

Policy-Oriented Insights to Enhance Effectiveness and Efficiency of Public Spending: Comparing the Determinants of Subsidies to Railways in key European Countries

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Abstract: *This paper aims to reconstruct the total amount of public expenditure on railways in key European Countries. The analysis bases on data referring to: Italy, Great Britain, Germany, France and Sweden. The main objective is to evaluate the appropriateness of transfers granted in view of containing and rationalizing public expenditure, improving overall system efficiency and protecting competition in a market that has, at least from a legal point of view, fully liberalized segments. Because of the lack of reliable data, previous literature struggled in identifying the determinants of public subsidies granted to national railways across Europe. This paper provides a synthetic index of the size of the rail sector (SISR) that justifies subsidies and estimates the subsidies from the public finances (SP) that would be paid in a specific country adopting the standard of another country or a European average. This paper concludes that there is plenty of room for a deeper investigation into the spending review of the public spending on railways. Finally, this study has major policy implications as it makes available harmonized and comparable data serve scholars and political institutions.*

Keywords: *railways, productivity, subsidy, transport economics, public finance.*

1. INTRODUCTION

The determinants and magnitude of subsidies to railways have triggered interest among policy-makers, academics, regulatory entities, professionals and European institutions. The purpose of this paper is twofold; firstly it makes financial, infrastructural and productivity data comparable across countries, secondly, a comparative index is built and applied in an effort to provide peace of evidences on the monetary assistance provided by government to the railway sector in key European countries. In Italy, for example, the public expenditure over the 21 years since the transformation of *Ferrovie dello Stato* (FS) into a public limited company (1992-2012) added up to €207.7bn; over the same period, the French expenditure amounted to €153.6bn while the British expenditure totalled €69.3bn. the above mentioned data alone fail in providing insights from the industry since remarkable difference in infrastructural assets and network productivity play a key role in the evaluation process suggested in this paper. This paper advocates that if the standards of these countries over the 1992-2012 period had been applied, total subsidies in Italy would have amounted to €83.2bn by French standards (40% of real), €63.6bn by British standards (31% of the granted) and €53.6bn by Swedish standards (26% of the granted). The average value of theoretical subsidies, calculated using the standards of these three countries, amounted to €66.8b (32% of the actual €207.7bn allowed). The comparison with other major countries shows that, in summary, the operating subsidies paid to the Italian railway sector are twice the European standard average while the total paid in the 1992-2012 period is triple. This study shows that the high expenditure on railways doesn't necessarily correspond to increase in traffic levels. Since 1992 FS passenger-km have decreased by 16%, while in Germany they have increased by 39%, in France by 45%, in Great Britain (a country under major incisive reform in the mid-90s) by 83% and in Sweden by 98%.

2. BACKGROUND AND RELATED LITERATURE

The evolution of subsidization represents one of the current most thought-provoking topic about government expenditure. Notwithstanding the substantial amount of public subsidies granted by

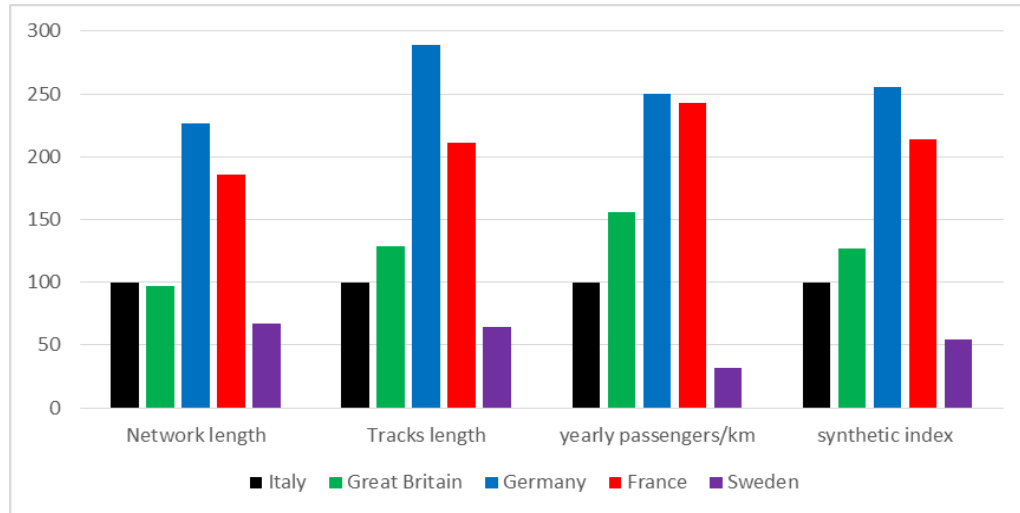
the European Union Member States to their national railway industries and the determinants of State aid to railways are still largely unexplored internationally (Crössmann & Mause, 2014). As conveyed in Mause & Schreeb (2011) despite the considerable share of subsidies to railways if compared with total subsidies (40% of total subsidies granted by EU Member States), there is a lack of literature in terms of cross-country comparison and from a time-series point of view. Many different approaches have been proposed in an effort to shed some light on this issue (Arrigo & Di Foggia, 2013). It has been suggested, for example, that national railways may receive substantial transfers from state or regions, in various forms: investments, subsidies for rolling stock, for service, for maintenance, public service obligations contracts, etc. and other hidden subsidies. The performance of the railway industry can be affected by the sector dynamics like the market regulation (Cantos, Passtor, & Serrano, 2012) and structure. It is well-known indeed that measures such as separation of infrastructure from operations, infrastructure charging regimes and regulation have major implications for the passenger sector (Nash, 2010; Friebel, Ivaldi, & Vibes, 2010). The structure of these public interventions is complex, slightly different according to the country and partially evolved over time (Beria, Quinet, de Rus, & Schulz, 2010). Overall, public budget contributions have become more transparent, with payments often made under contracts spanning several years, with only minimal funding for freight, identification of contributions in the accounts of railways, and treatment to normalise accounts with respect to these payments (NERA, 2004). As per the impact of government expenditure on the industry, Friederiszick, Röller, & Schulz (2003) analyse the effectiveness of national state aid in increasing the efficiency of railways in the fifteen Member States of the European Union. The authors suggest that there is a positive relation among the level of state aid and efficiency, nevertheless, results suggest that the intensity i.e. aid divided by cost, of the state aid have a negative influence on efficiency. It might be objected thought that excessive public spending in times of budgetary constraints may lead to financial troubles since the expenditure coverage shall be guaranteed by taxation or borrowing e.g. through issuance of securities, bills or bonds that in turn concur in debt servicing growing. Through issuance of securities, bonds and bills. To this extent control of subsidies should go in the direction of sustainable growth-enhancing policies while encouraging budgetary consolidation. Knipes (2013) provides a short overview of the provocative debates on the role of the State and the markets and the railway industry structure across Europe. Namely, State aid is defined as an advantage in any form whatsoever conferred on a selective basis to undertakings by national public authorities. In 2012, the EU Commission proposed a recast of a directive establishing a single European railway area; the recast heads toward a more competitive market (Directive 2012/34/EU). To the same token the European Commission has boosted its autonomy to implement state aid policy through a remarkable corpus of frameworks, communications, evaluations and guidelines constructed on the base of its Treaty-derived competence (Smith, 1998). The Member States are required to prove their ability for transposition, implementation and enforcing the Community-derived rules while harmonizing the needs of the domestic economic development against an indeterminate general interest. (Cremona, 2003). Implementation into the law of the Member States accomplishes the objective of guaranteeing the full disposal of those rights and obligations to people and enterprises. Provided that, in reality, most of the Member states do not punctually comply with the EU law frameworks, these studies suggest that serious improvements must be undertaken. Measures are needed in an effort to better regulate the industries and (i) to provide both European designated offices with reliable information on different countries markets, (ii) entrust fair competition and (iii) put the basis for a long period view of public finances as per expenditure in subsidy. As far as we know, there are, however, few studies that specifically focus on the measurement of the government expenditure on railways in a medium and long-term horizon. Public financial support to railways assumes a variety of forms and possible purposes. It may be for the network or transport service and in each case it can result in either capital or operating grants. Regarding operating grants, they may be intended as financial support for the management of the infrastructure or transport service. To this regard it can be acknowledged that the role of government in railways investment is a well-documented topic (Perkins, 2005).

3. RESEARCH QUESTIONS, METHODOLOGY, DATA AND LIMITATIONS

In the light of the current budgetary constraints and the struggling of many European countries in complying with Maastricht treaty's parameters, some questions arise. Shall the government

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expenditure on railways be reduced? Have governments been able to control expenditure and head it towards objectives of efficiency? The exercise that this papers attempt to carry out requires firstly the creation of an indicator of the size of the different national rail sectors. Of the different variables taken into consideration, the length of the network, the length of the track and the passengers transported are all segments that can request public financial support. The synthetic index of the size of the rail sector (SISR) that justifies subsidies corresponds to the simple average of the relative indices calculated for each country, which are represented in Graph1. .



Graph1. Relative sizes of rail transport in the major EU countries

Source: Own elaboration

Being Italy set to 100, the British rail sector results to be 27% larger than the Italian one, the French rail sector 114% larger, the German rail sector 155% larger and the Swedish rail sector 46% smaller. It is now possible to estimate the public subsidies (SP) that would be paid in a *j*-country adopting the *i*-country standard, calculated as a ratio between subsidies paid in that country and the specific SISR:

$$\frac{SP_{j,i}}{SISR_j} = \frac{SP_i}{SISR_i} \tag{1}$$

From the equation [1] it is possible to derive the theoretical subsidy (SP) described in the equation [2].

$$SP_{j,i} = SP_i * \frac{SISR_j}{SISR_i} \tag{2}$$

The theoretical subsidies expected in the *j* country with the criteria of the *i* country stem from the actual subsidies granted in country *i* times the ratio between the SISR of country *j* and that of country *i*. In Europe, data on state aid to railways suffer from some limitations (EU Commission, 2013), of which the main ones are the following: (i) missing data for some years as a result of missing notifications from Members States, (ii) the published data did not disaggregate between different aid given to the network for financing new investments, for renewals and maintenance, for operating expenses and for public service obligations (PSOs). This analysis is based on reliable information obtained from regulatory reports, ministries of the sector, annual reports from the infrastructure managers and the transport operators.

4. OVERVIEW OF FINANCIAL BENEFIT PROVIDED BY GOVERNMENTS OF SELECTED COUNTRIES

4.1. Italy

The public sector has long sustained the rail transport with significant transfers directed mainly to the financing of investment programs and to covering network operating costs and the cost of

local rail transport. In this paper we have had to limit the reconstruction of public subsidies to the FS group, ignoring local rail networks.

Table1. Public transfers to the FS group for operating expenses (million €).

Year	State contributions for operating the rail network	Using funds according to former laws 538/93 and 448/98 funding	Contributions from regional or local authorities to transport services	State contributions to transport services	Other grants for operating expenses	Total grants related to income
1992	1 808			2 221		4 028
1993	1 935	583		1 218	1 054	4 790
1994	2 020	616		1 323	89	4 049
1995	1 904	640		1 432	472	4 447
1996	1 762	762	4	1 452	89	4 068
1997	1 821		5	398	105	2 329
1998	1 692	900	7	1 510	16	4 125
1999	1 431	974	7	1 512	100	4 023
2000	1 450	999	22	1 613	124	4 207
2001	1 478	1 036	1 273	527	66	4 380
2002	1 453	1 823	1 274	481	29	5 060
2003	382	1 926	1 298	481	20	4 107
2004	1 304	1 831	1 311	481	21	4 948
2005	1 289	959	1 331	481	57	4 117
2006	902	464	1 348	367	71	3 151
2007	1 154	464	1 636	568	422	4 244
2008	1 041	448	1 712	599	566	4 366
2009	849	439	1 884	533	441	4 146
2010	975		1 947	546	44	3 512
2011	975		1 803	537	14	3 329
2012	1 110		1 725	514	46	3 395
Total						84 821
<i>Yearly average</i>						<i>4 039</i>

Source: own elaboration on Italian Court of Auditors and FS. As per the 1992-95 period, the first four operative years of FS under the legal status of a public limited company, data from Arrigo and Beccarello (2000) were used, while from 1996 onwards, data were extracted from FS group financial statements and annual reports from the Court of Auditors. Table shows granted related to FS. Since 2001, following the local public transport reform, transfers for public service obligations relating to this type of transport are provided by the regions, leaving only the segment of unprofitable medium and long distance services the responsibility of the state. With regards to the overall level of grants for operating expenses, we can see that during the 90s and in much of the subsequent decade, they amounted to between €4bn and €4.5bn per year, with some exceptions: in 1996 they were almost halved as a result of the cuts included in public financial measures designed to meet the Maastricht treaty criteria and allow admission to the euro; in 2002 and 2004, annual support rose to around €5bn; in 2006 there was a new reduction, nevertheless transitory, of total public support. Finally, in the 2010-12 period, the total transfers for operating expenses amounted on average to the lowest level of €3.4bn a year. In the 21 years of the FS in the form of public limited company, from 1992-2012, total operating grants amounted to €85bn. In addition to transfers for operating expenses, the State has also supported rail transport with substantial contributions to investment programs over the years. The reconstruction of cash flows for this purpose is shown in Table. In the nine years in which this form of total outlay was used, it amounted to €3.3bn a year on average. Furthermore, with the financial law passed in 2006, the state agreed to cover the €13bn of debt that FS incurred in order to finance the investment in the High-Speed programme. From 2006 onwards, partly as a result of comments made by Eurostat related to their failure to account for Public administration debt purposes, the method of capital increases in favour of granting direct contributions into the investment account was abandoned. Contributions made for this purpose, over the seven years between 2006 and 2012, reached a total

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of €25.5bn. Over the last three years, despite the completion of the High Speed line Turin-Milan-Naples project, the amount almost doubled: from €2.3bn in 2010 to €4.2bn in 2012.

Table2. Public grants related to assets and total support to the FS group (million €)

	Different contributions in capital	State subsidies for investments	State absorption of FS debt (1)	Increases in FS capital	Total grants related to assets	Total contributions borne by public finance
1992	38		5 000		5 038	9 066
1993	270		2 500		2 770	7 561
1994	56		3 174	852	4 083	8 131
1995	112		2 697	767	3 577	8 024
1996			2 098	2 541	4 639	8 708
1997			31 193	2 633	33 827	36 156
1998				3 371	3 371	7 496
1999				3 822	3 822	7 845
2000				3 176	3 176	7 383
2001				3 615	3 615	7 995
2002				4 078	4 078	9 138
2003	103	14		3 934	4 051	8 158
2004	68	257		2 665	2 989	7 937
2005	360	174		3 006	3 540	7 657
2006	416	4 477	13 058		17 951	21 102
2007	382	3 895			4 277	8 521
2008	317	3 015			3 332	7 697
2009	315	4 773			5 089	9 234
2010	93	2 201			2 294	5 806
2011	75	3 080			3 155	6 484
2012	117	4 047			4 164	7 559
Total					122 836	207 657
<i>Yearly average</i>					5 849	9 888

Sources: Reports of "Corte dei Conti" and FS. (1) with interests.

Throughout the 1992-2012 period, capital funding to FS reached a total value of €122.8bn (not adjusted in terms of price dynamics). If the funds for operating expenses are added, the total public support to the FS group amounts to €207.7bn over the 21 years, corresponding to a yearly average of €9.9bn.

4.2. Great Britain

Welsby & Michols, (1999) present a survey of the privatisation of the rail industry in Britain in the context of national rail policy over recent decades. They draw attention to the inherent problems of the British rail privatisation, including the need for continuing subsidy. Before the reform of the British rail transport sector, public financial support was formed by direct subsidies in favour of the incumbent operator British Rail (BR); subsidies were directed to Passenger Transport Executives (PTEs). Compared with the performance of the nationalised British Rail, gains made since privatisation are not as high as those made in the later period of public sector management (Cowie, 2002). The reform led to significant changes in the scheme of public funding, with the new regime based on the allocation of passenger rail services, broken down into groups of routes, through tenders designed to achieve economic stability by compensating for unprofitable lines. Public support to the rail sector was therefore mainly represented by transfers granted to railway companies of the OPRAF, which was first overtaken by the Strategic Rail Authority (SRA) followed in a direct way by the Department for Transport (from 1999 and from 2004). Cowie (2009) examines the issue of subsidy cuts and efficiency gains arising from the first round of franchises from the British passenger rail privatisation. The author states that a problem is identified in past studies regarding the lack of a progressive dynamic between subsidy and efficiency over time. The detection of the functional deficiencies of the network in the late '90s led to the need for costly, extraordinary, improvement interventions that could not be supported

by the private operator and thus required increasing public financial support. The taxonomy of grants to the rail sector has shaped as follows: (i) direct subsidies to the network operators, (ii) transfers from the central government to passenger TOCs for franchising contracts, (iii) transfers to the Passenger Transport Executives (PTE), (iv) subsidies to the freight transport segment, (v) residual costs of the financial relationships between the public sector and the railway sector. Table shows the reconstruction of public transfers to the British rail sector.

Table3. *Public subsidies to the rail transport sector in Great Britain (million GBP)*

	Direct subsidies to network operators	Central government subsidies to TOCs (and BR pre-reform)	TOTAL network and TOC subsidies	PTE subsidies	Other elements of public support to the rail sector	Subsidies to the freight transport segment	TOTAL subsidies to the rail transport sector
1985-86	0	849	849	78	61	7	995
1986-87	0	755	755	70	22	6	853
1987-88	0	796	796	68	-251	2	615
1988-89	0	551	551	70	-175	2	448
1989-90	0	479	479	84	232	1	796
1990-91	0	637	637	115	440	4	1 196
1991-92	0	902	902	120	562	1	1 585
1992-93	0	1 194	1 194	107	870	2	2 173
1993-94	0	926	926	166	535	4	1 631
1994-95	0	1 815	1 815	346	-464	3	1 700
1995-96	0	1 712	1 712	362	-1 643	4	435
1996-97	0	1 809	1 809	291	-1 044	15	1 071
1997-98	0	1 429	1 429	375	25	29	1 858
1998-99	0	1 196	1 196	337	53	29	1 615
1999-00	0	1 031	1 031	312	75	23	1 441
2000-01	0	847	847	283	84	36	1 250
2001-02	684	731	1 415	306	105	57	1 883
2002-03	1 166	935	2 101	304	183	49	2 637
2003-04	1 670	1 359	3 029	414	179	32	3 654
2004-05	2 370	878	3 248	389	154	26	3 817
2005-06	3 367	879	4 246	332	24	23	4 625
2006-07	4 463	1 456	5 919	313	76	30	6 338
2007-08	3 673	1 123	4 796	310	187	18	5 311
2008-09	4 266	237	4 503	317	356	21	5 197
2009-10	3 564	450	4 014	316	38	20	4 388
2010-11	3 492	-51	3 441	207	345	20	4 013
2011-12	3 745	-131	3 614	214	708	17	4 553
2012-13	3 780	-420	3 360	164	1 536	17	5 077
Total from 1992-93 to 2012-13			55 645				64 667

Source: *own elaboration based on Arrigo & Di Foggia (2013)*

4.3. Germany

The current structure of the German railway sector is a result of the reform executed in 1993-94 that required to implement the integration process between the two railway companies of the West and the East and to deal with the problems that came along with it, in particular the excess personnel, the social security imbalance and the outstanding debt. The reform was carried out according key elements starting from the merger of the two companies with three main areas of operation: infrastructure management, passenger transport and freight transport along with the creation of the EBA (*Eisenbahnbundesamt*), the Federal Railway Office. Based on the reform, the powers responsible for the provision of subsidies to the rail transport sector are shared between the central government and local authorities: the *Bund* is mainly responsible for financing investments in infrastructure while the *Länder*, through special authorities of the sector, are

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responsible for defining public service obligations for regional/local transport and distributing the relative compensations. Funds required by local authorities to finance regional rail transport are guaranteed by federal transfers from the *Regionalisation Fund* (RF), whose funds, equal to around €7bn per year, also include the financing of road transport in metropolitan areas and of modernising stations. Public subsidies to the German railway system can therefore be classified as follows: first comes the financial support from the central government to the network managers *DB Netz* for investments. Second comes the funding from local authorities appointed by the *Länder* for charges arising from public service obligations (PSO) for regional transport. Third comes the financial support to the public entity, BV. The reconstruction of the data on public subsidies in Germany is however problematic as the financial statements of *Deutsche Bahn* do not show public subsidies, while the balance sheet of the network operator *DB Netz* is not made available on the company website. Due to the impossibility of directly obtaining the data, we rely on data provided by Dehornoy (2011).

Table 4. *Subsidies to the rail transport sector in Germany (2010) – Mil. €*

Subsidies to:	Granted by:		
	federal government	Länder	total
Deutsche Bahn per PSO	300	4 500	4 800
Other undertakings to PSO		800	800
<i>Tot. Subsidies to PSO</i>		<i>5 300</i>	<i>5 600</i>
Network manager (DB Netz)	4 100	500	4 600
<i>Total subsidies network and transport</i>	<i>4 400</i>	<i>5 800</i>	<i>10 200</i>
BEV (historic debt and pension)	5 700		5 700
<i>Total public spending</i>	<i>10 100</i>	<i>5 800</i>	<i>15 900</i>

Source: *Own elaboration on data Dehornoy (2011).*

For the years following 2010, there is no data available that can be considered perfectly comparable, however it should be noted that Germany notified the EU commission of total state aid to the rail sector equal to €9.5bn for the year 2011 and €9.3bn for the year 2012, of which €4.8bn was support for the network and €4.5bn for public service obligations. In the case of Germany, a comparison over a longer period can only be made homogeneously for the nine years between 2002 and 2010 due to the unavailability of German data in the years before and after. During this period, the burden for German public finance was €88bn.

4.4. France

Quinet (2006) describes how, France, like other countries has special characteristics that affect its approach to railway reform. The author speculates about the likely effects of reforms in particular on competition issues. The French railway was subjected to reforms in the mid-90s following the application of EU directives. After the reform, the French National Railways (SNCF) remained in charge of railway operations while a new French Railways Infrastructure Authority RFF (*Réseau Ferré de France*) assumed management and development of the Freight national rail infrastructure (Batisse, 2003).ⁱ On the basis of the reform, the State is primarily responsible for the funding of infrastructure. *RFF* received grants to finance the difference between the costs of operation and maintenance of the network, and the proceeds of the tolls paid by *SNCF* railway and other companies, to help finance costs arising from the renewal of the network and new investments and to amortize the debt incurred for the construction of the old lines that remained its responsibility. Since 2011, the state has also taken on the responsibility of organising and financing some unprofitable interregional medium-long distance passenger transport services. The regions, by means of the *Autorités Organisatrices des Transports (AOT)*, are responsible for organising, assigning and financing passenger transport of local interest. Through the data of the *Comptes des transports* annual report, it was possible to reconstruct the public subsidies to the French rail transport sector for the 1987-2012 period, see Table. In 2012, total subsidies were equal to €9.7bn, a very similar figure to that of Germany, a country that is similar to France both in terms of network size and rail passenger transport development.

Table5. Subsidies to the rail transport sector in France (million €)

	Subsidies SNCF income	Subsidies SNCF assets	Subsidies SNCF total	Subsidies RFF income	Subsidies RFF assets	Subsidies RFF total	Total subsidies
1987			3 735				3 735
1988			3 644				3 644
1989			3 979				3 979
1990			3 796				3 796
1991			3 506				3 506
1992			4 528				4 528
1993			4 482				4 482
1994			4 756				4 756
1995			5 016				5 016
1996			5 183				5 183
1997			5 153				5 153
1998	2 607	1 052	3 354	1 799	1 844	3 644	6 998
1999	2 648	976	3 583	1 646	2 196	3 842	7 425
2000	2 648	919	3 567	1 631	2 104	3 735	7 302
2001	2 604	1 040	3 644	1 606	1 414	3 020	6 664
2002	2 827	1 275	4 102	1 406	1 765	3 171	7 273
2003	2 901	1 282	4 183	1 385	800	2 186	6 369
2004	3 251	1 249	4 500	1 765	1 837	3 602	8 102
2005	3 404	1 662	5 066	1 938	1 796	3 734	8 800
2006	3 527	1 979	5 506	1 949	1 824	3 773	9 279
2007	3 710	1 459	5 169	1 813	1 895	3 708	8 877
2008	3 960	1 348	5 308	1 463	2 029	3 492	8 800
2009	4 141	1 132	5 273	2 326	2 202	4 528	9 801
2010	4 260	915	5 175	2 400	2 230	4 630	9 805
2011	4 712	547	5 259	2 289	1 707	3 997	9 256
2012	4 940	689	5 629	2 190	1 923	4 113	9 742
Total 1992-2012			98 436			55 175	153 611
Yearly average							7 315

Source: Own elaboration on data: *Comptes des Transports*

4.5. Sweden

Sweden was the first European country to engage in a structural reform of its railway system and separate ownership and management of the network from the national transport operator. Sweden's reforms in the railway sector began in 1988 with the vertical separation of track infrastructure from operations, and the relocation of responsibility for unprofitable local and regional railway lines to the Public Transport Authorities (Alexandersson et al., 2012). In the same year, the network ownership switched from *Statens Järnvägar* (SJ) to the newly created public agency *Banverket* (BV). As a result of the reforms, the activities that remained under the incumbent responsibility were divided in 2001 into eight different LTDs of which only three remained State-owned. Over the following years, a gradual liberalisation implemented in 2010 led to the full opening of the market, thanks to which, starting from the 2011-12 season, it was possible for any rail operator within the EU to compete in the Swedish arena. Many operators entered the market and acquired significant market shares. In 2009, Sweden also took steps to unify the management of the transport networks through a new public body. Government subsidies supporting rail transport have assumed different characteristics, purposes and magnitudes over time. In the pre-separation period of the network, the incumbent was the only interlocutor of the government for sector interventions and the sole beneficiary of public transfers. Grants could take the following forms: (i) purchases of transport services, (ii) compensation for special tariffs aimed at special users, e.g. poor purchasing power; (iii) public support to private investments with long payback period; (iv) cancellation or reduction of the debts accumulated by the incumbent in favour of the State. In the decade preceding the reform, the different types of transfers resulted to amount to €0.3bn per year (Nilsson, 2002). Following the reform, the mentioned supporting schemes changed. Government transfers to *Banverket*, the new network manager, were designed to cover on one side the difference between operating and maintenance

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costs and revenues from rail tolls and on the other side investments for network renewals and new projects. Passenger operators received compensation for non-market transport services. The overall cost of the network borne by the public sector is measured by Nillson (2002) for the 90s decade by calculating the difference in total costs of *Banverket*, including network operating costs, maintenance costs, renewals and new investments, and operating revenues, mainly coming from rail charges. Using the same criteria, this paper updates the Swedish data based on the annual reports of *Banverket* until 2009 and *Trafikverket* from 2010 onwards.

Table6. Public expenditure for the Swedish rail network (1989-2012) – Mil. SEK

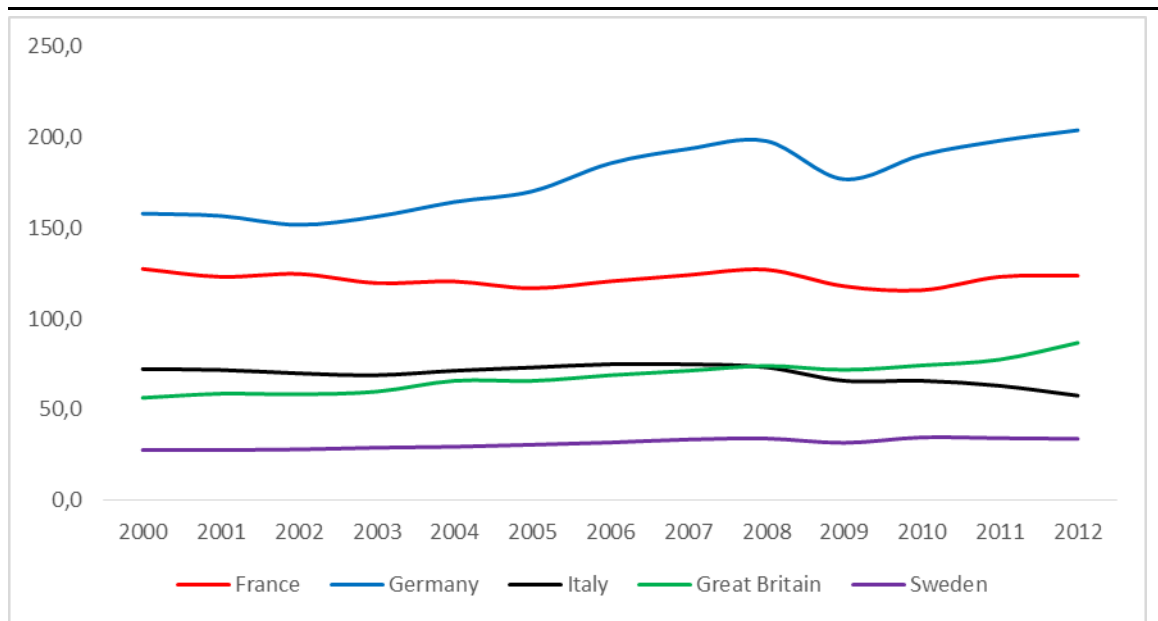
	Network operating revenues	Operating and maintenance costs	Operating costs net of revenues	Network renewal costs	New investment costs	Total costs net of operating revenues
	A	B	C=B-A	D	E	F=C+D+E
1989	751	1 870	1 119	805	1 140	3 064
1990	740	1 878	1 138	835	1 867	3 840
1991	687	1 854	1 167	702	2 574	4 443
1992	693	2 218	1 525	615	4 076	6 216
1993	670	2 236	1 566	821	4 687	7 074
1994	684	2 297	1 613	1 709	7 564	10 886
1995	711	2 307	1 596	1 822	8 643	12 061
1996	824	1 982	1 158	1 354	7 363	9 875
1997	1 034	2 010	976	1 043	4 883	6 902
1998	1 029	2 022	993	859	5 875	7 727
1999	275	2 384	2 109	520	5 068	7 697
2000	442	2 434	1 992	827	3 780	6 599
2001	456	2 745	2 289	858	3 277	6 424
2002	482	3 054	2 572	960	3 927	7 459
2003	513	3 431	2 918	1 085	4 721	8 724
2004	503	3 276	2 773	1 305	6 207	10 285
2005	545	3 215	3 215	1 534	7 200	11 949
2006	531	3 326	2 795	1 565	7 464	11 824
2007	676	3 532	2 856	1 499	9 258	13 613
2008	650	4 145	3 495	1 782	10 551	15 828
2009	732	4 685	3 953	1 940	12 664	18 557
2010	901	5 378	4 477	2 170	11 822	18 469
2011	869	5 679	4 810	1 605	11 428	17 843
2012	992	6 345	5 353	2 044	9 792	17 189
Total 1992-2012						233 201

Source: Own elaboration based on Nillson (2002), *Banverket* and *Trafikverket*

Total costs borne by the public sector in 2012, less than the previous years, amounted to €1.98bn using the average annual exchange rate of SEK8.7 per €1. For the whole period, 1992-2012, total grants amounted to €26.8bn.

5. RESULTS AND DISCUSSION

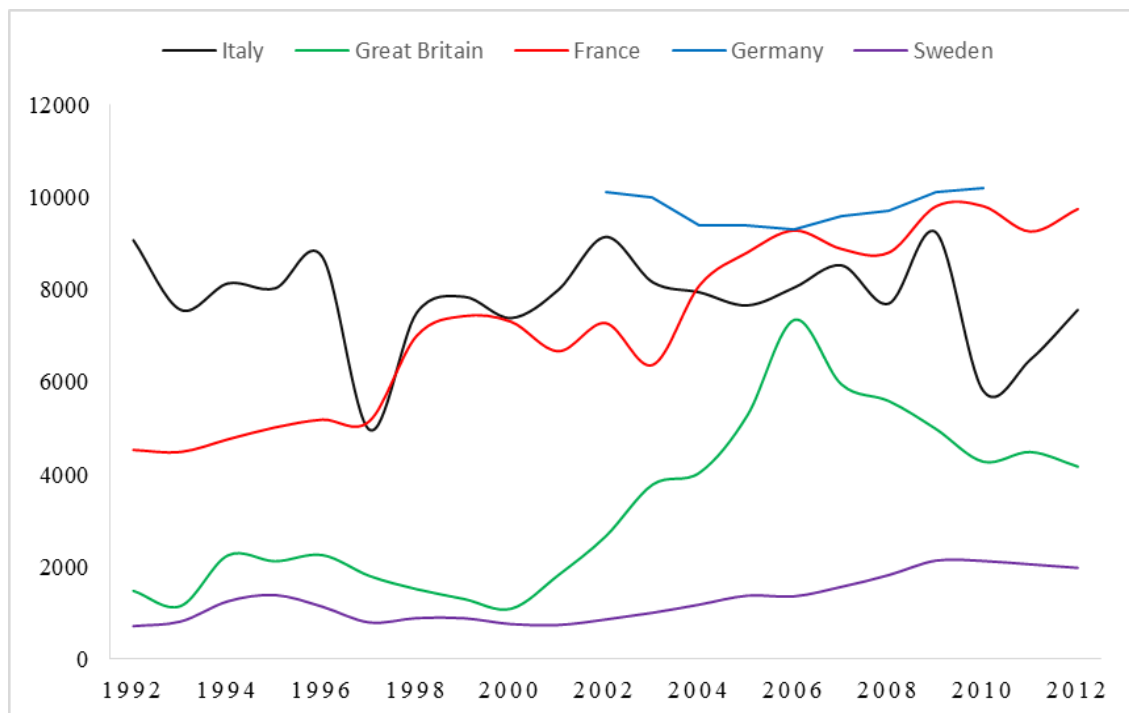
State representatives are expected to manage public resources accurately and pursue the most desirable community's surplus in terms of economic welfare, to this extent it is well-known that government policy and market structure influence the performance of firms (Di Foggia, 2014). After having reconstructed the data concerning total public transfers paid to the rail transport sectors of the five major European countries over a long period of time, sufficient information emerge to draw comparative conclusions on the coherence of the transfers paid in each of the countries with respect to the magnitude of the sector. Graph depicts the size of the railways industry according to the units of annual traffic produced.



Graph2. Size of rail transport in the five major EU countries

Source: Own elaboration

The units of traffic are, in the railway sector, a synthetic measure of production obtained by merging the transported passenger-km and ton freight-km. As illustrated in the graph, Italy, in addition to recording a decline from 2007 onwards, only reached 60bn units of annual traffic in 2012, less than that of Great Britain, while France exceeded 120bn and Germany exceeded 200bn.



Graph3. Total public subsidies to the rail transport sectors in the five major EU countries

Source: own elaboration of the data indicated in the analysis of each country. Italy: transfers of debt to the state that occurred in 1997 and 2006 are not included.

At this point, it is interesting to try to estimate the total amount of subsidies that would have been granted in Italy if they had used criteria similar to those of the other countries. More precisely, given that the criteria is not made explicit by the countries and we could only obtain the proportion between the subsidies actually paid and the factors (network size and transport) that may justify their needs, we attempt estimate the needs related to the subsidies in Italy, in order to verify what amount would be granted in a different contexts.

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Table7. 2012 Actual and theoretical subsidies in the five countries (Bil. €)

With standards of:	Public subsidy (yearly)					
	Sweden	Great Britain	France	Germany	Italy	Total 5 States
Sweden	2.0	4.6	7.8	9.3	3.6	27.3
Great Britain	1.8	4.2	7.0	8.4	3.3	24.6
France	2.5	5.8	9.7	11.6	4.6	34.2
Germany	2.0	4.6	7.8	9.3	3.6	27.4
Italy	4.1	9.7	16.2	19.4	7.6	57.0
Average (excluded Italy)	2.1	5.0	7.5	9.8	3.8	28.2
<i>Difference between actual subsidy and the average:</i>	-0.1	-0.9	2.2	-0.4	3.8	
<i>% Excess/lack of subsidy with respect to the average</i>	-5.1	-17.0	29.5	-4.5	101.5	

Source: own elaboration

Table indicates, taking into consideration Sweden as a reference, that in 2012, the theoretical subsidies calculated according to British standards would result €1.8bn, with German standards €2bn, using French standards €2.5bn and applying Italian standards €4.1bn. to the same token, using the average of the countries other than Sweden as a benchmark, exception made for Italy as it represents an anomalous case, the analysis suggests a value of €2.1bn, slightly higher than the actual value. Also for Great Britain, the average with the criteria of the other countries produces a value higher than the reality (€5bn versus €4.6bn), the same happens as per Germany (€9.8bn versus €9.3bn). The countries for which the actual value is higher than the theoretical value are France (€7.5bn expected versus €9.7bn actual) and Italy. Considering for example the British standards, the total subsidies to the Italian rail transport sector should have been €3.3bn per year. The average of the four countries therefore equals €3.8bn per year. The estimation of excess subsidies to the Italian rail sector is larger than that provided by Arrigo and Di Foggia (2013).

6. CONCLUSION

This paper showed that there is plenty of room for a deeper investigation into the spending review of the investigated sector. Throughout the entire 1992-2012 period, total government expenditure on railways in Italy was €207.7bn, in France was €153.6, in Great Britain was €69.3 and finally in Sweden was €26.8. We do not know the total of Germany for the entire period; nevertheless, from 2002 to 2012, it amounted to €88bn. The paper also showed what level would each country have reached by applying the standards of the other countries. In order to estimate this, our method was to multiply each of the other amounts by the ratio between the synthetic index of the dimensions of the Italian rail sector (SISR) and that of the specific country for the entire period of 21 years. To obtain the Italian value with French standards, we divided the total French subsidies – €153.6bn – by 1.85 (instead of the 2.14 used for 2012), obtaining €83.2bn, corresponding to 40% of the actual figure of Italy. In a similar way, in order to obtain the Italian value by British standards, we divided the total British subsidies – €69.3bn – by 1.09 (instead of 1.27 used for 2012), obtaining €63.6bn (31% of the actual Italian figure). Finally, in order to obtain the Italian value by Swedish standards, we divided the total Swedish subsidies – €26.8bn – by 0.5 (instead of the 0.54 used for 2012), obtaining €53.6bn (26% of the actual Italian figure). The average value of the theoretical subsidies, calculated by the standards of the three countries, amounted to €66.8bn corresponding to 32% of the actual Italian figure. The above mentioned results have political economy implications, especially in those countries where financial problems have arisen recently. Opening up national rail markets to cross-border competition is a major step towards establishing an integrated European railway area. Since the European Commission aims to remove obstacles to fair competition comparable information as provided in this paper is a pillar in shaping the market.

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