender is substantially higher than real traffic in the ramp-up period though this overestimation tends to diminish over the years.

RENEGOTIATION AND TRAFFIC RISK

Guasch (2004) demonstrated that concession contract renegotiations are quite common. This study shows that 54.7% of the transport projects in the sample were renegotiated. The study also shows that renegotiation can be prompted not only by the concessionaire, but also by the government. The concessionaire initiated 57% of the renegotiations in the transport sector while 27% and 16% were started by the government and by common agreement respectively. Guasch's study also shows that renegotiations are much more common in those concessions awarded competitively than in those concessions awarded through direct negotiation. This result can be interpreted as an empirical explanation of what is called "the winners curse" (Capen, Clapp and Campbell, 1971) where aggressive bids associated with inflated traffic forecasts lead to low bids by the concessionaire. Once the contract is secured, the concessionaire assumes the government will renegotiate the agreement if traffic is lower than expected.

Three factors may cause what we call the "asymmetrical behaviour of traffic risk" (see Figure 1). These factors are; first, a competitive procurement mechanism to grant concessions, which encourage bidders to be aggressive; second, a government willing to renegotiate in the future in order to keep its reputation; and, third, a concession contract that allocates the whole traffic risk to the concessionaire. If traffic turns out to be higher than expected, the concessionaire will make large profits and the government will be happy because the concession is working well whilst users still have to pay. However, if

traffic is much lower than expected, the concessionaire will put great pressure on the government to force a renegotiation. Quite often, governments yield in these situations since they prefer to renegotiate rather than to lose their reputation. This asymmetrical behaviour entails a "vicious cycle" in the concession tender since competition to be awarded concession contracts is fierce (see Figure 2). This "vicious cycle" explains why, if governments show a historical track record of renegotiation, bidders will be encouraged to inflate their traffic forecast to justify aggressive offers in order to increase their possibilities of winning the tender.

The empirical results up to date shows how traffic forecasts for greenfield toll motorway concession projects, which are often awarded competitively, present a consistent bias towards overestimating traffic. A study conducted in 2005 by Standard & Poor's (S&P) reveals that forecasters overestimate first year traffic by 20%-30%. Beyond the first year, the study shows that optimism bias and error measurement statistics remain constant through years 2-5 (Bain and Polakovic, 2005). According to these studies, traffic forecast errors for toll motorways seems to be consistently in a range between 0.20 and 0.30 in terms of standard deviation.

Flyvbjerg et al. (2005) carried out a large study comparing real traffic with forecasts for 214 road projects in 14 countries—most of them free roads. Unlike the S&P study, this study showed almost no bias towards overestimation, even though they reported forecasting errors (standard deviation = 0.44) even greater than the S&P study. The difference of overestimation between these two studies can be based on the different nature of the roads. The study by Flyvbjerg et al. focuses mainly on free roads where traffic estimations are mostly conducted by the public sector. However, the study by Standard and Poor's focuses its sample on motorways concessions where bidders have to submit their traffic estimations. In the latter case, the bidders have an incentive to submit aggressive offers, especially if the government's willingness to renegotiate is notorious.

The two studies above show large values of the standard deviation, which demonstrate the difficulty in forecasting traffic for greenfield projects for both the government and the private sector. However, the level of overestimation considerably varies between concessions and free roads. We postulate that the consistent trend towards

overestimating traffic risk in greenfield toll concession projects is mostly caused by the strategic behaviour of bidders in the tender as a consequence of the vicious cycle previously described.

MOTORWAY CONCESSIONS IN SPAIN

History

Spain has long experience in the implementation of toll motorway concessions. This fact has prompted the passage of specifically relevant laws throughout these years. The first legislation passed in Spain was mainly concerned with motorway concessions, and did not include other kinds of public infrastructure. Recent legislation broadened the scope of concessions to other kinds of infrastructure. Figure 3 shows that, since 1967, the Spanish Central Government has granted 32 motorway concessions. In 2006, a total of 2,700 km were awarded and 2,300 km of that total were already in operation.

There are three different periods in the history of toll motorway concessions in Spain (Vassallo and Sánchez, 2006): from 1967 to 1975, from 1976 to 1995, and from 1996 to 2005. Each one of these periods entailed significant legal reforms. From 1967 to 1975, 15 motorway stretches were awarded, which means almost 50% of the concessions granted in Spain up to date. The first set of toll motorway concessions were awarded through specific legislation approved by the government for each concession. The toll motorway regulation became much more stable in 1972 when the Toll Motorway Concession Law (*Ley 8/1972 de Autopistas en Regimen de Concesión*) was passed by the Spanish Parliament. This Law allowed motorway concessions to enjoy several advantages compared to other industries; these included loan guarantees, and exchange insurance provided by the State for those loans denominated in foreign currencies. These guarantees turned out to be very costly with the rise of gas and diesel prices, a result of the two oil price hikes of 1973 and 1979. These caused traffic growth to be lower than expected and currency exchange rates became unstable.

The second period lasted from 1976 to 1995. This period coincided with a historical stage well-known in Spain as the “transition to democracy”, which took place after Franco’s death. During this period, mostly by a government under the Socialist Party, infrastructure funding policy in Spain changed radically. The socialist government was

reluctant to implement toll concessions (see Figure 3) for two reasons. First, there was the negative experience derived from the effects public guarantees in concessions had caused to the public budget. And second, there was the socialist government's conviction that road transport should be free of charge. Instead of toll motorways, the socialist government opted for modernizing the Spanish road network by widening and upgrading the most important roads, turning them into double-track fast lanes with quality standards well below those for toll motorways. In 1988 a new Law, the Roads Law (*Ley de Carreteras*), was passed by the Spanish Parliament. This law did not really consider motorway concessions, but it abolished some advantages included in the Toll Motorway Concession Law of 1972 such as government loan guarantees and the government exchange rate insurance.

The third period lasts from 1996 to 2005. During this period including the present time, the European Union has been forcing its member states to comply with strict convergence criteria (public deficit, inflation, interest rates, and so on) if they wished to join the Euro single currency. This is the reason why the Popular Party carried out a substantial reform concerning the funding of infrastructure. The first aim of these measures was to recover macroeconomic stability in Spain without constraining infrastructure investment by reactivating the concession model. Between 1996 and 2004, fifteen new concession motorway stretches were awarded. This new trend towards private funding was reinforced by a new Public Works Concession Law, passed in 2003, which widened and updated the old Toll Motorway Concession Law passed in 1972. The objectives of this Law were, among others, to update the old motorway concession model and extend it to every type of public works (courts, prisons, hospitals and similar structures), to reinforce the contribution of private financing for constructing and maintaining public facilities, and to improve the legal framework by defining a new risk-sharing approach (Vassallo and Gallego, 2005). In 2004, the Socialist Party was once again elected to government. Unlike what happened a few decades before, they decided to incorporate the concession mechanism in its program as a means of financing public infrastructure.

Renegotiation of Concession Contracts in Spain

Concession contract renegotiations have been common in Spain. The aim of these renegotiations were mostly to re-balance the economics of the concession, so as to allow

for additional investments imposed by the government, modifications of the tolls contractually agreed in the contract, or to take account of actual traffic levels that turn out to be much lower than what was expected. Very often, these renegotiations have implied substantial extensions of the pre-established duration of the original contract. In some cases, contract extensions have meant a doubling of the length of the concession originally agreed in the contract. This has happened, for instance, in four concessions in Spain (Montmeló–El Papiol, Burgos–Armiñón, Sevilla–Cádiz and Bilbao–Zaragoza).

Renegotiations in Spain have often been prompted by a shortage of revenues caused by too optimistic traffic forecasts. As concession contracts in Spain are awarded on the basis of competitive procurement, the bidders often play the strategy of bidding aggressively in order to be granted the concession, no matter how slim the likely profit, in the hope, and expectation, that the government will be willing to renegotiate in the near future. This way, the bidders have tended to inflate traffic forecasts to justify their own initial, quite aggressively-priced financial offers. This behaviour, corresponding to the "vicious cycle" previously described, has been unfortunately fairly common in motorway concessions in Spain.

The legislators, conscious of the renegotiation problems caused by many toll motorway concession contracts, decided to implement a mechanism to mitigate traffic risk. This mechanism was defined in the 2003's Public Works Concession Law (Vassallo and Gallego, 2005). One of the first objectives of implementing this mechanism was to limit renegotiations to specific events agreed upon in the contract, and to discourage initial bids that were wildly optimistic and therefore obviously very likely to need to be renegotiated later on.

RESEARCH METHODOLOGY AND EMPIRICAL ANALYSIS

Objectives and Methodology

The main goal of this research was to analyze the behaviour of traffic deviations (actual traffic compared to the traffic declared by the concessionaire in its offer) in toll motorway concession contracts in Spain, particularly the first few years of operation of the concession (the ramp-up period). During this period, the users are getting used to the new infrastructure so traffic growths turns out to be unusually high. The end of the

ramp-up period occurs when traffic stabilizes and becomes more in line with traffic patterns observed in other comparable roads (Bain and Wilkins, 2002).

First, we studied traffic overestimation in toll motorway concessions in Spain. According to our hypotheses, we should expect that concessionaires overestimate traffic due to the willingness to renegotiate demonstrated by the Spanish Government. Second, we wanted to discover the behaviour of the deviations throughout the first three years of the concession. Three, we considered the question whether the trend towards overestimating traffic follows a similar pattern in all the concessions. And fourth, we attempted to study the behaviour of traffic growth rates during the ramp-up period. This research is useful for several reasons. First, it could confirm the hypothesis that the government willingness to renegotiate can encourage traffic overestimations. And second, it enables us to know the traffic behaviour of greenfield motorway concessions during the ramp-up period.

The methodology used in this research is based on comparing actual traffic with the traffic declared by the concessionaire in motorway concessions in Spain. To that end, two indicators are defined. The first indicator, which we call "Annual Traffic Deviation", shows the level of estimation, whether over or under, of actual traffic in year t compared to the traffic declared by the concessionaire in year t. This indicator is calculated according to equation (1).

$$AD_t^j = \frac{RY_t^j - FY_t^j}{FY_t^j} \cdot 100 = \left(\frac{RY_t^j}{FY_t^j} - 1 \right) \cdot 100 \qquad (1)$$

where:

AD_t^j: Annual traffic deviation for year t and concession j

RY_t^j: Real traffic intensity (annual average daily traffic in year t for concession j)

FY_t^j: Declared traffic intensity (annual average daily traffic in year t for concession j)

If $AD_t^j > 0$, traffic predictions were underestimated whereas if $D_t^j < 0$, traffic predictions were overestimated.

The second indicator, which we call "Traffic Growth Rate Deviation", estimates the difference between the real and the forecasted annual traffic growth rates. Equations (2) and (3) show the way in which the real and the estimated growth rates are calculated. Equation (4) shows how the "Traffic Growth Rate Deviation" is calculated for the growth rate between year t and year t+1 and for concession j.

$$R\delta^{j}_{t/t+1} = \frac{RY^{j}_{t+1} - RY^{j}_{t}}{RY^{j}_{t}} \cdot 100 \quad (2)$$

$$F\delta^{j}_{t/t+1} = \frac{FY^{j}_{t+1} - FY^{j}_{t}}{FY^{j}_{t}} \cdot 100 \quad (3)$$

$$GR^{j}_{t/t+1} = R\delta^{j}_{t/t+1} - F\delta^{j}_{t/t+1} \quad (4)$$

If $GR^{j}_{t/t+1}<0$, this means that the actual annual growth rate from year t to year t+1 was lower than expected. If $GR^{j}_{t/t+1}>0$, this means that the actual annual growth rate in year t was higher than expected.

Data

The actual Annual Average Daily Traffic (AADT) for each concession was easily obtained from the databases that are published every year by the Secretary of Public Works (*Ministerio de Fomento*) of the Government of Spain. The last issue of this publication includes data up to 2005. This is the reason why this research compares traffic flows until 2005.

However, it was much more complicated to obtain the estimated traffic information since this information is included in the financial plans that were submitted by the bidders to the government in the tender. Thanks to the collaboration of the Concession Unit of the Secretary of Public Works, we were able to dig into the financial plans presented by each one of the concessionaires. Those financial plans included, in some cases, the traffic predicted. Due to the difficulty in gathering this information, this is the first time that an analysis of this type was conducted for toll motorway concessions in Spain.

We were not able to collect traffic data from all the concession contracts awarded in Spain. Ten financial plans submitted by the concessionaires, especially the oldest ones,

are not available. Three concessions (Villalba – Villacastin, Villacastin – Adanero and Bilbao – Behobia) did not include traffic estimations in their financial plans. And five concessions did not start their operation in 2005. This is the reason why our database was able to deal with 14 motorway concessions out of the 32 already granted in Spain. It is important to highlight that all the motorway concessions included in the sample were awarded before the 2003 Concession Law was passed by the Spanish Parliament. Consequently, in these concession contracts, no traffic risk mitigation mechanism was included.

Table 1 shows a classification of the number of concessions analyzed, sorted by the political party then in power, and the legislation applicable when the concession was awarded. From an overall view, the sample data covers 43.75% of the whole population, which is a good representation. It is notable that the representation of the sample is particularly good for concessions awarded by the Popular Party under the 1972 Toll Motorway Concession Law.

Results

Figure 4 shows the evolution of the annual traffic for the Tarragona – Valencia concession, which is the one in our sample with the longest track record. The trend towards overestimation that can be observed in this Figure represents quite well what happened in many concession contracts in Spain. This concession started its operation several months before schedule, but the level of traffic during the first year was much lower than expected. We wondered how the concessionaire was able to survive with a level of traffic that was barely 50% of what was predicted. The answer is that the concession was renegotiated several times throughout the years due, among other reasons, to its low level of traffic. As a consequence of those renegotiations, the duration of the concession was extended twice. The length of the original concession, agreed to in the contract, was 26 years. Right now, the current concession duration has been extended to a period of 45 years.

Table 2 shows annual traffic deviations (AD_t^j) and traffic growth rate deviations ($GR_{t/t+1}^j$) for the 14 concessions in the sample. Annual traffic deviations were estimated for the first three years of operation for each one of the motorways in the sample. Figure

5 shows in graph form the evolution of annual traffic deviations in the ramp-up period for those concessions for which data was available for the three first years. Traffic growth rate deviations were estimated for both the growth rate between year 1 and year 2, and for the growth rate between year 2 and year 3.

Taking a look at the annual traffic deviations, it is noticeable how 13 out of 14 concessions analyzed overestimated traffic during the first year of the concession and during the ramp-up period. On average, for the first year traffic was overestimated around 40%. In other words, real traffic during the first year of the concession was around 60% of what was declared by the concessionaires. We observe how this trend towards overestimation of traffic is also common for the second and the third years of the concession. This fact shows how there is a clear bias towards traffic overestimation in the ramp-up period. We believe that the main cause of this trend has to do with the perverse incentive provoked by the "vicious cycle" shown in the previous section.

However, annual overestimation seems to diminish throughout the second and the third year. Comparing the ten concessions for which we have data for the first three years (see the row mean for 10 concessions), we see how the average overestimation decreases from -35.18% in the first year to -31.34% in the second year and to -27.06% in the third year. We presume that the cause of this lies in the difficulty of knowing the user's reaction in the very first year of operation of a greenfield motorway. Once a project is factored into the users' daily calculations, the deviations tend to be smaller.

Looking at the standard deviations of AD_t^j for year 1, 2 and 3, we find that it increases throughout the years. This means that traffic deviations of the concessions are closer to each other in year 1 than in year 2 and year 3. In fact, for the ten concessions sample (see row SD for ten concessions), the standard deviation is 27.93% for year 1, 33.84% for year 2 and 35.01% for year 3. This means that, even though the farther into the future the year under discussion, the better on average is the initial prediction, the farther the year, the more different is the behaviour of the concessions in the sample.

Analyzing the behaviour of traffic growth rates deviations ($GR_{t/t+1}^j$), Table 2 shows how, unlike annual traffic, on average, traffic growth rates are mostly underestimated

(4.57% for the 1/2 growth rate and 8.32% for the 2/3 growth rate). However, for this indicator, the behaviour of deviations was not as clear cut as annual traffic deviations. From year 1 to year 2, seven concessions underestimated traffic growth rates and six concessions overestimated traffic growth rates. From year 2 to year 3, seven concessions underestimated traffic growth rates and three concessions overestimated traffic growth rates.

Regarding the standard deviations of $GR^j_{t/t+1}$, we obtained several findings. First, those deviations are smaller than the standard deviations of AD^j_t so the behaviour of the concessionaires in predicting traffic growth rates is more stable than in predicting traffic volumes. And second, the standard deviation for $GR^j_{2/3}$ is lower than for $GR^j_{1/2}$ so the longer the period under discussion, the more similar the behaviour among the set of concessions analyzed seems to be.

CONCLUSIONS AND FURTHER RESEARCH

Some interesting conclusions can be reached based on this research.

- Renegotiations of concession contracts in Spain have been quite common. In some cases, these renegotiations have prompted long extensions of the durations agreed upon in the original concession contracts. The willingness to renegotiate by the government, along with a competitive tender, usually have encouraged aggressive offers and consequently traffic overestimations.

- The trend pointed out before is contrasted with empirical data. There is a clear bias towards overestimation of traffic in the ramp-up period for toll motorway concessions in Spain. On average real traffic is substantially overestimated (around -35%) in the ramp-up period. This result is consistent with the results found in other studies, such as the one periodically conducted by Standard & Poor's.

- Although the trend toward overestimation shown in the previous paragraph may be valid as an average, we observe that the deviations vary substantially among concessions—one concessionaire even underestimated traffic by 30% the first year.

This fact is corroborated by the great variance of the distribution of the annual traffic deviations, which, depending on the year, ranges between 25% and 35%. This result, which is consistent with the literature, confirms that it is not possible to use the average overestimation rate obtained in this study to correct the accuracy of traffic estimations for individual projects.

- Counter intuitively, the longer into the future the year for which estimates are being made, the better the traffic predictions seem to be, or, in other words, traffic predictions seem to be less accurate the first year of operation of motorway concessions. This fact may be caused by the difficulty of knowing the behaviour of users the very first year of a new motorway being opened.

- The traffic growth rate deviations are mostly positive so, unlike annual traffic deviations, traffic growth rates are mostly underestimated by concessionaires in the ramp-up period. This result is consistent with the fact that annual traffic deviations tend to diminish throughout the first years of operation. Moreover, the behaviour of traffic growth rate deviations seems to be much more homogeneous among concessions, compared to annual traffic deviations.

We postulate that the main reason why on average traffic is substantially overestimated in toll motorway concessions in Spain has to do more with the strategic behaviour of bidders in the tender, which declare traffic levels higher than they actually estimate, than with modelling issues. We identify three causes for this strategic behaviour: the government willingness to renegotiate in order to keep its reputation, a fierce competition among bidders in the tender; and a concession contract that allocates the whole traffic risk to the concessionaire.

To solve this problem, two courses of actions could be adopted. The first one is to include in the legislation specific limits to the renegotiation of concession contracts in order that the government is not allowed to renegotiate as it wants. The second course of action is to set up mechanisms to mitigate traffic risk (Vassallo, 2006) in order to reduce the importance of traffic in the performance of the concession. A third measure could be addressed towards reducing competition in the tender. However, we think that this latter measure is not suitable since competition is always good to promote efficiency.

According to the recommendations in the paragraph above, we should expect that after the implementation of the 2003's Public Works Concessions Law, traffic overestimation in concession contracts in Spain should diminish. This Law includes the possibility of implementing mitigation mechanisms for traffic risk in concession contracts, and limits the causes of renegotiation to a very few specific circumstances. Unfortunately, the first set of concessions under this Law were awarded in 2004 and 2005, and the motorways are still under construction, so no traffic data is available yet to make this comparison. Undoubtedly, this analysis will be interesting as an ongoing research.

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FIGURES AND TABLES

FIGURE 1. Asymmetrical Behaviour Caused by a Whole Traffic Allocation Approach to the Concessionaire in a Competitive Tender

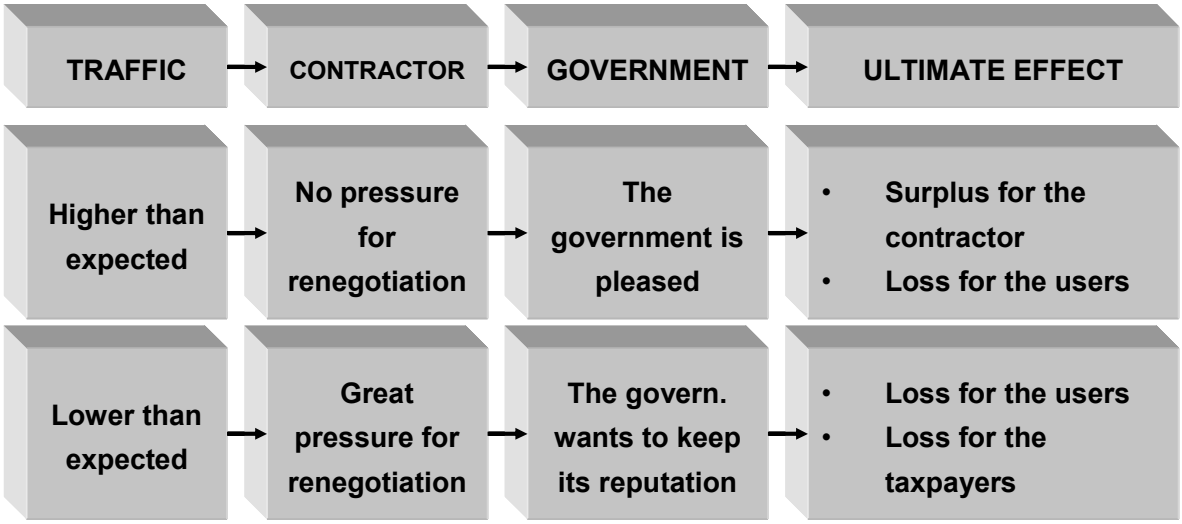

FIGURE 2. Vicious Cycle of Awarding Concessions when the Government Shows Willingness to Renegotiate

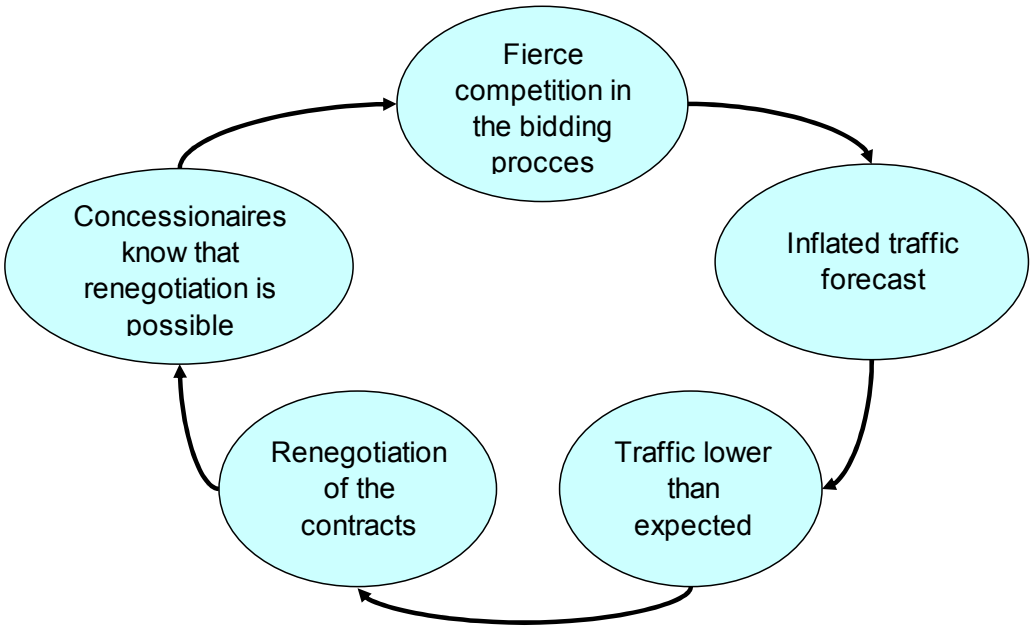

FIGURE 3. Number of Toll Motorway Concessions Granted by the Central Government in Spain from 1967 to 2006

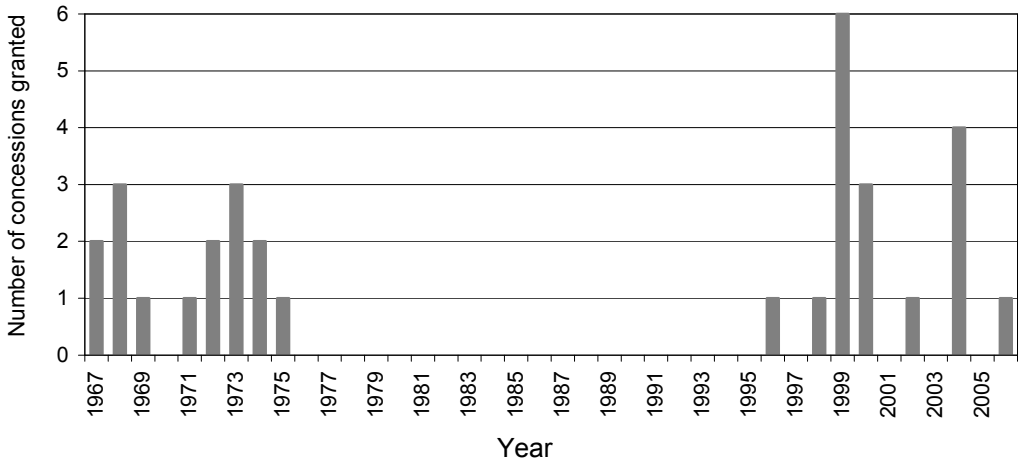

FIGURE 4. Annual Traffic Evolution for the Tarragona-Valencia Motorway

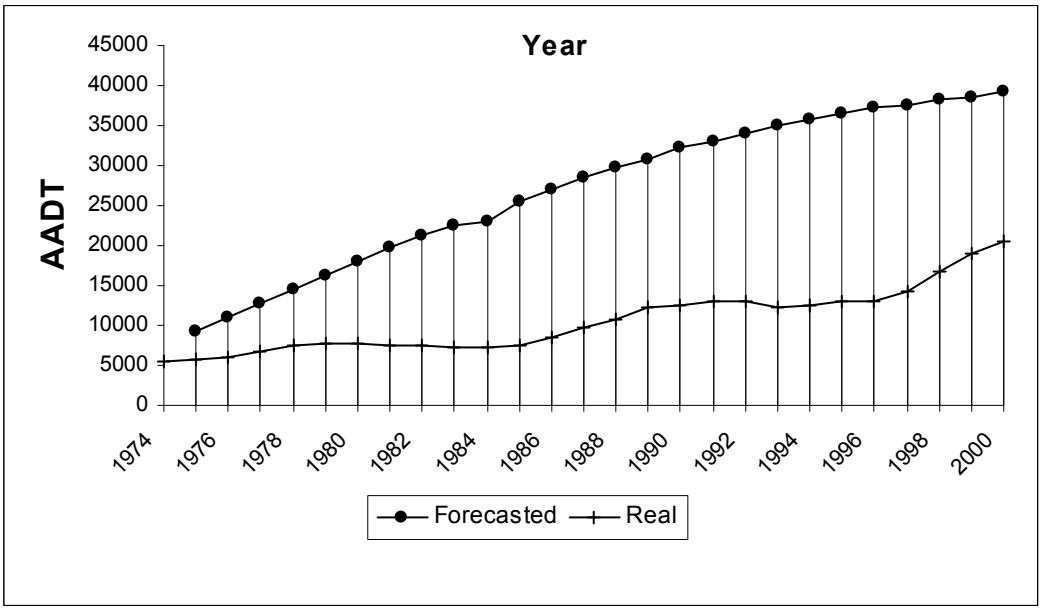

FIGURE 5. Annual Traffic Deviations in the Ramp-up Period for Eight Concessions of the Sample

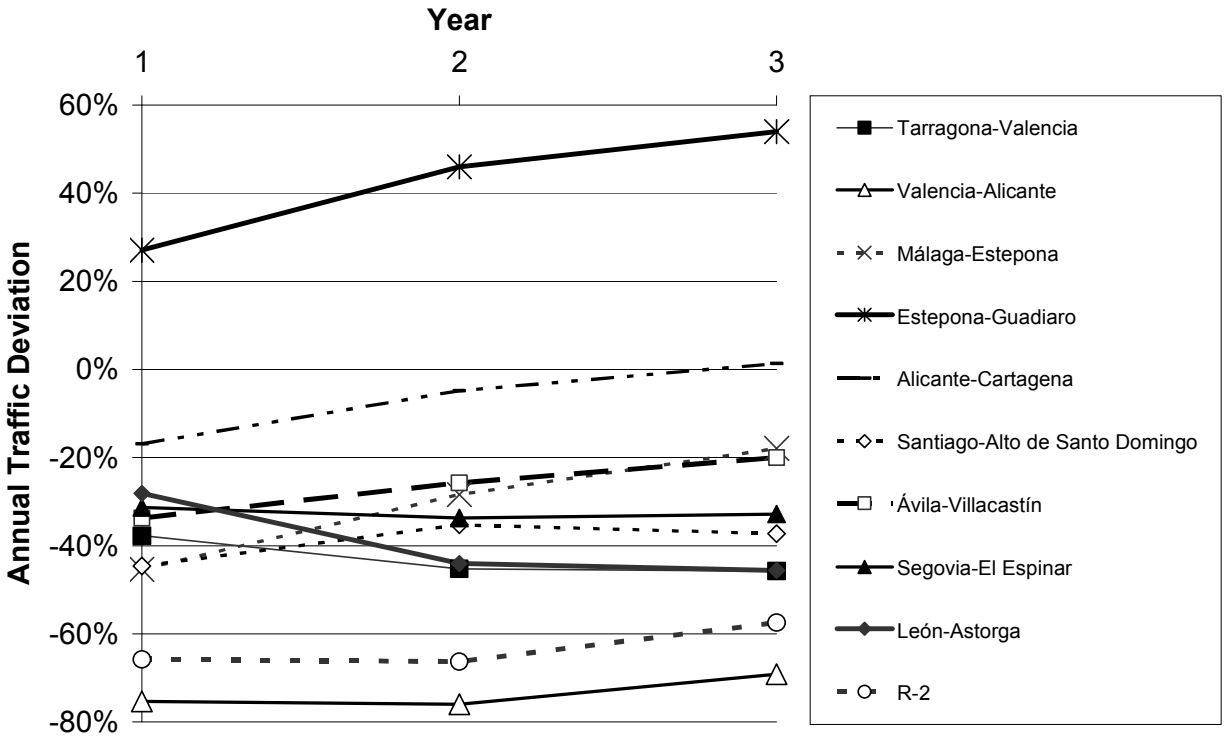

TABLE 1. Concessions Analyzed Compared to Concessions Awarded Classified According to Legal Period and Political Party in Government

		Concessions analyzed	Concessions awarded	Percentage
Political Party in Government	Dictatorship	2	15	13.33%
	Socialist Party	1	2	50.00%
	Popular Party	11	15	73.33%
	TOTAL	14	32	43.75%
Legal period	Before 1972 Act	1	7	14.29%
	1972 Act	13	24	54.17%
	2003 Act	0	1	0.00%
	TOTAL	14	32	43.75%

TABLE 2. Summary of Results

Concession j	Year of Awarding	AD_t^j			$GR_{t/t+1}^j$	
		t= 1	t= 2	t= 3	t= 1 / t+1=2	t= 2 / t+1=3
Tarragona-Valencia	1971	-37.73%	-45.21%	-45.74%	-14.20%	-1.11%
Valencia-Alicante	1972	-75.30%	-75.93%	-69.17%	-3.08%	27.43%
Málaga-Estepona	1996	-45.34%	-28.38%	-17.92%	32.44%	15.26%
Estepona-Guadiaro	1999	27.06%	45.98%	53.97%	15.59%	5.73%
Alicante-Cartagena	1998	-16.91%	-4.85%	1.33%	15.33%	6.86%
R-3	1999	-60.68%	-53.40%	-	19.66%	-
R-5	1999	-63.91%	-61.90%	-	6.02%	-
Santiago-Alto de Santo Domingo	1999	-44.60%	-35.27%	-37.24%	17.41%	-3.18%
Ávila-Villacastín	1999	-33.73%	-25.72%	-20.00%	12.53%	7.98%
Segovia-El Espinar	1999	-31.32%	-33.70%	-32.77%	-3.60%	1.46%
León-Astorga	2000	-28.13%	-44.04%	-45.60%	-24.96%	-3.01%
R-2	2000	-65.81%	-66.28%	-57.43%	-1.72%	25.77%
R-4	2000	-58.55%	-59.20%	-	-1.67%	-
Eje aeropuerto	2002	-62.94%	-	-	-	-
Mean (14 concessions)		-42.71%	-	-	-	-
Mean (13 concessions)		-41.15%	-37.53%	-	5.37%	-
Mean (10 concessions)		-35.18%	-31.34%	-27.06%	4.57%	8.32%
SD (14 concessions)		26.34%	-	-	-	-
SD (13 concessions)		26.74%	31.63%	-	15.52%	-
SD (10 concessions)		27.93%	33.84%	35.01%	17.10%	11.17%