



Public Expenditure on Railways in Europe: a cross-country comparison

Ugo Arrigo - Giacomo Di Foggia



Ugo Arrigo: Professor of Public Finance, University of Milano-Bicocca

Giacomo Di Foggia: Adj. Prof. of Economics, University of Milano-Bicocca

Sommario

| | |
|---|-----------|
| 1. Introduction and main results | 3 |
| 2. Types of public subsidies to the rail transport sector..... | 5 |
| 3. Public subsidies to the rail transport sector in Italy | 7 |
| 4. Public subsidies to the rail transport sector in Great Britain..... | 11 |
| 5. Public subsidies to the rail transport sector in Germany | 16 |
| 6. Public subsidies to the rail transport sector in France..... | 21 |
| 7. Public subsidies to the rail transport sector in Sweden..... | 25 |
| 8. A comparison of public subsidies granted in the five countries..... | 28 |
| 9. The formation of the Italian public debt | 34 |
| References | 37 |

1. Introduction and main results

What is and which was, over a long period of time, the overall burden of Italian rail expenditure on public finance? Was it or is it higher or lower than in other countries, taking into consideration different network sizes and traffic? Can it, from a *spending review* perspective, be reduced? Have governments that have succeeded been able to control expenditure and direct it towards objectives of efficiency, growth within the sector or modal shift? What impact has public railway expenditure given had on the formation of Italian public debt?

Since the answers to all of these questions are unknown, this paper aims to reconstruct the total amount of public subsidies paid to the railway sector over the last quarter of a century in five major European countries: Italy, Great Britain, Germany, France and Sweden. The main objective is to evaluate the appropriateness of transfers granted in Italy compared to other European countries in view of containing and rationalising public expenditure, improving overall system efficiency and protecting competition in a market that has, at least from a legal point of view, fully liberalised segments.

In Italy, the public expenditure on railways in the 21 years since the transformation of FS into a public limited company (1992-2012) was tremendous: €207.7 billion – €84.8 billion grants to the income while €122.8 billion to assets, reconstructed by adding historical data together, without any inflation adjustment. This corresponds to €9.9 billion per year, a figure that represents a significant share of the annual Italian public deficit. During the same period, French expenditure on railways was €153.6 billion, however the French rail sector is twice the size of Italy's in terms of infrastructure dimensions and has more than double the amount of passenger transport. British expenditure on railways was €69.3 billion, one third of that of Italy, despite the British network being the same length as Italy's and the traffic transported throughout the period considered being practically the same. The comparison with Germany also confirms Italy's over expenditure. German figures are only available for the nine years between 2002 and 2010, amounting to €88 billion in total (compared to €85 billion in Italy in the same period), corresponding to an annual average of €9.8 billion. However, the German railway sector is two and a half times the size of Italy's.

In the last year available, 2012, the total government expense finance was €7.6 billion, well below the average of the 21 years analysed, but considerably higher than the €6.5 billion in 2011 and €5.8 billion in 2010. By British subsidy standards, calculated in the study based on the size of the network and traffic, the total transfers to the Italian rail sector would have amounted to just €3.3 billion last year, €4.6 billion by French standards and €3.6 billion by German and Swedish standards. Based on the average standards in these four countries, the total outlay for Italian public finance should have only been €3.8 billion, exactly half of what was actually granted to the FS group.

If the standards of these countries over the 1992-2012 period would have been applied, total subsidies in Italy would have amounted to €83.2 billion by French standards (40% of that given in Italy), €63.6 billion by British standards (31% of that given) and €53.6 billion by Swedish standards (26% of that given). The average value of theoretical subsidies, calculated using the standards of these three countries, amounted to €66.8 billion, equal to 32% of the actual €207.7 billion given in Italy.

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. Two-thirds of total public expenditure on railways in Italy could have been saved, had they followed subsidy choices similar to those of the other countries.

High-spending in the Italian rail sector, on the other hand, cannot be justified by increased investment in Italian high speed lines: since 1992, 700km of high speed lines have been built and put into operation in Italy, compared to more than 1200km in Germany, 1300km in France and 1600km in Spain - a country traditionally characterised by low rail subsidies but that, due to lack of data, could not be included in this study. The high Italian expenditure on railways cannot even be justified by a greater increase in traffic levels, given that Italy is the only country in which they have in fact decreased: from 1992 to date, FS passenger kilometres 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%.

This study also aims to assess the impact that expenditure on railways has had on the formation of the high Italian public debt. If one assumes that all transfers to the railway sector, from 1992 to date, have been financed by debt, the railway component of the current stock of public debt would amount to €388 billion, €215 billion for rail subsidies (obtained by adding the €207.7 billion from 1992 – 2012 and the €7 billion hypothesised for 2013) and €173 billion for accumulated interest on the debt. This figure represents 18.8% of the gross Italian public debt as of the end of 2013 and 19.9% of the public debt calculated net of cash and loans to the Treasury.

If one assumes instead that the public expenditure on railways actually needed, calculated according to the standards of other countries, was financed by taxation and that only excess spending related to it was financed with debt, the impact of railway spending on the formation of debt amounts to €259 billion, of which €143 billion arises from excess subsidies and €116 billion from the interest paid on the debt incurred to finance them. The figure of €259 billion corresponds to 12.5% of the Italian gross public debt before 2013, and 13.3% of net Italian public debt.

A further calculation refers to the weight of the public “railway” debt on the excess of the Italian public debt with regards to the compatible level set by the Maastricht parameter i.e. 60% of GDP. The level of net public debt, €1.95 trillion in 2013, can be divided into €934 billion allowed by the

Maastricht constraint based on nominal GDP and €1.016 trillion “excess”. Of this €1.016 trillion, the €259 billion of Italian railway overspending and the relative interest represent 25.5%. If they had been avoided by a prudent policy of public transfers to the railway sector, today the debt / GDP ratio would be 17 percentage points lower.

These calculations regarding the impact of the high Italian expenditure on railways on the public debt refer to the excess expenditure since 1992 (eve of the so-called Second Republic) to date, that we have been able to estimate. Since it seems difficult to imagine that the rail expenditure, over a long period of time, was more virtuous in the first republic than the second, we should not be surprised to discover, if it were possible to go even further back in the reconstruction of rail subsidies, that the excess Italian rail expenditure is responsible for between one-quarter to one-third of the total Italian public debt and more than half of the excess debt than that allowed by the Maastricht constraint.

2. Types of public subsidies to the rail transport sector

This paper is a continuation of a previous analysis that examined the transfers to the rail sector listed as “State Aid”, reported annually by member countries and delivered to the European Union Commission (Arrigo and Di Foggia, 2013). In Europe, data on state aid to railways suffer from some limitations (EU Commission, 2013), of which the main ones are the following:

1. Missing data for some years as a result of missing notifications from members. Italy, for example, did not submit notifications for 2008 and 2011, while the 2012 notification did not include assistance granted by regions to local rail transport.
2. 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). Additionally, some countries (not including Italy) include, without the possibility of distinguishing them, public expenses resulting from the coverage of the imbalance of pension accounts of former railwaymen.

In order to overcome these problems, this analysis has attempted to obtain data on the public subsidies in a direct way, from national sources of the countries surveyed (such as regulator reports, ministries of the sector, annual reports from the managers of the railway network and the transport operators). The sources are specified throughout the paper and the relevant references are listed in the bibliography.

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. With regards to the intended purpose, it may be destined, on the network side, to the construction of new railway lines, the renewal of existing ones, or their ordinary management; on the transport side, to the

acquisition or modernisation of rolling stock, the support of local passenger services (long distance unprofitable ones) or freight transport.

Regarding operating grants, they may be intended as financial support for the management of the rail network or transport service. Firstly they have the effect of allowing usage tariffs of the network to be lower, advantageous for the majority of the rail transport companies that use the network and therefore not distorting competition. Secondly, specific beneficiary transport companies that may be in competition with others are not distortive if finance was granted through fair tender procedures that are transparent and non-discriminatory of the market's competition mechanisms. This method, although planned as part of Italian local public transport reforms introduced in the second half of the 90s, has never reached complete or extensive implementation.

Regarding the objectives, capital grants for the network are typically targeted at the development of the network in the event that it cannot be maintained by the operator in market conditions through venture capital and debt financing. Since network operation is rarely profitable due to the inability of recovering costs through tools that are sustainable for transport operators, this method of support affects all European networks with very few exceptions. Routes created by *project financing* are, in fact, very rare: the great Danish bridges, the Eurotunnel, the High Speed 1 between London and the English Channel, the connection of Oslo and Stockholm with the respective airports and the new Franco-Spanish line between Perpignan and Figueras.

Support for network operating expenses is intended to finance network tariffs lower than the average cost and close to or equal to the incremental cost in the short term if required. Lower network tariffs represent an important incentive geared towards growing rail transport and, thank to this, readdressing the balance between different forms of transport. It is clear that this type of support should lead to non-discriminatory network tariffs in respect of operators that use the network.

Support for transport services, unprofitable regional or long-distance, is ultimately aimed at financing lower network tariffs for users, lower than the average cost per passenger, that promote greater use of rail transport. Without them, many links would prove to be non-economically viable, given the low load factor and the limited willingness of users to pay. Also, it is essential in this case that all rail operators can compete for grants and that they are not reserved to the incumbent operator by the decision-maker, which in all of the European countries considered, with the exception of Great Britain, is still public.

All subsidies to the rail transport sector are justified by the underlying objectives of collective well-being: those grants to the networks (related to assets) were in the form of infrastructure growth, those to the network but related to income in the form of usage growth by those who offer transport services and finally, those to transport services in the form of increased demand from users.

If we transition, however, from a normative analysis, which identifies the need to be a system, to a positive kind of analysis that examines the actual reality, as in this paper, it can be noted that not all grants are necessarily used to increase infrastructural facilities, the provision of transport services or the relative demand from customers. They may in reality be provided, by not particularly effective public decision-makers, excessively with respect to such requirements, or not properly used by those who receive them for the specific purposes for which they were awarded. In such cases, the following consequences may occur:

1. The financing of unnecessary, and therefore inefficient, costs by the network operator and/or the manager of the transport service;
2. The financing of cross-subsidies by transport services offered under monopoly, that receive public assistance, to services offered in conditions of free competition that should not benefit.

This second risk concerns countries in which market competition (*on the tracks*) is possible, at least in certain service segments. Although so far they are few in number, they are destined to grow and Italy can be found among them, in which there is competition in the high-speed segment. It is evident that if an *incumbent* operator obtains direct grants for certain types of offer without competition and in the absence of checks that should be carried out by an independent market regulator, they will be tempted to use these grants to finance predatory pricing in the segment in competition, which evidently represent their alteration.

3. Public subsidies to the rail transport sector in Italy

The public sector has long sustained the rail transport sector in Italy with significant transfers directed mainly to the financing of investment programs and to covering network operating costs and the cost of local rail transport. A complete and accurate reconstruction of all subsidies in Italy is very difficult, unlike other countries, due to the absence of a body taking on the task of recording and publishing the information over time. As a result of this difficulty, we have had to limit our reconstruction to public subsidies to the FS group, ignoring local rail networks.

Table 1: Public transfers to the FS group for operating expenses (Mil. €).

| 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.

For the 1992-95 period, the first four operative years of FS under the legal status of a public limited company, data already reconstructed and analysed by Arrigo and Beccarello (2000) has been used and reviewed, while from 1996 onwards, data has been extracted from FS group financial statements and annual reports from the Court of Auditors. Grants related to income (to FS) are shown in Table 1. The main items are represented, in accordance with the types authorised by Community rules, by contributions for the operation of the rail network and by contributions to, mainly local, transport services (for public service obligations, relating to services that are not offered under normal market conditions as they are unprofitable). In a first sub-period, up until 2000, both of the contributions were paid by the state. An additional item is represented by the use of restructuring reserves, established by specific laws (n. 538 of 1993 and 448 of 1998) to allow FS to reduce the impact of the substantial amortization of the network. There are also minor contributions for operating expenses for the four years from 1992 to 1996 that relate to contribution for early retirement costs. 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 €4 billion and €4.5 billion 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 1997 Maastricht criteria and allow admission to the euro; in 2002 and 2004, years that fell within the new center-right wing legislation, annual support rose to around €5 billion; 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 €3.4 billion a year. In the 21 years of the FS in SpA form (public limited company), from 1992-2012, total operating grants amounted to €85 billion, equivalent to an annual average of €4 billion.

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 2. As can be verified, in the first five years of the FS being managed in a corporate form, the main aid distributed was for the reimbursement of the interest paid on the debt and relative depreciation charges that led to the decision, adopted by financial law in 1997, to transfer a lump sum to the FS state debt corresponding to as much as €31.2 billion. Between 1997 and 2005, support for investments became the most prevalent form of FS capital increases approved by the sole shareholder of the Treasury. In the nine years in which this form of total outlay was used, it amounted to 30 billion lire, equivalent to €3.3 billion a year on average. Furthermore, with the financial law passed in 2006, the state agreed to cover the €13 billion 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 (Pa) 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 grand total of €25.5 billion, equivalent to €3.6 billion each year on average. Over the last three years, despite the completion of the High Speed Turin-Milan-Naples project, the amount almost doubled: from €2.3 billion in 2010 to €3.2 billion in 2011 to €4.2 billion in 2012.

Table 2: Public grants related to assets and total support to the FS group (Mil. €)

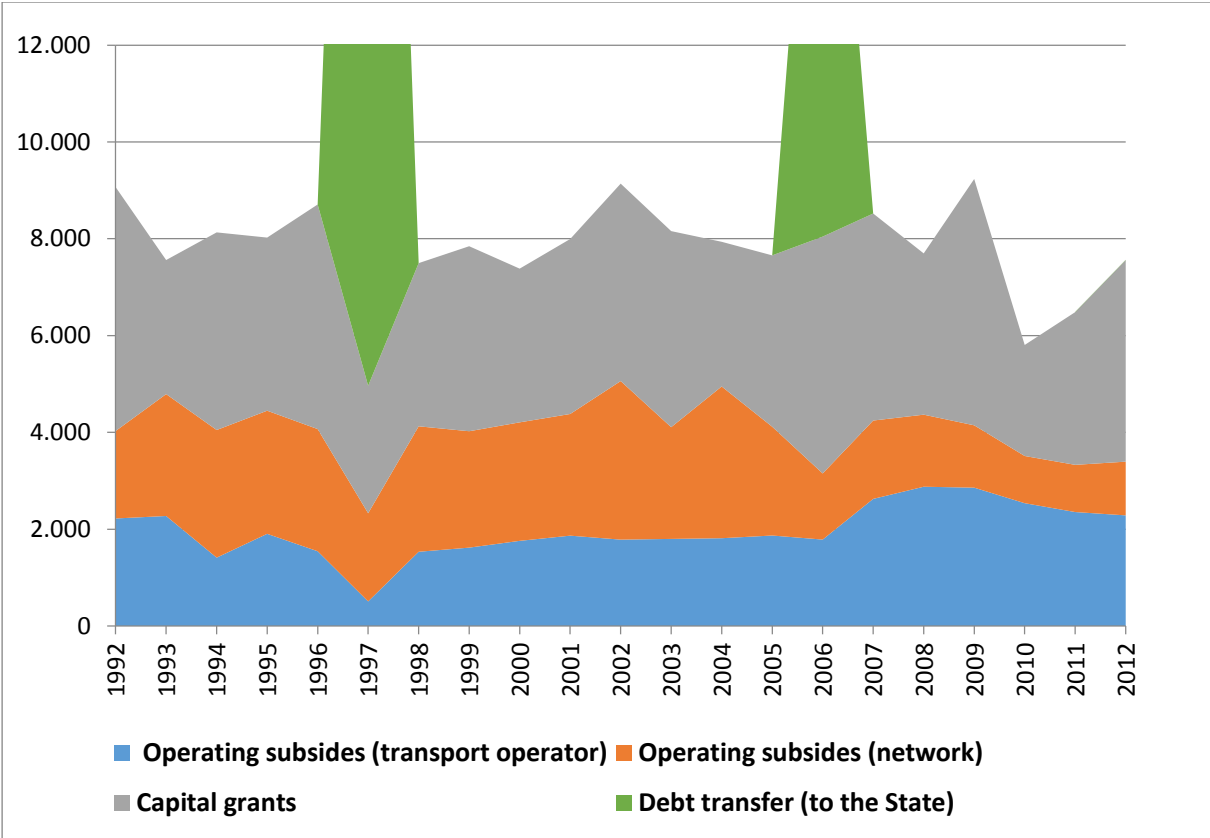
| | Different contributions in capital | State subsidies for investments | State absorption of FS debt (1) | Increases in FS capital | Total grants related to assets | Total contributions borne by public finance |
|------|------------------------------------|---------------------------------|------------------------------------|-------------------------|--------------------------------|---|
| 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 €122.8 billion (not adjusted in terms of price dynamics), corresponding to an annual average of €5.8 billion. If the funds for operating expenses are added to this, equal to €84.8 billion, the total public support to the FS group amounts to €207.7 billion over the 21 years, corresponding to a yearly average of €9.9 billion. In the last year taken into consideration, 2012, the total public outlay borne by public finance was €7.6 billion, considerably higher than the €6.5 billion in 2011 and €5.8 billion in 2010. The dynamics of public transfers are broken down into three kinds relating to subsidies, represented in Graph 1: the support of transportation services, the operation of the network and capital grants. Within the graph, the two largest transfers of debt from FS to the state, which occurred in 1996 and 2006, are only partially visible due to the different scale.

Graph 1: Public subsidies to the rail transport sector in Italy (1992 – 2012)



Source: own elaboration on data: Reports of “Corte dei Conti” and FS

4. Public subsidies to the rail transport sector in Great Britain

Before the complex reform and privatisation of British rail transport, implemented by the Major government in 1994-95, public financial support was formed by direct subsidies in favour of the incumbent operator *British Rail* (BR), a monopolistic operator that was vertically and horizontally integrated following the nationalisation of 1948, alongside loans from the national loan fund, aimed at financing investments. Public subsidies were directed to Passenger Transport Executives (PTEs), local authorities for transport in the metropolitan areas. The Major reform was characterised by the following measures (the reform did not concern the Northern Ireland rail company):

- a. The clear separation of the railway infrastructure (assigned to the new operator *Network Rail*) from the operation of passenger and freight transport (shared between several companies), motivated by the idea that competition was central to the development of the market and that it would be better guaranteed by a network manager that was not also a rail transport company.
- b. The separation of transport services actors based on their functions: providers of passenger services (TOCs), freight services, network maintenance services, rolling stock maintenance and rental (ROSCOs).

- c. Creating, from the splitting of the public monopoly, a multiplicity of actors for each of the previous functions in such a way that they were able to operate in competitive conditions.
- d. The privatisation of all railway system actors, including “the infrastructure manager” of the network (that became public again at the beginning of 2000),
- e. Keeping the following functions in the public sphere: (i) technical regulation of the sector; (ii) economic regulation; (iii) allocation, on a competitive basis, of transport services (franchising) supported by government subsidies on non-profitable routes to new railway companies. The Railways Act of 1993 assigned the last two duties to non-ministerial government departments: the Office of the Rail Regulator (ORR) for economic regulation and the Office of Passenger Rail Franchising (OPRAF) for the allocation of services through tender.

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). Alongside transfers to the railway companies were grants to the PTE, limited contributions to BR to finance the residual activities of and subsidies to, even though small, freight transport. Direct public transfers in favour of the network operator were not provided, for which reason it was determined that operating costs should be entirely covered by tolls paid by train operators.

This organizational and financial arrangement for the railway sector did not work and had to be revised at the beginning of the 2000s, mainly due to the fact that the network needed substantial investments for modernization and renewal. At the time of the reform, British rail transport was not in adequate organizational conditions due to insufficient investments in previous years in both the network and in rolling stock. Moreover, with the new, decidedly profit-oriented, post-reform private managers and the presence of limited-duration service concessions (franchising contracts), there were no sufficient incentives to accelerate investments while, in the presence of revenues that could not easily be increased in the short term, the possibility of gaining profits and rewarding shareholders depended principally on the reduction of costs. As a result of this, insufficient maintenance and renewals were carried out, leading to both an old and inadequate network and a dated rolling stock fleet. The discovery of the severe functional deficiencies of the network in the late '90s led to the need for costly, extraordinary, improvement interventions that could not be supported by its private operator and thus required increasing public financial support. The Blair government therefore decided to restore network operation to public control and to proceed with direct subsidies for its financing needs. Since then, the different elements of support of the rail sector are as follows:

- i. Direct subsidies to the network operators (*Network Rail* and *LCR–London and Continental Railways*);
- ii. Transfers from the central government to passenger TOCs for franchising contracts (which include Performance Receipts, expenses and performance awards).
- iii. Transfers to the Passenger Transport Executives (PTE) for metropolitan rail transport;
- iv. Subsidies to the freight transport segment;
- v. Residual costs of the financial relationships between the public sector and the railway sector.

Table 3 shows the reconstruction of public transfers to the British rail sector from the mid-80s until now, broken down into the previously listed items. These items are also represented in Graph 2. As one can note, the reconstruction does not include direct transfers to the networks before the 2000s as: (i) up until the 90s reform, there was no separation of the network within BR and the public company received a single transfer for network charges and service charges; (ii) following the reform, the government only funded the TOCs while the network's private operator, Railtrack, financed its operating costs exclusively through rail tolls; (iii) it was only after the constitution of the new public network operator, Network Rail, that the government chose to permanently finance it directly.

These transfers grew rapidly to reach a maximum amount of £4.5 billion in the year 2006-07 (out of £6.3 billion total subsidies to the sector). In the following years however, there was a reduction that led to the stabilisation of values between £3.5 and £3.8 billion in the last four years. During the same period, a progressive decrease in government transfers to the passenger rail operators, the TOCs, was witnessed, which, starting from close to two billion in the years of the reform, were completely cleared and became negative, transforming into net income for the public sector (£420 million in the last financial year available). This means that the total concessionary charges paid to the public sector by the railway companies that operate on the profitable routes exceed the total amount of subsidies paid by the public sector to the operators of non-profitable routes.

Table 3: Public subsidies to the rail transport sector in Great Britain (Mil. GBP)

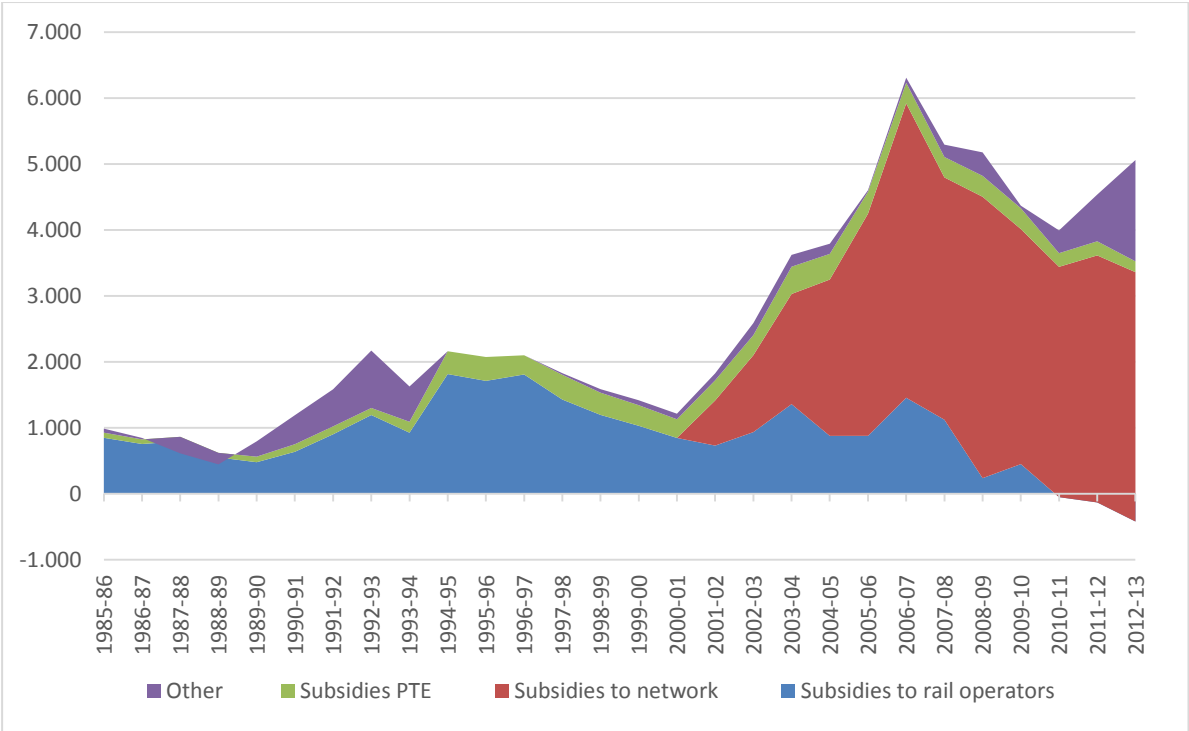
| | Direct subsidies to network operators | Central government subsidies to TOCs (and BR pre-reform) | TOTAL network and TOC subsidies | PTE subsidies | Other elements of public support to the rail sector | Subsidies to the freight transport segment | TOTAL subsidies to the rail transport sector |
|---------|---------------------------------------|--|---------------------------------|---------------|---|--|--|
| 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: ORR on data Department for Transport, Transport Scotland, National Assembly for Wales

Which of the subsidies listed in Table 3 should be considered comparable with the data relevant to the case of Italy, discussed in the previous paragraph? It is reasonable to exclude two items: (i) PTE grants, related to rail transport in metropolitan areas, since it was not possible to include its Italian non FS local rail transport equivalent in the analysis; (ii) the residual subsidies relative to a multiplicity of elements that are difficult to identify (in the years between 1994-96, this item negatively records the income generated by the public sector with the sale of the railway companies, amounts that are not represented in Graph 2) and especially since in recent years they primarily represent grants related to assets arising from cross-rail investments, a project for a high speed rail connection under the city of London that is the responsibility of Transport for London.

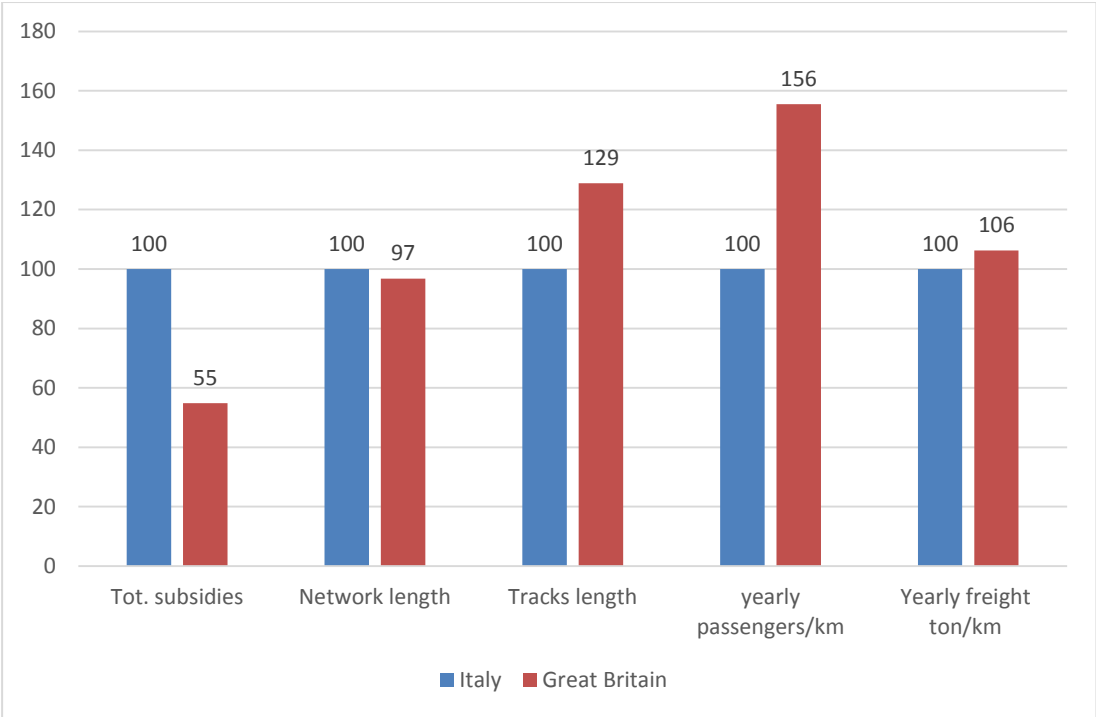
Graph 2: Public transfers to the British railway system



Source: on elaboration

The figure that is comparable to the total €7.6 billion granted to the FS group in 2012 is therefore represented by the £3.377 billion which, using the average exchange rate for 2012 of £0.81 per euro, corresponds to €4.169 billion. This value is 45% lower than that of Italy, despite the UK rail network having the same length and a significantly higher freight and passenger traffic. Graph 3 shows a bilateral comparison between Britain and Italy in 2012 regarding both the total public subsidies paid to the rail transport sector (to the FS group in Italy and to the entire sector in Britain) and some dimensional variables of the sector: network length, track length, annual transported passenger kilometres and annual transported ton kilometres. For each variable, the Italian value is always set to 100.

Graph 3: UK-Italy comparison regarding total subsidies, network and traffic (Italy = 100; year 2012)



Source: Own elaboration on data: ORR, *Conto nazionale dei trasporti*, Eurostat.

As we have previously seen, the subsidies distributed in Britain were equal to only 55% of those distributed in Italy to the FS group. The British network is slightly smaller than the Italian (-3%) when measured by the length of the lines and 30% larger when measured by the length of the tracks. The traffic carried on the British network is 56% higher with regards to annual passenger kilometres (58.3 billion compared to 37.5 billion) and 6% higher for freight ton kilometres (21.5 billion compared to 20.2 billion) – In this case all of the shipping on the RFI network is considered for Italy.

If we extend this comparison to the entire period for which we have data for both countries, one can observe that the total transfers, made between 1992-93 and 2012-13 in Britain for the items indicated above, amounted to £56.1 billion, equivalent to €69.3 billion (using the average 2012 exchange rate). Over the 1992-2012 period, public support for the Italian railway sector came to a total of €207.7 billion, exactly three times that of Britain.

5. Public subsidies to the rail transport sector in Germany

The current structure of the German railway sector is a result of the reform executed in 1993-94 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 to the following steps, of which the first four were implemented in 1994:

- i. The definitive merger of the two companies into a single LTD, (*DeutscheBahn Aktion Gesellschaft*) DB AG, divided into three main areas of operation: infrastructure management, passenger transport and freight transport.
- ii. The creation of the EBA (Eisenbahnbundesamt), the Federal Railway Office, a public body for the technical and partly economic regulation of rail activity, responsible for public funding to the company.
- iii. Reliance on the new body, BEV (Bundeseisenbahnvermögen), a kind of *bad public company*, for the management of redundant and retired staff of the old rail companies DB and DR together with the management of the debt of the past companies, amounting to around 67 billion marks (corresponding to €34 billion). The federal government bore all of the charges relating to the historical debt and to retired employees up until the end of 1993.
- iv. From 1994, DB Netz was responsible for infrastructure management and carrying out activities related to the allocation of network capacity to the carriers requesting it, traffic control, network maintenance and improvements, and the construction of new routes. The company operated according to commercial principals and recovered its operating costs through solely through toll charges collected by the carriers and other commercial revenue while the government was responsible for supporting the costs arising from investments in the network.
- v. In 1996, making the *Länder* responsible for local passenger transport with particular regards to the definition of different levels of service offered and the possibility to appoint rail operators at a local level. Simultaneously, the definition of a scheme of subsidies from the federal government to the *Länder* was defined to enable them to fund the service.
- vi. The division of the DB AG into three independent companies corresponding to the previous divisions. Consequently, DB became a holding company at the beginning of 1999 that controlled the following specialised companies: Netz for network management, *Reise&Touristik* for long-haul passenger transport; Regio for short-haul passenger transport; Cargo for freight transport; Station & Service for the management of railway stations and rail yards. In 2002, the railway market was fully liberalised with free access to the network.
- vii. In 2008, DB AG was divided into two separate holdings, the first for network activities (DB AG that owns 100% of DB Netz Ag, Db Station & Service Ag and DB Energy GmbH) and the second for transport activities (DB Mobility Logistics Ag). Thereby, a clearer separation between the network and services was created, comparable to that formed in Sweden at the beginning of the decade.

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 responsible for defining public service obligations for regional/local transport and distributing the relative compensations. A total of 27 local bodies consequently determine the levels of service and

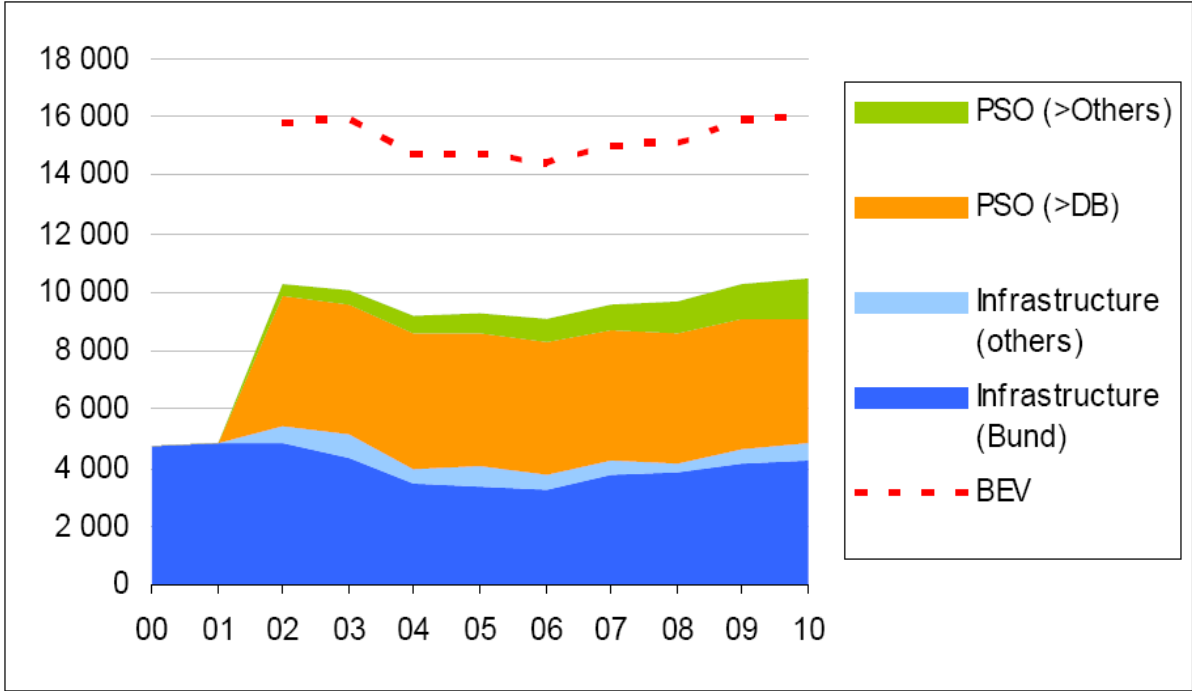
assign the offer, choosing between direct entrustment to the *Deutsche Bahn*, to a different operator, or to put the service to tender.

Long distance passenger transport cannot however benefit from public support or service obligation programmes (PSO), but must rely entirely on market revenues (as a result of this rule, after the implementation of the reform DA reduced the supply of long distance passenger transport on routes that were not considered profitable). 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 €7 billion per year, also include the financing of road transport in metropolitan areas and of modernising stations. Only around three-quarters of the *Regionalisation Fund* is used for local rail transport.

The types of public subsidies to the German railway system can therefore be classified into the following:

- i. Financial support from the central government to the network managers *DB Netz* for investments (new programmes and network renewals).
- ii. Funding from local authorities appointed by the *Länder* for charges arising from public service obligations (PSO) for regional transport, which is either attributed directly or by tender. On the basis of the 2010 data available, more than 85% of national expenditure for this purpose is given to *Deutsche Bahn*
- iii. Financial support to the public entity, BV, that is responsible for paying pensions to pre-reform rail employees and managing the stock of debt inherited from the previous rail companies. This support does not generate direct benefits for the two *Deutsche Bahn* holdings.

Graph 4: Subsidies to the rail sector in Germany (Mil. €)



Source: Dehornoy (2011). Data before 2002 partially missing.

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 use the data reported in the study by Dehornoy (2011), which used disaggregated information obtained directly from the German Ministry of Transport (Graph 4).

If we exclude, for a homogenous comparison, the public costs for pensions and outstanding debt, the total transfers to the German rail transport sector reached a sum of just less than 10 billion a year throughout the decade of 2000, exceeding it slightly in 2009-10. For 2010, the latest year available, it is possible to create a more detailed construction of the amount based on the distributing agency and its purposes. In Table 4: Subsidies to the rail transport sector in Germany (2010) – Mil. €, the total costs of the German railway system amounted to €15.9 billion, which is reduced to €10.2 billion if we exclude the federal support given to BEV for the management of the previous rail debt and the payment of pensions to former employees of the two rail companies of the West and East. Of the €10.2 billion rail subsidies, €4.6 billion were for the network and €5.6 billion were to cover the costs arising from regional rail transport.

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

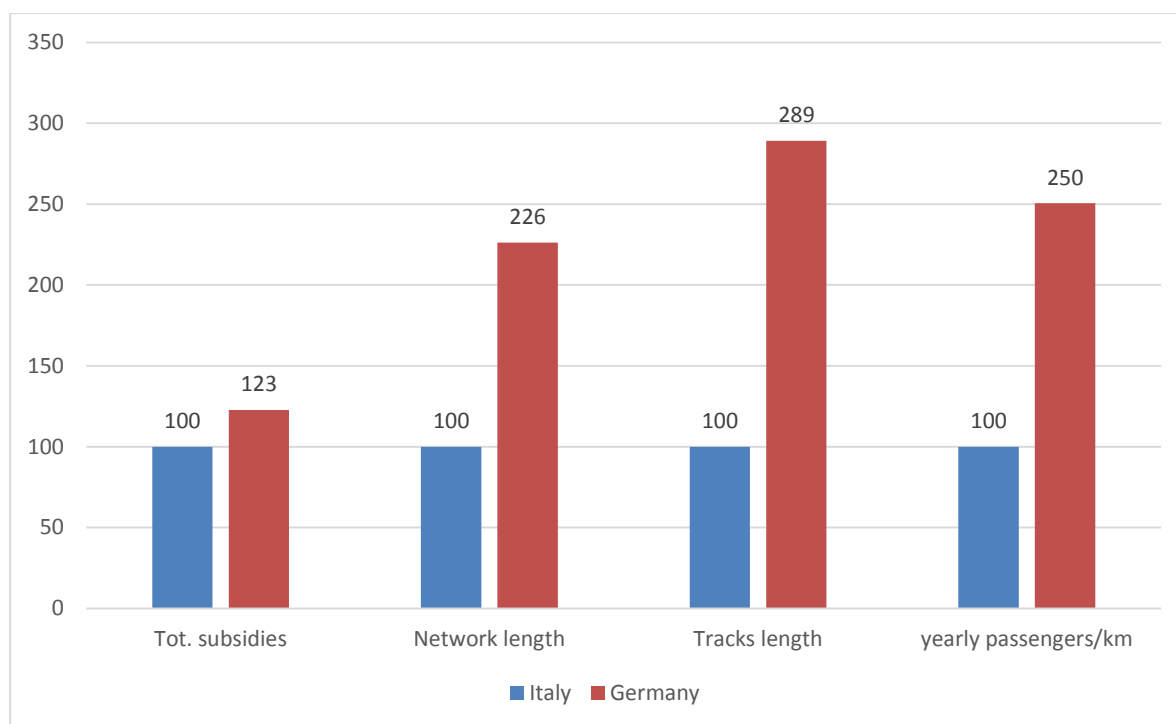
| Subsidies to: | Granted by: | | |
|--|--------------------|--------------|---------------|
| | federal government | Länder | total |
| Deutsche Bahn per PSO | 300 | 4 500 | 4 800 |
| Other undertakings to PSO | | 800 | 800 |
| <i>Tot. Subsidies to PSO</i> | | <i>5 300</i> | <i>5 600</i> |
| Network 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 €9.5 billion for the year 2011 and €9.3 billion for the year 2012, of which €4.8 billion was support for the network and €4.5 billion for public service obligations. Total German support of €9.3 billion was 23% higher than that of Italy for the same year, however, the German rail network is far more extensive and both passenger and freight traffic is multiple times the size of that of Italy.

Graph 5 makes the same bilateral comparison with Germany as was made in Graph 3 for Great Britain. German subsidies are 23% higher than those issued in Italy but the German rail network is more than twice the size of Italy's (+126%) if measured by the length of the lines and almost triple the size (+189%) if measured by the length of the tracks. Annual transported passenger kilometres are two and half times the Italian figure (93.9 billion compared to €37.5 billion in Italy, +150%), while the annual freight ton kilometres, not shown in the graph for scale reasons, are five and a half times that of Italy (€110 billion compared to €20.2 billion). Although the German subsidies are only slightly higher than those of Italy, their transport system is much more developed and consists of a much larger network.

Graph 5: Germany-Italy comparison in relation to total subsidies, network and traffic



Source: Own elaboration on data EU Commission, *Corte dei Conti*, *Conto nazionale dei trasporti* and Eurostat.

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 €88 billion while that corresponding to Italian public finances was €85.3 billion if we include the transfer of debt from FS to the Treasury and €72.2 billion if we exclude it.

6. Public subsidies to the rail transport sector in France

The French railway was subjected to reforms in the mid-90s following the application of EU sector directives. The main measures adopted were the following:

1. Establishment of RFF (*Réseau Ferré de France*), a public economic entity assigned the ownership of the network, the responsibility for its operation and investment programmes. However, despite the RFF being responsible for the operation of infrastructure and maintenance, these tasks remain delegated by the reform to the rail company SNCF and the RFF's role is reduced to mere ownership. The debt attributable to the infrastructure was transferred to RFF, 20 billion euros at its highest.
2. The SNCF retained the exclusive right to operate passenger and freight rail that would subsequently be lessened by Community rules. From 2006, freight transport was fully

liberalised (already liberalised in 2003 for international connections and in 2006 the Etablissement Public de Sécurité Ferroviaire (EPSF) for technical regulatory functions of the industry was established) and from 2010 so was international passenger transport.

3. The regionalisation of responsibilities, in terms of local transport passenger services, was put into practice on an experimental basis in 1997, but definitively and generally in 2002 with the creation of specific regional bodies. The task of defining the local rail transport services and the relative financial compensation paid, exclusively to the SNCF, were transferred to the regional bodies as a result of the reform.
4. The state has gradually borne the historical debts of the SNCF, mainly resulting from investments related to the construction of high-speed lines, through the *Service annexe d'amortissement de la dette (SAAD)*, the body that bore the cost, in several instalments during the 90s, of around 11 billion of railway company debt. Following Eurostat findings in 2008, the *SAAF* was dissolved and its debt was incorporated into state debt. Similarly, the state took over the cost of pensions of former sector employees (up until 2007 pensions were paid directly from the *SNCF*, to which the government assured a financial contribution. From 2007 however, pensions were paid independently from public funds).

On the basis of the reform, the State is primarily responsible for the funding of infrastructure. *RFF*, to compensate for its public service tasks, received grants to: i) 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; (ii) to help finance costs arising from the renewal of the network and new investments; (iii) 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. The data, broken down by beneficiary entity and type, is shown in Table 5. In 2012, total subsidies were equal to €9.7 billion, 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. Of the €9.7 billion distributed in France, €5.6 billion was given to *SNCF* (of which €4.9 billion were for public service obligations and €0.7 billion were for investments), while €4.1 billion was given to the infrastructure manager *RFF* (of which €2.2 billion were grants related to income and €1.9 billion were for investments). The total subsidies for the two entities in the grants related to income amounted to €7.1 billion, while those grants related to assets were €2.6 billion.

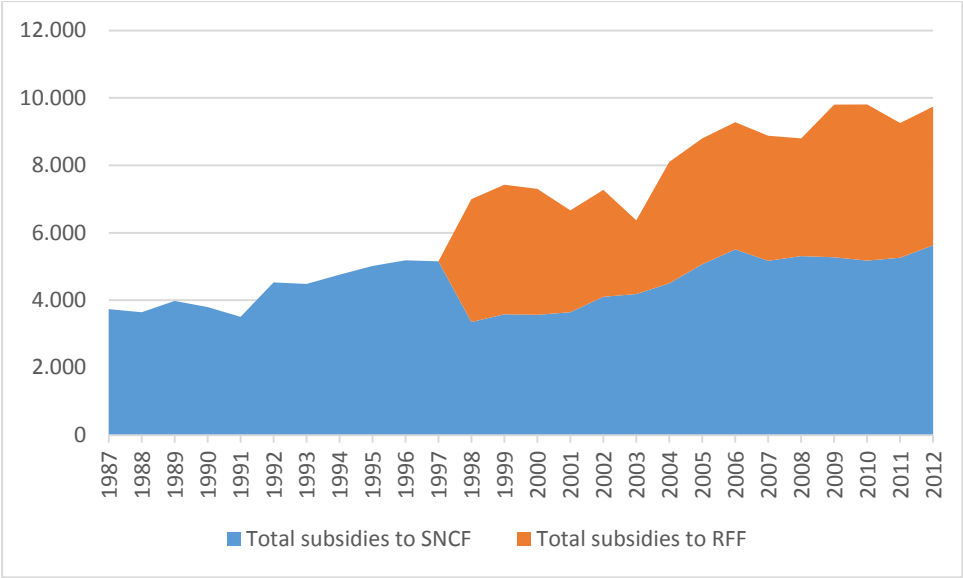
Table 5: Subsidies to the rail transport sector in France (Mil. €)

| | 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*

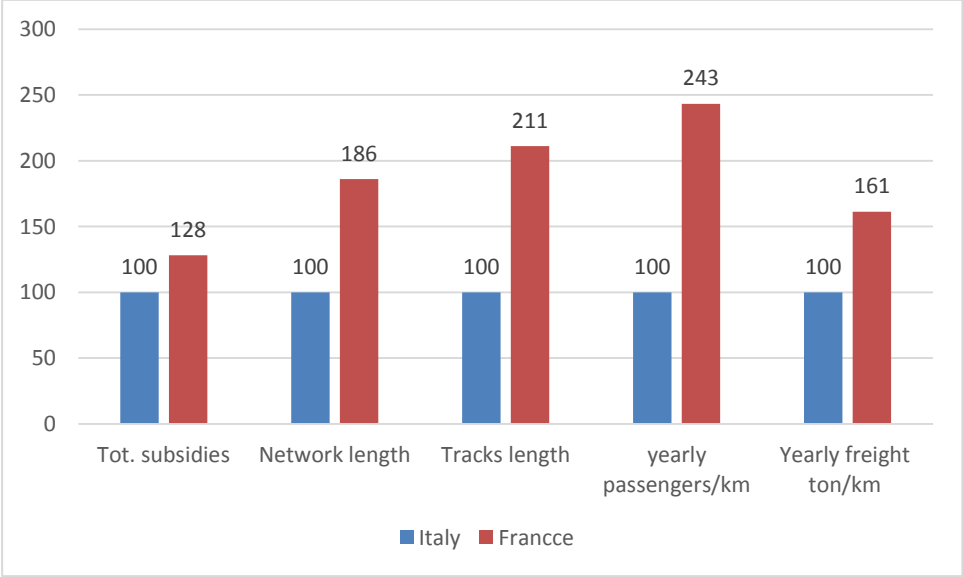
It should be noted that in more recent years, subsidies to the French rail transport sector were more substantial than those in Italy, however this did not occur throughout the examined period. In fact, between 1992 and 2012, total French transfers were equal to €153.6 billion, corresponding to 74% of the €207.7 billion allocated in Italy.

Graph 6: Subsidies to the rail transport sector in France



Source: Own elaboration

Graph 7: France-Italy comparison relative to total subsidies, network and traffic



Source: Own elaboration

Graph 7 makes the same bilateral comparison with France as already carried out for Great Britain and Germany. In 2012, French subsidies were 28% higher than those in Italy, however the French rail network is almost twice the size of Italy’s (+86%) when measured by the length of the lines and more

than double (+111%) when measured by the length of the tracks. The annual transported passenger kilometres were 2.5 times those of Italy (91.2 billion versus 37.5 billion in Italy, (+143%) while annual freight ton kilometres were 61% higher than the Italian figure. Similarly to the German case, we can also say that French subsidies were only slightly higher, however the network is much larger and the traffic much greater.

7. Public subsidies to the rail transport sector in 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. In 1988, the old public railway company, Statens Järnvägar (SJ), was deprived of network ownership as it was transferred to the newly created public agency, Banverket (BV). The reform should have been completed with the full liberalisation of network access in 1994, however the new social democratic government chose, instead of introducing competition to the market, to create competition for the market by means of tender in subsidised transport.

As a result of the new reform, the activities that remained the responsibility of the transport company SJ were divided in 2001 into eight different LTDs of which only three remained public property: (i) SJ confined to the management of passenger transport; (ii) Green Cargo, separated from SJ, for the management of freight transport; (iii) Jernhusen for the management of stations, service facilities and other property. 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 ask the network operator for any available track to offer their transport services on the Swedish network.

Following the various stages of liberalisation, and as a result of the tendering of transport subsidies, a large number of operators entered the market and acquired significant shares that were deducted from the two public incumbent operators. In 2009, Sweden also took steps to unify the management of the transport networks through a new public body called Trafikverket that overtook the Banverket rail network operator.

Government subsidies supporting rail transport in Sweden have assumed characteristics, purposed and different dimensions over time according to the different industry structures. In the period before the separation of the network, up until 1988, the public operator SJ, a vertically integrated monopoly, was the only interlocutor of the government for sector interventions and the sole beneficiary of public transfers. They could take the following forms: (i) purchases of transport services by the state that would not have been given by the SJ from a market point of view; (ii) compensation for tariff concession granted to support specific categories of users; (iii) financing of investments which would not have been granted by the SJ from a market perspective as they relate to unprofitable routes of

interventions; (iv) cancellation of the debts accumulated by SJ to the state. In the decade preceding the 1988 reform, the different types of transfers resulted in an annual average outlay, if certain stages of SJ debt repayment are excluded, of around 3 billion kronor at 2011 prices, corresponding to less than 300 million euros (Nilsson, 2002).

Following the reform, the different types of subsidy, their total amount, the entities that granted them and the subjects to which they were intended all changed. Government transfers to *Banverket*, the new network manager, were designed to cover: (i) the difference between operating and maintenance costs and revenues from rail tolls; (ii) investments for network renewals and new projects. Passenger operators, initially SJ but later all of the operators that won the assignment tender, received compensation for non-market transport services. Two types of distinct entities distribute these: (i) *Rijkstrafik* for interregional/long distance passenger rail services; (ii) the CPTA – *County Passenger Transport Authorities* for regional/local services. These grants were permanently low values, never exceeding 1 billion kronor per year throughout the 90s decade, corresponding to less than 100 million euros. They included, among other things, gross chargers for the public sector as the type of contract with which the service is assigned by the local CPTA and Rijkstrafik is of ‘gross cost’: the grantor pays the operator for the transport service based on the vehicle kms reached but takes the payment from the passengers.

The overall cost of the network borne by the public sector is much larger than the subsidies to rail carriers for unprofitable services. It was measured by Nilsson (2002) for the 90s decade by calculating the difference in total costs of *Banverket*, which include network operating costs, maintenance costs, renewals and new investments, and operating revenues, mainly coming from rail tolls. Using the same criteria, we have updated the Swedish data based on the annual reports of *Banverket* up until 2009 and *Trafikverket* from 2010 onwards, with difficulties, in the case of the manager, coming from having to separate the data related to the network from those related to the road network.

Public costs for the Swedish railway, reported in **Table 6** and **Graph 8**, highlight that the major component, relating to new investments, amounted to 9.8 billion kronor in 2012, to which the other 2 billion for renewals should be added. The total operating and maintenance costs amounted to 6.3 billion kronor, largely borne by the public sector as the cost of access charges follows the marginal cost criteria in order to maximise the use of the network and consequently allow a very limited recovery of costs. The operating revenues, largely represented by the tolls paid by the rail transport operators, consequently do not even cover one sixth of the operating costs of the network (less than a billion in 2012).

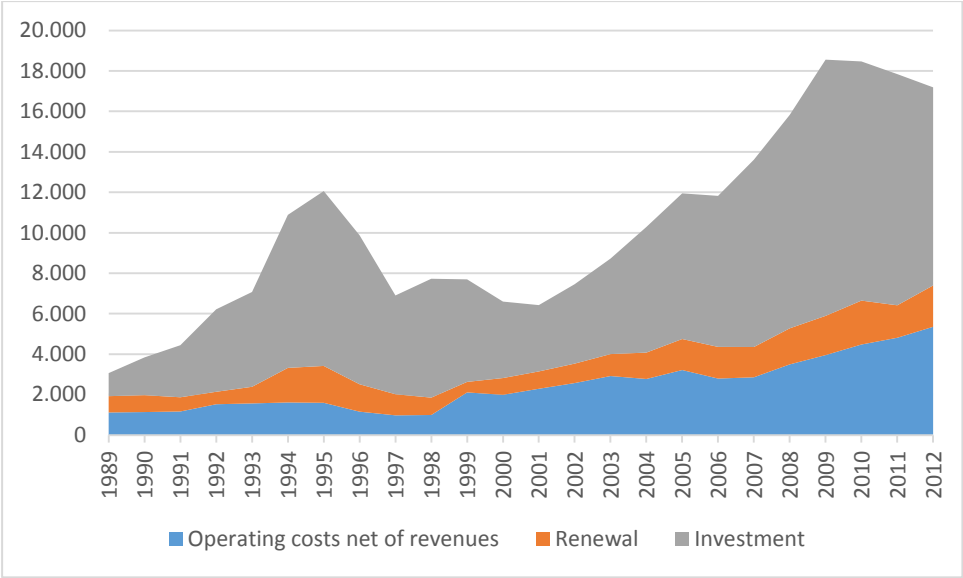
Table 6: Public expenditure for the Swedish rail network (1989-2012) – Mil. SEK

| | 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*

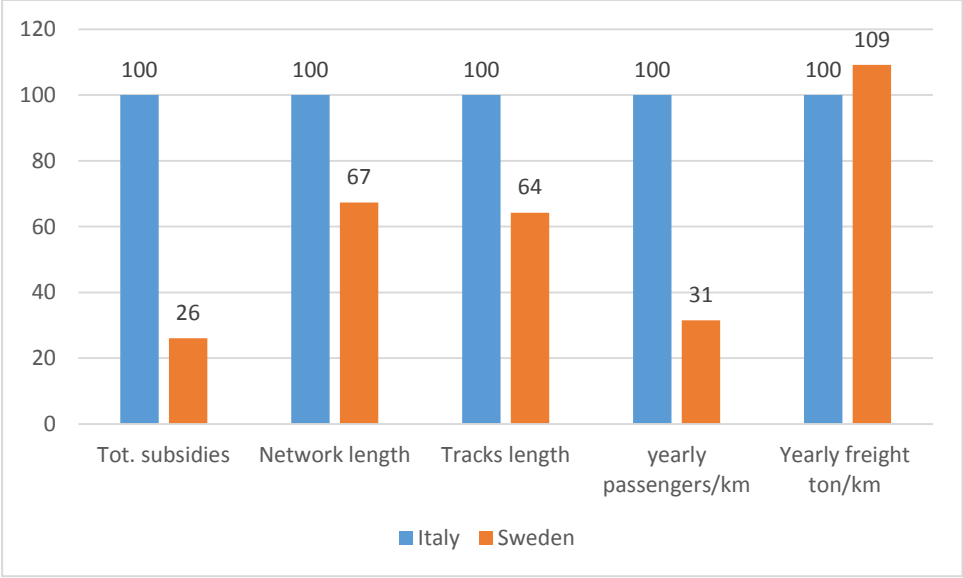
Total costs borne by the public sector in 2012, less than the previous years, amounted to SEK17 billion, equivalent to €1.98 billion euros using the average annual exchange rate of SEK8.7 per €1. For the whole period, 1992-2012, the total amounted to 233 billion SEK, equivalent to €26.8 billion. Graph 9 once again bilaterally compares the examined country and Italy: in 2012, public expenditure in Sweden was equal to only 26% of the Italian value, despite the Swedish network being equal to 67% of Italy's if measured by length of the lines and 64% when measured by length of the tracks. Transported passenger km were 31% of Italy's (€11.8 billion versus €37.5 billion in Italy, but Sweden has less than a sixth of Italy's population) while the annual freight ton km were 9% higher than Italy's.

Graph 8: Public expenditure for the Swedish rail network (1989-2012)



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

Graph 9: Sweden-Italy comparison in relation to total subsidies, network and traffic



Fonte: Own elaboration based on: *Trafikverket, Conto nazionale dei trasporti* and Eurostat.

8. A comparison of public subsidies granted in the five countries

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, we have sufficient information to draw

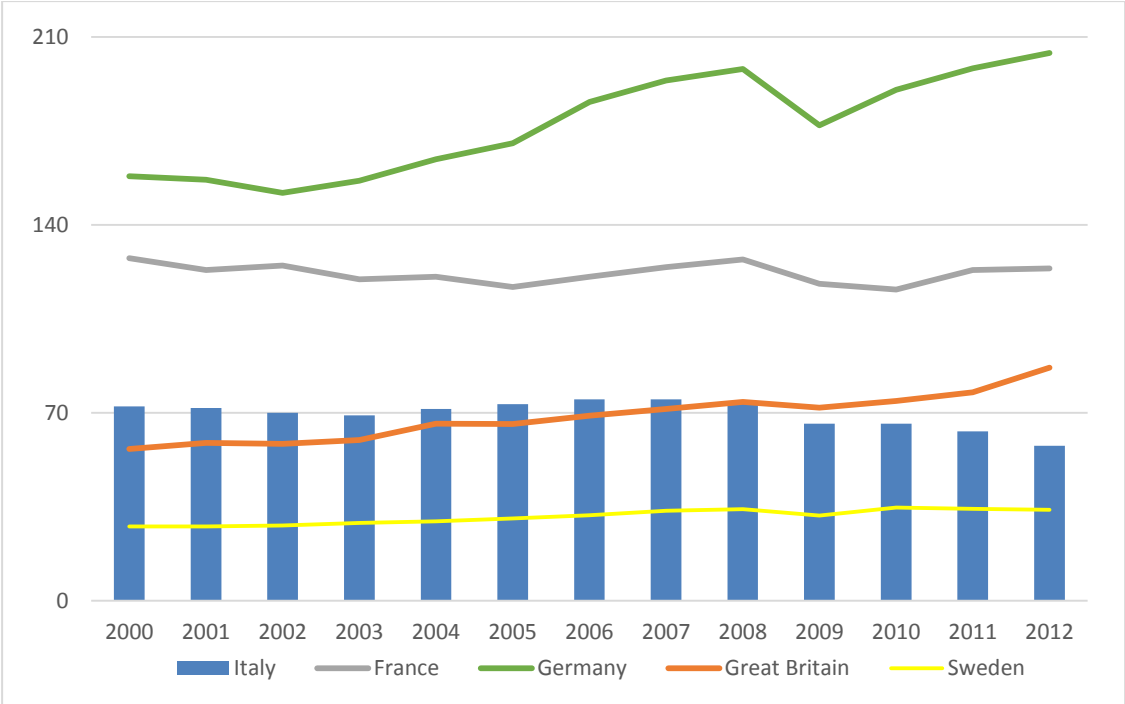
comparative conclusions on the coherence of the transfers paid in each of the countries with respect to the magnitude of the sector, represented by the size of the network and the traffic carried. The traffic carried in the five countries is represented in Graph 10 through the units of annual traffic produced. The units of traffic are, in the railway sector, a synthetic measure of production that is obtained by adding together the transported passenger km and freight ton km. As illustrated in the graph, Italy, in addition to recording a decline from 2007 onwards, only reached 60 billion units of annual traffic in 2012, less than that of Great Britain, while France exceeded 120 billion and Germany exceeded 200 billion. Very briefly we can note that the total traffic in Italy is a little less than double that of Sweden, about two-thirds of that of Britain, half of that of France and less than a third of that in Germany.

These same proportions however are not witnessed in the case of public subsidies to the rail sector. From Graph 11, we can in fact verify that Italian subsidies, in addition to being considerably higher than those in Britain, were also significantly different for the entire period studied, despite having an almost identical network in terms of size and a similar level of total transport over the 21 years examined. Italian subsidies were, for most of the period, even higher than or similar to those of France and only in the past few years have they amounted to just less than those of France and Germany, despite the Italian network being only a fraction of the networks of these countries, and the same applies in relation to total traffic.

In the version of Graph 11 that includes Italian subsidies as well as the substantial transfer of FS debt to the Treasury, which took place in 1996 and 2006, the dashed blue line of Italy covers the solid yellow line of Germany, suggesting the hypothesis, that only further investigation can confirm, that public rail expenditure in Italy was also higher than that of Germany, despite the fact that the Italian rail sector is less than a third of its size.

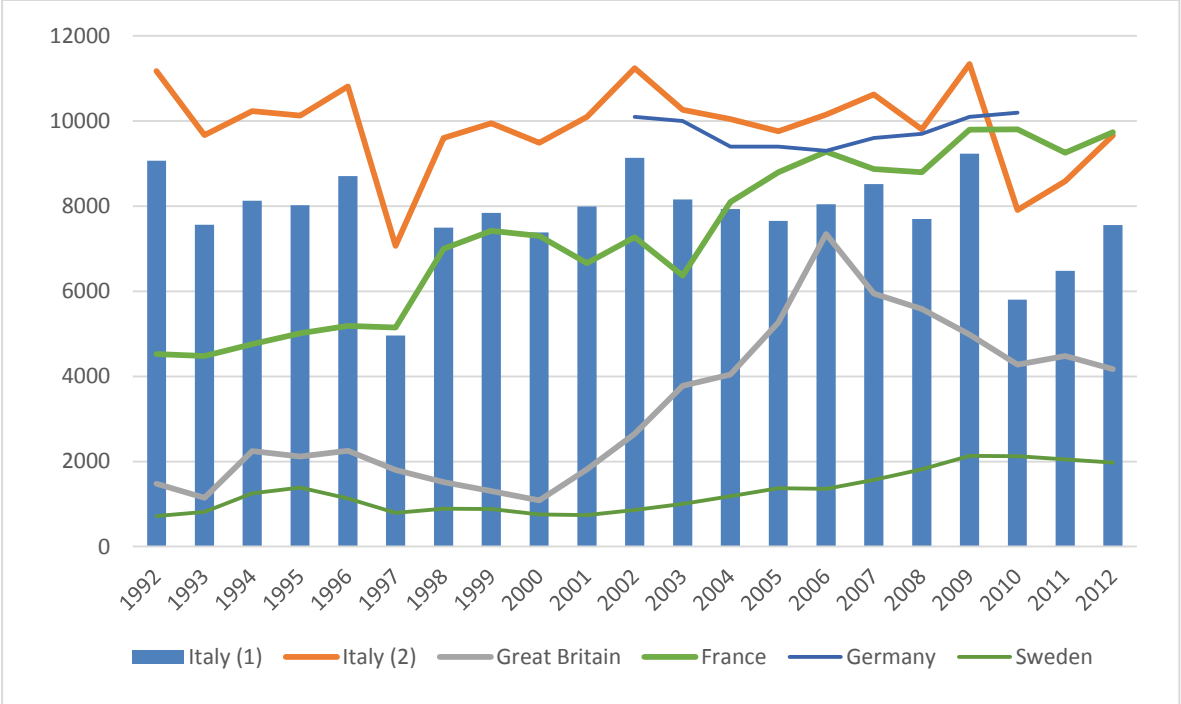
At this point, it is interesting to try to estimate the total amount of subsidies that would have been granted in Italy if they had used criteria similar to those of the other countries studied. More precisely, given that the criteria is not made explicit by the countries and we can only obtain the proportion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

Graph 10: Size of rail transport in the five major EU countries



Source: Own elaboration

Graph 11: Total public subsidies to the rail transport sectors in the five major EU countries

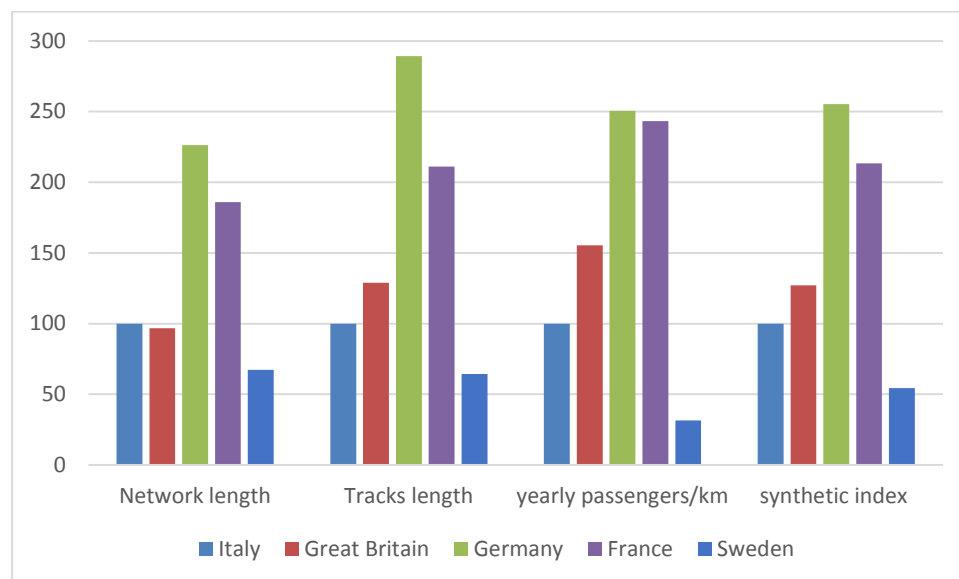


Italy (1): transfers of debt to the state that occurred in 1997 and 2006 are not included

Italy (2) transfers of debt in 1997 and 2006 are evenly spread over the 21 years

Source: Elaboration of the data of the bodies indicated in the analysis of each country

Graph 12: Relative sizes of rail transport in the major EU countries



Source: Own elaboration

The exercise that we attempt to carry out requires firstly the creation of an indicator of the size of the different national rail sectors relevant to the justification of subsidies; essentially a synthetic indicator of the size of the rail sectors that require public subsidies. 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 are able to request public financial support. The same does not go for freight transport however as, even though it is fully liberalised in the EU, it is subject to public subsidies of unimportant size.

The synthetic index of the size of the rail sector (ISDF) that justifies subsidies may then be the simple average of the relative indices already calculated for each of these three aspects between every country and Italy, which are represented in Graph 12 to calculate the ISDF. The British rail sector will thus be considered 27% larger (and 27% more in need of subsidies) than the Italian rail sector, 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, using a proportion, the public subsidies (SP) that would be paid in a *j-country* adopting the *i-country* standard of each of the other countries, calculated as a ratio between subsidies paid in that country and the specific ISDF:

$$\frac{SP_{j,i}}{ISDF_j} = \frac{SP_i}{ISDF_i} \quad [1]$$

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

$$SP_{j,i} = SP_i * \frac{ISDF_j}{ISDF_i} \quad [2]$$

The theoretical subsidies expected in the j country with the criteria of the i country are therefore given by the actual subsidies granted in country i multiplied by the ratio between the ISDF of country j and that of country i . Table 7 presents the results of applying this method to the data concerning subsidies given in the different countries in 2012, the latest year available. The data on the diagonal axis represent the actual subsidies paid in each of the countries.

Table 7: 2012 Actual and theoretical subsidies in the five countries (Bil. €)

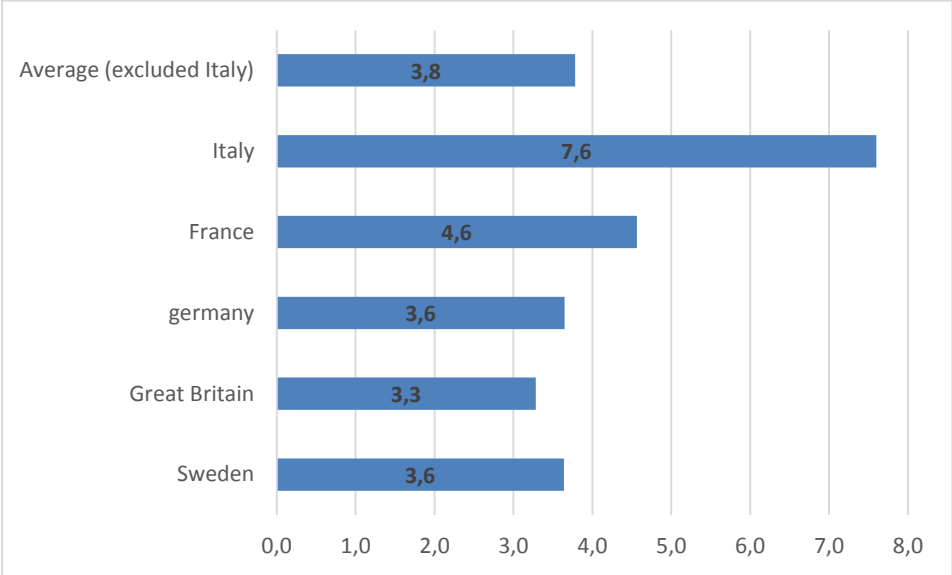
| With standards of: | Public subsidy (yearly) | | | | | Total 5 States |
|---|-------------------------|---------------|--------|---------|-------|----------------|
| | Sweden | Great Britain | France | Germany | Italy | |
| Sweden | 2.0 | 4.6 | 7.8 | 9.3 | 3.6 | 27.3 |
| Great Britain | 1.8 | 4.2 | 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 7 indicates, if we take into consideration Sweden, that in 2012, compared to an actual total subsidy equivalent to €2 billion, the theoretical subsidies calculated by British standards would have been €1.8 billion, with German standards €2 billion, French standards €2.5 billion and Italian standards of a good €4.1 billion. If we use the average of the countries other than Sweden as a benchmark, but exclude Italy, as it clearly represents an anomalous case, we obtain a value of €2.1 billion, 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 (€5 billion versus €4.6 billion) and the same for Germany (€9.8 billion versus €9.3 billion).

The countries for which the actual value is higher than the theoretical value are France (€7.5 billion expected versus €9.7 billion actual, with an excess of €2.2 billion) and, above all, Italy: by British standards, the total subsidies to the Italian rail transport sector would have been equal to only €3.3 billion annually, by French standards €4.6 billion and German and Swedish standards, €3.6 billion. The average of the four countries therefore is only €3.8 billion annually, exactly half of those borne by public finance in Italy (Graph 13). This estimate of excess subsidies to the Italian rail sector is larger than that estimated in the study by Arrigo and Di Foggia (2013), based on the data of state aid communicated in member countries to the EU Commission in 2010, according to which the necessary subsidies amounted to 3/5ths of those actually given. This figure shows with certainty how there is plenty of room for a deeper investigation into the *spending review* of the sector.

Graph 13: Theoretical 2012 subsidy in Italy calculated applied standards of the other countries (Bil. €).



Source: Own elaboration

If the actual subsidies allocated to the rail sector in Italy in 2012 are more than double those expected by applying the standards of other major European countries, this figure is expected to worsen significantly when the analysis is extended to the entire period considered in this study; the 21 years between 1992 and 2012. Despite the fact that the Italian railway subsidies were still very large in the last three years, they were significantly lower than almost all of those of the previous periods.

Throughout the entire 1992-2012 period, total government expenditure on railways in Italy was €207.7 billion, 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, however in the nine years from 2002 to 2012, it amounted to €88 billion versus the €85 billion of Italy. What level would the Italian figure have reached by applying the standards of the other countries? In order to estimate this, our method is to

multiply each of the other amounts by the ratio between the synthetic index of the dimensions of the Italian rail sector (ISDF) and that of the specific country, obviously recalculated for the entire period of 21 years. To obtain the Italian value with French standards, we divide the total French subsidies – €153.6 billion – by 1.85 (instead of the 2.14 used for 2012), obtaining €83.2 billion, corresponding to 40% of the actual figure of Italy.

In a similar way, in order to obtain the Italian value by British standards, we divide the total British subsidies – €69.3 billion – by 1.09 (instead of 1.27 used for 2012), obtaining €63.6 billion (31% of the actual Italian figure). Finally, in order to obtain the Italian value by Swedish standards, we divide the total Swedish subsidies – 26.8 billion – by 0.5 (instead of the 0.54 used for 2012), obtaining €53.6 billion (26% of the actual Italian figure). The average value of the theoretical subsidies, calculated by the standards of the three countries, amounts to €66.8 billion corresponding to 32% of the actual Italian figure.

In summary, the application of our estimation method leads us to argue that the actual subsidies to the rail sector are double compared to the European standard, while the total paid during the 1992-2012 period was triple. Two thirds of the total public expenditure to the railway could have consequently been saved.

9. The formation of the Italian public debt

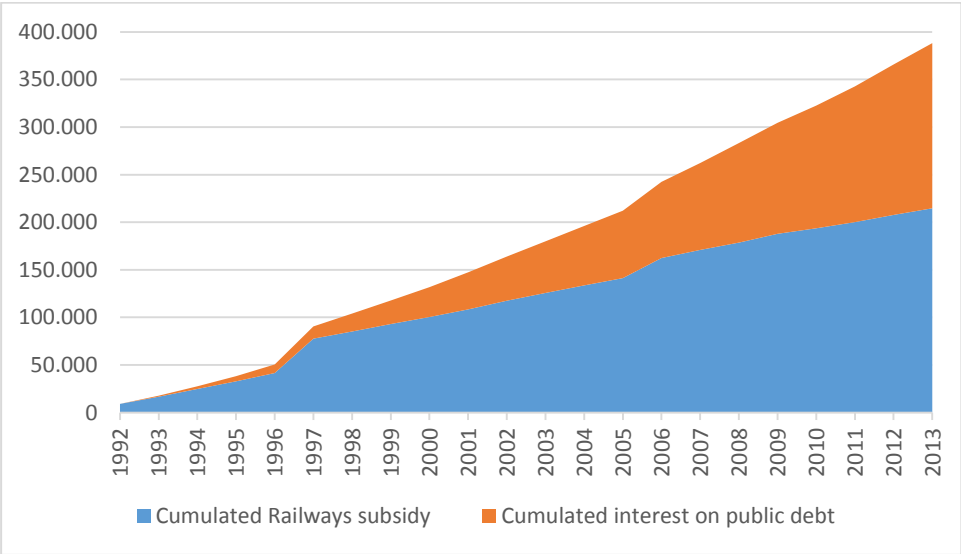
The total cost borne by public finance arising from the railway sector is not limited to €207.7 billion calculated in this study. There are in fact other items that we were unable, at least for the moment, to quantify: (i) the imbalance of social security, coming from the difference between contributions paid by the FS for workers and the cost of social security payments paid to the pensioners of the railways; (ii) public subsidies to the local non FS rail networks and to the relative transport.

There is however a third item that we can estimate: the interest costs generated by the financing of public expenditure with public debt. In this case, it should be state that it is not possible to know with certainty with which method the public expenditure for the railway was financed given that it ended up in the great cauldron of public spending, financed partly by taxation and partly by debt issuance. Three hypothesis may however be formed, two extreme and one moderately reasonable.

The first hypothesis is formed by the total financing of expenditure on railways through taxation. In this case, there is no additional burden on public finance. Expenditure on railways has been grossly inefficient however the taxpayer has been obliged to repay it in full. At the other extreme of the possible hypotheses, is the total financing through debt. In this case, the interest costs resulting from the public debt contracted to finance the railway sector should be calculated, year after year. Since 1992, the state has supported rail expenditure by issuing securities of €9.1 billion (in our hypothesis),

and in 1993 (and all of the subsequent years) it would have also had to bear the cost for interests on said securities. When the average cost of debt was at its highest, the annual interest costs amounted to €1.1 billion. For the following year, the public ‘rail debt’ would consist of the initial €9.1 billion plus the €1.1 billion in interests plus €7.6 billion of new subsidies to the railway, reaching a total of €17.8 billion on which interest costs will be paid in the new year. This calculation until 2013, always based on the average annual cost of each period of public debt, can be seen in Graph 14, which distinguishes between accumulated public subsidies to the railway and the cost of accumulated interest.

Graph 14: Impact on the Italian public debt in the event of total debt financing of rail subsidies (Mil. €)



Source: own elaboration

In our hypothesis, the public rail debt formed from 1992 until today, would have amounted to €388 billion, of which €215 billion were for rail subsidies and €173 billion for interest accumulated on the debt (for the year 2013, €7 billion public expenditure on railways conservatively assumed). This figure, in relation to the Italian gross public debt equal to €2067 billion at the end of 2013, accounts for 18.8%. However, if we exclude cash and loans to the Treasury from the gross Italian debt then we compare it with the net debt, the debt that was formed to finance deficit spending equal to €1.95 trillion in 2013, it accounts for 19.9%.

These estimates depend on the hypothesis of total rail subsidy financing with public debt, which may be considered excessive. More acceptable is the assumption that the necessary rail expenditure, calculated according to the standards of the other European countries, has been reasonably financed by taxation and that only the excess spending, compared to other countries, has been financed with debt. In this hypothesis, the impact of expenditure on railways on the Italian public debt would have been €259 billion from 1992 until today, with €143 billion coming from excess subsidies and €116 billion from interest paid on the public debt to finance it. The figure of €259 billion corresponds to 12.5% of the gross Italian public debt in 2013 and to 13.3% of the net Italian public debt.

A further calculation can be done in relation to the weight of the public 'rail' debt on the excess Italian public debt compared to the compatible level within the Maastricht parameter, equal to 60% of GDP. The level of net public debt in 2013 of €1.95 trillion can therefore be divided into €934 billion compatible with the Maastricht parameter and a further €1.016 trillion 'excess'. Of this €1.016 trillion, the €259 billion excess Italian rail expenditure and the relative interest represent 25.5%. If they had instead been avoided, today the debt/GDP would be 17% lower.

These calculations regarding the impact of the high Italian expenditure on railways on the public debt refer to the excess expenditure since 1992 (eve of the so-called Second Republic) to date, that we have been able to estimate. Since it seems difficult to imagine that the rail expenditure, over a long period of time, was more virtuous in the first republic than the second, we should not be surprised to discover, if it were possible to go even further back in the reconstruction of rail subsidies, that the excess Italian rail expenditure is responsible for between one-quarter to one-third of the total Italian public debt and more than half of the excess debt than that allowed by the Maastricht constraint.

References

Arrigo U. e Beccarello M., (2000). Il trasporto ferroviario. La convergenza europea nel settore pubblico, Franco Angeli, Milano.

Arrigo U. e Di Foggia G., (2013). Gli aiuti di Stato al settore ferroviario nell'Unione Europea [State Aid to Railways in Europe]. Working Paper, Dipartimento di Scienze Economico Aziendali, Università di Milano Bicocca.

Arrigo U. e Ferri V., (2012). La separazione delle reti ferroviarie [the separation of Rail Network]. Working paper, Istituto Bruno Leoni.

Banverket, Annual Report, several years.

CESifo GmbH - Munich Society for the Promotion of Economic Research, (2011). Degree of Separation in the EU Railway Sector.

Commisariat Général au Développement Durable, Comptes des Transports, several years.

Corte dei Conti – Italian Court of Auditors (many years). Relazione sulla gestione finanziaria di Ferrovie dello Stato Italiane [Final relation on the Ferrovie dello Stato financial management].

Corte dei Conti – Italian Court of Auditors (many years). Relazione sulla gestione finanziaria di Rete Ferroviaria Italiana [Final relation on the Italian rail Network financial management].

Dehornoy J., (2011). The evolution of public funding to the rail sector in 5 European countries. A comparison.

E.U. Commission, Transport in figures, Statistical Pocketbook, several years

Eurostat, Transport statistics database. Rail statistics.

Everis-NTU, (2010). Study on Regulatory Options on Further Market Opening in Rail Passenger Transport.

MIT – Ministero delle infrastrutture e dei trasporti, Conto nazionale delle infrastrutture e dei trasporti (vari anni).

Network Rail, Annual Report and Accounts, several years

ORR–Office of Rail Regulation, Annual efficiency and finance assessment of Network Rail 2009-10

ORR—Office of Rail Regulation, National Rail Trends, several years.

Trafikverket, Annual Report, several years.