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# “When supply travels far beyond demand: Institutional and regulatory causes of oversupply in Spain’s transport infrastructure”

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### *Abstract*

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Spain's transport infrastructure policy has become a paradigmatic case of oversupply and of mismatch with demand. The massive expansion of the country's transport infrastructure over the last decade has not been a response to demand bottlenecks or previously identified needs. For this reason, the intensity of use today on all interurban modes of transport in Spain falls well below that of other EU countries. This paper analyzes the institutional and regulatory factors that have permitted this policy, allowing us to draw lessons from the Spanish case that should help other countries avoid the pitfalls and shortcomings of Spanish policy. Based on our analysis, we also discuss policy remedies and suggest reforms in different regulatory areas, which could help improve the performance of Spain's infrastructure policy.

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## 1. Introduction

Spain's infrastructure policy over the last decade has been characterized by an almost overwhelming degree of public investment that has, however, been largely unrelated to current or prospective demand. This situation has affected all interurban modes of transport. Indeed, the country's policy managed to exacerbate the mismatch between supply and demand well before the economic crisis set in and provoked further reductions in demand. The reality of the situation is even acknowledged in the current Transport Infrastructure Plan (PITVI, 2012), in a section devoted to conducting a policy diagnosis [Part II, p. 57]: "Nonetheless, in recent years planning has focused on, and given priority to, the continued expansion of the system's supply without any direct correlation existing with growth in demand". Paradoxically, at around the same time, the drafter of the Plan, Ana Pastor, Minister of Public Works and Transport, was recorded as saying in a speech in favor of maintaining government plans for extending the high-speed rail (HSR) nationwide: "I don't want an asymmetric Spain (...) How do I explain to the Spaniards that the people of one region are more important than those of another".<sup>1</sup>

Indeed, even in the throes of the current economic crisis, the Spanish government continues to spend large amounts of resources on its HSR (c. 3,300 million euro in 2013, amounting to 33% of total central investment in transport infrastructure) and to build motorways on routes that carry little more than 1,000 vehicles per day. Under such a framework, the economic crisis can only worsen the mismatch between capacity and traffic with telling consequences for government budgets and future generations of tax payers.

In this paper, in addition to presenting evidence of Spain's overcapacity in all transport modes, we analyze the contribution made by institutional and regulatory policies to the existing and prospective oversupply and to the mismatch between traffic demand and (transport) capacity supply. This is examined both in network and single modes of transportation. By so doing, we provide further explanations for an overall design that has permitted the extreme imbalance in the present-day system. The Spanish experience, therefore, provides an example of the waste of public resources on overambitious programs of investment in underutilized infrastructure. Revealing the institutional and regulatory design that provided the mechanisms for such an

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<sup>1</sup> Presentation of Spanish proposals for the Trans-European Transportation Network. Ministry of Public Works and Transport (*Ministerio de Fomento*), Madrid, 12 February, 2012.

irrational policy should, in itself, be a valuable lesson for any country seeking to modernize and improve its transport infrastructure.

The rest of the paper is structured as follows. First, we provide a detailed description of the extent of the system's current overcapacity and the mismatch between supply and demand by examining the statistics for each transport mode in an international benchmarking assessment. Second, we examine the rationale of the regulatory framework supporting the management and investment policies for high capacity networks (motorways and HSR) and single point-to-point infrastructure (airports and ports). Finally, we present our conclusions and discuss the policy implications that can be derived from the extreme case of mismatch between and traffic demand and capacity in Spain.

## **2. Spain's infrastructure policy: When supply travels far beyond demand**

Spain is – by a long way – the country whose infrastructure supply (including both interurban and long distance modes) has grown most in recent years. However, demand has not kept pace with the increase in supply – truth be told, this mismatch was evident even before the economic crisis set in at the end of the last decade. For this reason, the Spanish case has come to be seen – domestically, as well as in the EU at large – as a paradigmatic case of the wasteful use of public resources for the building of infrastructure. This section presents data that allow a comparison to be made of the infrastructure supply in Spain with that available throughout the EU and other countries. The mismatch between infrastructure and demand is also described in greater detail.

Beginning with surface networks, there can be little doubt that if anything has come to characterize Spain's infrastructure policy since the early 2000s it has been the extension of the country's high-speed rail based on the laying of new tracks and dedicated almost exclusively to passenger transport. Successive Spanish governments have boasted of their achievements here both domestically as well as in international forums. Indeed, the dedication of massive budgetary resources has enabled Spain to build the most extensive (in absolute terms) HSR network in Europe and one that is even more extensive than the Chinese network in relative terms. Table 1 shows the extent of HSR (HSR 250 km/h) networks (in kilometers) in those countries that operate such a service (including the network that is operational and that which is under construction).

(Insert Table 1 around here)

According to information provided by the International Union of Railways (UIC) on 1 April 2013, eight EU countries and fourteen countries worldwide offered a high-speed rail service. Of these, Spain was ranked second (to China) on the basis of the overall number of kilometers of network in operation, and ranked a clear first (50% more than its nearest rival France and considerably more than all the other countries) on the basis of the number of kilometers per million inhabitants. If to these figures we add the number of kilometers under construction, Spain further strengthens her leadership with a network that almost doubles France's in terms of kilometers per million inhabitants.

However, HSR ridership data tell quite a different story with figures for the EU as well as for the Asian countries being much higher than those recorded in Spain. For instance, annual ridership (number of trips) in Japan is well over 300 million, and over 110 million in France, whereas the number of trips on Spain's HSR network in 2010 was just 16.8 million. A more refined view of the massive difference in ridership is obtained from data produced by the European Commission (2012), which provides passenger\*km -pkm- per country figures for 2010. From these, we can obtain the number of pkm for each kilometer of HSR network (that is, a true measure of a network's intensity of use) in the EU countries. Thus, ridership in France is 4.8 times higher than Spanish ridership relative to the network length. Relative ridership in Germany is 3.3 times higher than that of Spain, and in Italy it is 2.2 times higher.<sup>2</sup> These differences are likely to have increased in recent years, because low density HSR lines have been opened in Spain, while the economic crisis has reduced demand across the whole network.

Spain is also the European Union country with the most extensive motorway network. At the end of 2011, it covered a distance of 14,554 km (a figure that does not include dual carriageways). In 2009, the last year for which Eurostat provides homogeneous data for almost all EU countries, Spain already had 14,021 km of motorway in service, followed by Germany with 12,813 km. In relative terms (i.e., km of motorways per million inhabitants), Spain, with more than 300 km per million inhabitants, was ranked well above all other large and medium-sized EU countries, as shown in Table 2. The population density of the motorway network in Spain is surpassed only by that of Slovenia, Cyprus and Luxembourg, small countries with small populations and characteristics that are not really comparable.

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<sup>2</sup> The passenger-km (pkm) figures in absolute numbers (thousand millions) are: France 51.89, Germany 23.9; Italy 11.61; Spain 11.72. Recall, for instance, that the length of the Spanish network more than doubles that of Italy and Germany.

(Insert Table 2 around here)

Clearly, the fact of having a more extensive motorway network does not mean that the traffic volume will be equally great. And, here, according to data provided by the OECD for road passenger traffic in 2008, the total number of passenger\*km (pkm) in Italy was 3.6 times higher than that of Spain; in Germany it was 2.3 times while France and the UK nearly doubled the Spanish statistic.

Unfortunately, there are no equivalent physical measures that allow us to make homogeneous cross-country comparisons of airport infrastructure supply. However, Fageda and Voltes (2012) have analyzed the average ratio of passenger numbers to the surface area of Spanish airport terminals and compared their results with a sample of international airports for 2010. They show that the mean number of passengers per square meter of terminal in Spain is 71, while the international mean is 101. Tellingly, sixteen Spanish airports have a mean number of passengers per square meter of terminal below 50.

Data on airport investment obtained from the International Transport Forum (ITF) show that, between 2000 and 2009, investment in airports in Spain rose to 16,577 million euro. This figure is much higher than investment levels in other EU air markets with more than 100 million passengers:<sup>3</sup> 1.5 times that of Germany (although Germany has more traffic), 1.9 times that of France, and 4.8 times that of Italy. Equally, while 46 Spanish airports offer international commercial flights, 13 of them handled fewer than 100,000 passengers in 2012. Among these airports, only that of La Gomera (Canary Islands) serves an island with low domestic and tourist demand. As such, this is the only airport that fulfils what might be considered a public service obligation to prevent isolation and provide mobility in an insular environment devoid of suitable alternatives.

Data on investment in ports (also obtained from the ITF) show that, between 2000 and 2009, investment in Spain amounted to 19,733 million euro, which is almost double that invested in ports in Italy, more than three times that spent in Germany and six times that in France. By combining ITF investment data with figures for the gross weight of seaborne goods handled by a country (data provided by Eurostat), we can build a measure for investment relative to port cargo traffic in most EU countries.<sup>4</sup> For the period 2005 to 2009, the ratio (investment/port cargo traffic)

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<sup>3</sup> International Transport Forum does not provide data on investment in the UK after 2005.

<sup>4</sup> International Transport Forum does not provide data on investment in the Netherlands, and data of investment in the UK is not available after 2005.

in Spain was 3.1 euro per ton. This figure is well above that of all other countries in the EU: for instance, it is 2.5 times that of Italy, 1.9 times that of Germany, 4.1 times that of France, 3.9 times that of Belgium, 14.2 that of Sweden, 8.5 times that of Finland, 4.2 that of Denmark, and 11.4 that of Poland.

As can be seen, overinvestment and the mismatch between supply and demand have been the most salient features of Spain's infrastructure policy, affecting all interurban modes of transport. Indeed, Spanish leadership in infrastructure supply is indisputable in all modes. Yet, demand has lagged far behind, especially in surface transportation networks. All in all, the policy has proven to be badly misguided and its detrimental effects have only been magnified with the economic crisis. Below, we analyze the contribution that institutional and regulatory policies have made to this oversupply and the mismatch between demand and supply.

### **3. Institutional and regulatory causes of mismatch**

#### **3.1 Network modes**

High capacity network modes have received – and, in fact, continue to receive – the largest share of Spanish investments in transport infrastructure. As a result, they also provide an obvious illustration of the mismatch that exists between infrastructure supply and demand. Taxpayer subsidies, together with the massive arrival of European funds for high-speed rail and free motorway projects, and the offer of favorable guarantees and the negotiation of risk mitigation agreements for private toll motorway projects, are among the main factors fueling this mismatch in network modes.

##### *Motorways*

Spain's motorway network, which is under central government regulation, is characterized by a mixed funding model in which 75% of motorways are free, while the remaining 25% are tolled and privately operated. This duality can be accounted for by the different models that have been adopted in each of the three main waves of motorway investment in the country (see Bel, 1999).



Overall, Spain boasts 16,358 km of motorways, the largest high capacity network in per capita terms in Europe if we consider countries of a comparable size.<sup>5</sup>

The first motorways in Spain were opened to traffic under the dictatorship, which chose a privately tolled motorway concession model to develop the network.<sup>6</sup> Private motorway projects involve great uncertainties in terms of demand and cost risks, while private screening can be expected to provide profitable projects as it allows the selection of routes on the basis of predicted traffic volumes. However, the private advantage of being able to avoid white elephants is only possible with the right allocation of risk. In this regard, the dictatorship offered various guarantees and risk mitigating mechanisms including exchange rate insurance, an economic-financial breakeven guarantee and State-endorsed foreign debt (see Bel, 1999).<sup>7</sup> Under these regulations, the Motorway Plan projected a frenzied construction effort of 6,430 km of tolled motorways in just over a decade. However, the international economic crisis of the seventies was to highlight the important mismatch between projected capacity and actual traffic. Eventually, only 2,042 km of construction were awarded and by the 1980s only about 1,800 km were actually in operation. Moreover, part of the industry had to be rescued through a process of renegotiation and nationalization.<sup>8</sup>

In the late 90s and in the years that followed, the democratic central government continued to award new private toll motorway concessions and to offer similarly favorable guarantees. However, the most heavily used corridors were by now already covered by previous investments – both private and public. Consequently, most of the new motorways built (above all, those constructed to provide additional access routes to Madrid's six existing motorways) are proven white elephants – with traffic volumes in some cases (the R2 concession, for example) at just 34% of expectations. The use of these motorways has been badly undermined by existing free parallel motorways, while their profitability has been hit by huge (unexpected) expropriation costs.

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<sup>5</sup> This 2012 figure is obtained from the Ministry of Transport and includes free motorways, tolled motorways and free dual carriageways, which are technically similar but not the same as free motorways. Note that the figure is higher than that reported in Table 2 (section 2), as there we consider a technically homogeneous identification of motorways as provided by Eurostat.

<sup>6</sup> The first motorway concessions were awarded in 1967 and inaugurated in 1969. The main reasons for opting for this approach would seem to be 1) fiscal constraints (Bel, 1999); 2) the influence of Mussolini's fascist regime model based similarly on private concessions (Bel, 2012); and, 3) the advantage of user charges along tourist corridors, thus transferring part of the cost to foreigners (Puncel, 1996).

<sup>7</sup> In spite of regulations favoring foreign investments, concessionaires were solely domestic. Interest in attracting capital from international financial markets was a strategy used to improve the Spanish balance of payments. Specifically, exchange rate insurance was provided to facilitate foreign private investment.

<sup>8</sup> The government bailed out those concessions experiencing the greatest problems (1) by nationalizing three concessions (Atlántico, Astur-Leonesa and Navarra) in 1984 and (2) by restructuring the same Decree-Law governing the sector and encouraging the absorption of two other problematic concessions by the industry's main concessionaires (ACESA and AUMAR) on the most profitable routes. In return, the government renegotiated the corresponding contract durations.

Vasallo and Baeza (2011) report a significant bias towards the overestimation of traffic volumes on Spanish toll motorways. They argue that such overestimation is a strategic move given the possibilities for renegotiating concessions. Indeed, the State has been shown to have secured liabilities and is currently negotiating to rescue concessionaires that find themselves in trouble having accumulated debts of more than 3,500 million euro.

The free motorway network is fully funded from the government budget and received its latest boost from large scale investment programs between 1984 and 1993. The switch from toll to free motorways was adopted in part because private initiative was unable to provide coverage in regions with low traffic volumes. Motorway plans in this period acquired a centralized design, connecting Madrid to provinces in the periphery. The impressive growth in levels of investment was possible in part to the massive arrival of European funds that targeted specific regions, but without any consideration of traffic volume. Unlike the toll motorways, this free network has been extended constantly since 1984.

Since 1993, however, Spanish governments have not operated a strategic plan for the country's motorways. Only selected projects have been presented in a number of investment programs, but no specific criterion has been applied as regards capacity enlargements. Technically, it is generally accepted that conventional roads should be converted into high capacity roads when they reach an average daily traffic of around 15,000 vehicles – or 10,000 when congestion is severe or heavy traffic represents a share of 15% or more. Yet, in Spain, several roads have been converted into motorways with traffic volumes below 2,000 vehicles per day – examples include the routes Cuenca-Teruel (1,399 daily vehicles), Huelva-Zafra (1,409 daily vehicles) and Alcolea del Pilar-Caminreal (1,975 daily vehicles). There are at least five more such enlargement projects with daily traffic volumes below 4,000 vehicles.<sup>9</sup>

Regulatory prices on toll motorways are based on a price cap rule introduced in 2001, which in turn is based on the differences between projected and actual traffic on each specific motorway (See Albalate, Bel and Fageda, 2009).<sup>10</sup> However, such price regulation has not played a significant role in the overinvestment bias given that the largest part of the network is free, which produces well-known incentives to overinvest. Additional interpretations concern short-term motivations, such as electoral productivity (Castells and Solé, 2005), and long-term motivations, such as centralization (Albalate, Bel and Fageda, 2012).

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<sup>9</sup> See Macias and Aguilera (2013) for an extensive list of low traffic conventional roads being converted into free motorways in Spain in 2013.

<sup>10</sup> This price cap regulation substituted the modification in tolls linked to 95% of the Retail Price Index.

## *High-Speed Rail*

High-speed rail has been at the heart of Spain's transport policy. Even in the 2013 budget – which included major cuts in social benefits – HSR was allocated 3,302 million euro, 71% of all investment for railways and 33% of overall investment. The Strategic Plan of Transport Infrastructure (PEIT, 2004) foresaw that 43.7% of total investment between 2005 and 2020 was to be dedicated to intercity rail, with a particular emphasis on high-speed rail, which was expected to receive a third of the Ministry's total investments. The new Transport Infrastructure Plan (PITVI, 2012), replacing the previous one, retains intercity rail investment at 39% of the total. It also confirms the general allocation of funding for high speed rail projects countrywide. The plan reflects the fact that since the year 2000, the main objective of Spain's transport policy has been to provide an HSR link between the political capital and all provincial capitals<sup>11</sup> – a policy shared by the two main political parties that have ruled the country over the last few decades. This situation accounts for the fact that Spain continues to top the table in terms of new HSR construction (See Table 1 above), even when there is overwhelming evidence of the mismatch between supply and demand on the lines already in operation. Indeed, the market share of the rail mode in passenger-km stood at just 5.2% in 2011.<sup>12</sup>

Such a mismatch cannot be supported by private initiative. Both the infrastructure and the service are managed by publicly owned monopolies. There is a vertical accounting separation between the manager of the infrastructure (*ADIF*) and the manager of the services (*RENFE*), with both corporations being controlled by the Ministry of Transport.

Competition is not allowed among passenger traffic in Spain and the characteristics of the country's infrastructure – distinct from those of conventional railways – are incompatible with freight transport. Indeed, high-speed rail links have concentrated all of Spain's modernization efforts in the railway sector, with no interest for freight transport, which today suffers severe bottlenecks along the main corridors. As a result, Spain's freight rail transport presents one of the lowest (and decreasing) market shares in Europe, standing at just 2.5%.<sup>13</sup> As such this is the principal opportunity cost of investment efforts in passenger oriented high-speed rail, which should come as no surprise if we consider that ports and UIC-gauge railways have yet to be linked up in Spain. Indeed, the first project of this kind did not take place until 2012, when the Port of Barcelona was connected with a minor single dedicated track.

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<sup>11</sup> This objective was first introduced by President José María Aznar in the investiture debate preceding the 2000-2004 legislation (*Diario de sesiones del Congreso*, 2000, nº.2, [April 25] p.29.

<sup>12</sup> Estimates provided by the Ministry of Transport in the Transport Infrastructure Plan (PITVI) 2012-2024, part II, p.3.

<sup>13</sup> Estimates offered by the Ministry of Transport in the Transport Infrastructure Plan (PITVI) 2012-2024, part II, p. 5.

Taxpayers, together with European funds (which account for around a quarter of project investments), have borne the brunt of the expense of the high-speed rail program (See Albalade and Bel, 2012).<sup>14</sup> This has come about, first, because the fees paid for the use of infrastructure do not fully cover the maintenance of both the network and train stations. As a result, the infrastructure has to be fully subsidized, as does the rolling stock in part (even though it was purchased by RENFE). Second, it reflects the fact that, during the early years of operation, prices were heavily subsidized. In this regard, the European Commission prohibited subsidies to cover operating losses on RENFE's long distance services, including its high-speed rail lines, in 2009. This aid had amounted to € 248 million in 2007, and would have risen to to € 400 million in later years. None of the high speed lines fulfills public service obligations.

### 3.2 Single facilities

In Spain, single transport facilities are characterized by a centralized management model of publicly owned monopolies – *AENA aeropuertos* for airports and *Puertos del Estado* for ports – under central government control. Although ports and airports are two types of infrastructure that have a local economic influence within their respective hinterlands and which are funded by user payments (as a system), the main management decisions are taken by centralized institutions that implement cross-subsidy schemes between business units and price regulations that do not reflect their individual costs. These two mechanisms provide a regulatory framework that facilitates overcapacity (due to a scale of investment that would not be possible if it depended solely on their individual revenues) leading to a sizeable mismatch between infrastructure supply and demand (which, furthermore, is not justified by public service obligations).

#### *Airports*

AENA manages 47 of the 48 airports with commercial traffic in Spain.<sup>15</sup> This contrasts with the present situation in other European countries with various large airports, such as France, United

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<sup>14</sup> It is worth recalling that because of Spain's relief and urban density, the average construction costs of the HSR network have been lower than those in other European countries, and well below those in Italy (See Beria and Grimaldi, 2011).

<sup>15</sup> The only commercial airport not managed by AENA is Lleida-Alguaire, a small airport that handled just 33,041 passengers in 2012. A further three airports, which do not currently carry commercial traffic, are not managed by AENA.

Kingdom, Germany and Italy, where airports are managed on an individual basis by either public or private firms (for more details, see Bel and Fageda, 2010).<sup>16</sup>

AENA is the owner of all the facilities provided by Spain's airports and it controls all the financial resources generated by them. All investment plans are drawn up jointly between AENA and the Ministry of Transport, with airport charges being fixed by the Spanish Parliament. All other relevant decisions regarding airport management are made by AENA, including those related to the undertaking of retail activities, the allocation of slots, check-in counters and airline gates.

The centralized management system means that Spanish airports are unable to compete with each other to attract airline services, as typically occurs in other European countries. Furthermore, any financial losses are compensated through a cross-subsidy system. Here, Bel and Fageda (2009) show that the cross-subsidy system is not necessarily driven by a criterion of solidarity as it is usually claimed. On the contrary, a significant positive correlation can be found between investments and income per capita, leading to a larger allocation of the resources raised by profitable airports to the richest territories.

As regards revenues, Law 25/1998 fixed the initial values for current aeronautical charges (the fees for landing and aircraft parking, and for terminal use, etc.) and other fees, including car parking and the retail activities undertaken by AENA. The company operates four airport categories and sets aeronautical charges accordingly (note that within the same category, price differences are minimal). The airports of Madrid and Barcelona are in the first category, the main tourist airports comprise the second, while the other two categories are made up of the airports handling lower traffic volumes. This discrete categorization of regulation, however, fails to allow prices to reflect individual costs, and as such is a significant source of inefficiency.

Any changes to these charges proposed by AENA must receive the approval of the Spanish Parliament. Thus, in theory, airport charges are based on the total costs of all the airports managed by AENA; however, in practice, these charges are approved by Parliament, so they are adjusted annually in line with the charges made for other public services (except in 2011 and 2012 when airport charges in Madrid and Barcelona were increased substantially in relation to those in place at the other airports because of the huge investment debts accumulated in Barcelona and, above all, in Madrid). Thus, while charges are strictly regulated, they do not necessarily cover costs.

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<sup>16</sup> Exceptions do exist; thus airports located in the same urban area tend to be managed by one single firm. This is the case of airports in Paris, Rome and Milan and it was the case of those in London and Glasgow before the break-up of BAA airports.

Thus, it should be noted that AENA has recorded financial losses since 2007, making it the airport operator reporting the largest deficit in the world (Bel and Fageda, 2011). AENA's current debt stands at more than 14,000 thousand million euros. In 2011, only ten airports were profitable and each of them moves more than four million passengers per year. This contrasts starkly with reports for other European airports where the traffic profitability threshold can be as low as one million passengers (European Commission, 2002).

In short, the poor financial performance of Spanish airports can be attributed to a lack of competition, the cross-subsidy system and the absence of incentives to be cost efficient. All these factors, derived from the centralized management system, have a detrimental impact on the financial accounts of Spanish airports and encourage the tendency to over-invest, which is perhaps the main factor accounting for AENA's current financial distress.

### *Ports*

Public ownership and centralized decision-making on such matters as investment and prices also characterize Spain's ports.<sup>17</sup> However, the Port Authorities have a greater degree of financial autonomy than that enjoyed by the airports since here investments are more closely linked to the amount of revenues that each port generates individually. Furthermore, privately-owned terminals, with high degrees of independence from the Port Authorities, are permitted on port premises.<sup>18</sup>

The two main agencies managing the ports of Spain are *Puertos del Estado* and the Port Authorities. *Puertos del Estado* is a state-owned company whose main objectives are to coordinate operations and to approve the Port Authorities' investment plans. The company is financed by four per cent of the total revenues of each Port Authority located on the mainland and two per cent of the revenues of ports situated on islands, and in Ceuta and Melilla.

Spain has 28 Port Authorities managing a total of 47 ports.<sup>19</sup> The Port Authorities are public institutions that have their own legal structure and a president appointed by the regional Government. The president's role is to propose investment plans and establish concession contracts with the companies that operate in the terminal. All the Port Authorities are financed by property income and port charges that are paid by terminal operators and shipping firms. The

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<sup>17</sup> In contrast, port authorities in Northern Europe are generally managed individually by public firms and on a strong commercial basis.

<sup>18</sup> There have been several changes in the legislation regulating port management in Spain since the early nineties (see Castillo-Manzano et al., 2008, for details)

<sup>19</sup> Other minor non-commercial ports are subject to regional regulation.

initial values of port charges are fixed by law and the annual update is approved in provisions accompanying the General Budget Law. No formal link has been established between charges and costs, although the Port Authorities are generally profitable.

The regulations provide some scope for price competition through the use of two tools: a correction coefficient and discounts. The correction coefficient is the percentage that each Port Authority can apply in order to modify the fee paid by the shipping companies. The main feature of the correction coefficient is that it involves a “regulation of maximum profits”. Thus, a Port Authority with profit levels higher than the national mean has to lower its prices, while a Port Authority with lower profit levels has to increase its prices. Such a regulatory measure however can cause an economic distortion, as the price setting is not necessarily related to the costs of each Port Authority. The second tool to promote competition comprises the discounts that Port Authorities can apply under certain conditions (regulated by law) to terminal operators and shipping companies. For each Port Authority, the regulation fixes an upper limit, this being the maximum amount that discounts can represent as a share of the port’s total revenue.

Ports in Spain can also receive resources from the “Inter-port Compensation Fund”, which sees resources being transferred between ports to compensate for disadvantageous situations arising from hinterland limitations or island locations, and to improve the ports’ road and rail accessibility. To finance this fund, each Port Authority has to contribute up to 12 per cent of their income.

However, Fageda and González-Aregall (forthcoming) show that the current regulation of port charges does little to foster price competition, while Castillo-Manzano and Fageda (forthcoming) report a tendency towards over-investment in the Spanish port system. Since the early nineties, investment in the Spanish port system has multiplied three-fold (after controlling for inflation). Port Authorities have been accruing debt with financial institutions at a double-digit annual growth rate, so that the accumulated debt more than doubles the total annual revenue for the whole port system. In a similar vein, Soraya-Hidalgo et al. (2013) show, by estimating a cost-function for the 1986-2005 period, that most Spanish ports are operating at over-capacity. Hence, the combination of weak price competition and the financial autonomy of the Port Authorities seem to have led to capacity competition and the resulting overcapacity of the Spanish port system.

#### 4. Discussion and Policy Implications

We have shown that Spain's transport policy in recent years has been characterized by a sizeable mismatch between capacity investment and traffic demand. In this instance, the mismatch cannot be attributed to problems of isolation or accessibility, but rather to programs of public investment and regulatory and institutional mechanisms that have actively favored overcapacity. Of further concern is the fact that no major reform is foreseen in either current or prospective policies for limiting this overcapacity. Indeed, the current economic crisis and the fiscal constraints being imposed by the European institutions do nothing to prevent the extension of large expensive transport projects that continue to be justified under the same policies as those adopted in the recent past.

As has been argued, today's network modes are the outcome of large investment programs, funded primarily from the public budget, and which have failed to take into consideration future traffic forecasts. Even in the case of private toll motorways, the institutional and regulatory design of concession contracts (and their offer of generalized guarantees) has mitigated the importance of demand risk in the valuation of projects, resulting in similar white elephant projects to those produced by the Government in its free motorway programs. In the case of single infrastructure, the main problems driving overcapacity can be identified as (1) institutional – due to the centralization of management under publicly owned corporations controlled by the central government; and, (2) regulatory – due to the use of price regulations based on cross-subsidy schemes not justified by public service obligations.

Reforming transport policy in Spain is urgent; yet, recent developments appear to show that current policies are limitless, even though they are having a negative impact on both current and future generations. What is required are measures that seek to link investment and capacity to different service delivery thresholds. This means accommodating investment projects and the modernization of each mode – gradually, when indivisibilities do not apply – to the demand expectations of non-commercial infrastructure. In the case of commercial infrastructure it is imperative that the institutional and regulatory framework be reformed. In this regard, the management of these units should be undertaken on an individual basis and price regulations need to be reformed so as to ensure that the fees charged meet costs. However, this will only be possible if the reforms provide a (new) regulation of the public policy process.

Spain is the only example among the large and medium-sized countries of the OECD in which absolutely all interurban transportation modes are under central government control. Regulation and institutional designs are all determined by the Ministry of Transport (either directly



by the Ministry or indirectly by corporate companies owned by the Ministry) and, as shown, they have promoted overinvestment. Internationally no executive enjoys a comparable concentration of powers in the transport sector. Thus, institutional reforms need to consider the establishment of an independent regulatory agency for transport, one that is outside central government control. This is of pressing interest; especially, if we bear in mind that the Ministry of Transport itself is aware of the lack of correlation between investment and growth in demand; yet, the political precepts consider an equal endowment of infrastructures (in terms of both quantity and quality) to guarantee equality between the citizens of different regions.

Finally, it is worth remembering that over-investment in Spain's infrastructure has been heavily supported by the huge subsidies assigned to it by the European Union. As such, the Spanish case illustrates the existence of the poorly planned effects of European policy, which is guilty of having paid little attention to the economic rationality of its co-financed projects. Moreover, European policy actually encourages the planning of major infrastructure projects since in this way countries stand a better chance of receiving all their pre-allocated subsidies. Given this state of affairs, regulatory reform of infrastructure policy at the EU level would also be highly beneficial.

## References

- Albalate, D. and Bel, G. (2012) *The Economics and Politics of High Speed Rail: Lessons for policy makers from experiences abroad*. Lanham: Rowman and Littlefield (Lexington books Group).
- Albalate, D., Bel, G., and Fageda, X. (2009) "The privatization and regulation of toll motorways in Europe", *Governance* 22(2), 295-318.
- Albalate, D., Bel, G., and Fageda, X. (2012) "Beyond the efficiency-equity dilemma: Centralization as a determinant of government investment in infrastructure", *Papers in Regional Science* 91(3), 599-615.
- Bel, G. (1999) "Financiación de infraestructuras viarias: la economía política de los peajes", *Papeles de Economía Española* 82, 123-139
- Bel, G. (2012) *Infrastructure and the Political Economy of Nation Building in Spain, 1720–2010*. Eastbourne: Sussex Academic Press.
- Bel, G. and Fageda, X (2009) "[Preventing competition because of 'solidarity': Rhetoric and reality of airport investments in Spain](#)", *Applied Economics* 41(22), 2853-2865
- Bel, G. and Fageda, X. (2010) "Privatization, regulation and airport pricing: An empirical analysis for Europe" *Journal of Regulatory Economics* 37(2), 142-161.
- Bel, G., and Fageda, X. (2011) "La reforma del modelo de gestión de aeropuertos en España: ¿Gestión conjunta o individual?", *Hacienda Pública Española*, 196, 109-130
- Beria, P. and Grimaldi, R. (2011) "An early evaluation of Italian High Speed Rail projects", *Trimestrale del laboratorio, Territorio, Mobilità e Ambiente* 4(3), 15-28.
- Castells, A. and Solé, A. (2005) "The regional allocation of infrastructure investment: The role of equity, efficiency and political factors", *European Economic Review* 49(5), 1165-1205.
- Castillo-Manzano, J.I. and Fageda, X. "How are investments allocated in a publicly-owned port system? Political factors vs. economic criteria", *Regional Studies*, forthcoming.
- Castillo-Manzano J. I., López-Valpuesta L. and Pérez J. J. (2008) "Economic analysis of the Spanish port sector reform during the 1990s", *Transportation Research Part A: Policy and Practice* 42(8), 1056-1063.
- European Commission (2002), *Study on competition between airport and the application of state aid rules*, Final Report, Volume 1. Brussels: European Commission.
- European Commission (2012) *EU transport in figures. Statistical Pocketbook, 2012*.
- Fageda, X. and González-Aregall, M. "Port charges in Spain: The roles of regulation and market forces", *International Journal of Shipping and Transport Logistics*, forthcoming.
- Fageda, X. and Voltes, A (2012). [Efficiency and profitability of Spanish airports: a composite non-standard profit function approach](#), Working paper, Universitat de Barcelona.
- Hidalgo-Gallego, S., Núñez-Sánchez, R., Coto-Millán, P. (2013). *Demand uncertainty and overcapacity in Spanish Port Authorities for the period 1986-2005*. Working paper, Universidad de Cantabria.
- Macias, P. and Aguilera, G. (2013) *La gran bacanal. La política desorbitada de les infraestructures a l'Estat*. Barcelona: Deu i Onze Edicions.

PEIT (2004) *Plan Estratégico de Infraestructuras de Transporte*. Ministerio de Fomento, Madrid.

PITVI (2012), *Plan de Infraestructuras de transporte y vivienda 2012-2024*. Ministerio de Fomento, Madrid.

Puncel, A. (1996) *La Autopista del Mediterráneo: Cesiones, concesiones, servicios y servidumbres*. Servei de Publicacions de la Universitat de València. València.

Vasallo, J.M. and Baeza, M.A. (2011) "Traffic Uncertainty in Toll Motorway Concessions in Spain: An analysis of the ramp-up period" *Proceedings of the Institution of Civil Engineers: Transport*.

**Table 1. High-Speed Rail ( HSR  $\geq$  250 km/h) in the World (April 1, 2013)**

	<b>Km HSR in operation</b>	<b>Km HSR / Million people</b>	<b>Km HSR operation + construction</b>	<b>Km HSR (op+cons) / Million people</b>
Spain	2192	47	3739	79
France	2036	31	2793	43
Belgium	209	19	209	19
Japan	2087	16	2869	23
Italy	923	16	923	16
Taiwan	345	15	345	15
Germany	1019	12	1447	18
Austria	93	11	93	11
South Korea	412	8	598	12
Netherlands	120	7	120	7
China	8359	6	14604	11
Turkey	444	6	991	13
Switzerland	35	4	107	13
United Kingdom	113	2	113	2

Source: HSR networks, from International Union of Railways (UIC). Population, from Eurostat and different national sources. Info downloaded on May 8, 2013

**Table 2. Motorways (free and tolled) in the European Union (2009)**

Country	Km Motorways	Km motorways / Million inhabitants
Slovenia	747	368
Cyprus	257	324
Luxembourg	152	308
<b>Spain</b>	<b>14021</b>	<b>306</b>
Portugal	2705	255
Denmark	1130	205
Sweden	1891	204
Austria	1696	203
France	11163	173
Belgium	1763	164
Netherlands	2631	160
Germany	12813	156
Ireland	663	148
Finland	765	144
Hungary	1273	127
Italy	6661	111
Greece	1120	99
Lithuania	309	92
Estonia	100	75
Slovakia	391	72
Czech Republic	729	70
United Kingdom	3674	60
Bulgaria	418	55
Poland	849	22
Romania	321	15
Latvia	0	0
Malta	0	0

Source: European Commission (2012, p. 75). Eurostat for Latvia and Malta, an also for population.

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- WP 2006/07 "Against the mainstream: nazi privatization in 1930s germany" Bel, G.
- WP 2006/06 "Economía Urbana y Calidad de Vida. Una revisión del estado del conocimiento en España" Royuela, V.; Lambiri, D.; Biagi, B.
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