

The evolution of public funding to the rail sector in 5 European countries - a comparison

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This paper reflects the sole author's personal views and should not be regarded in any way as a position of SNCF.

Abstract

Twenty years ago, European Directive 91/440/EEC launched a massive movement of structural reforms in the European railways. These reforms had three key objectives : develop international traffic, foster quality of service and improve economic efficiency. This paper aims at assessing how much has been achieved regarding the third objective and, more precisely, it focuses on the impact of these reforms on the cost of railways for the taxpayers in Germany, Great-Britain, France, Sweden and Switzerland. Available data show high level of public financial support in all these countries and the impossibility to conclude whether one system is intrinsically more efficient for the taxpayer than the others, though Sweden has clearly one of the cheapest and Switzerland one of most expensive systems in Europe.

1. Introduction

The European rail sector has seen a global shift from national public monopolies towards market opening and international competition over the last 20 years. The same move was observed in other network industries and was usually led by three concerns : European unification and the development of cross-border traffic, an increase in quality and an acceleration of innovation, an enhanced economic performance and a reduction of the burden for the taxpayer. The European Union played a central role by passing and enforcing Directive 91/440/EEC and the later three railway packages in 2001, 2004 and 2007. The main goal of this policy has been to transform European railways from national public monopolies where economic performance and innovation were no priorities into a single competitive European rail market, with as much private initiative as possible. Discussions are now underway to revise the first railway package in order to increase vertical separation requirements and to pass the fourth package in order to enforce competition in domestic passenger rail. These projects offer an opportunity to assess the impacts of structural reforms that were made to date. Especially, it is important to see how well the reforms managed at reaching the objectives stated above.

This paper focuses on the third of these objectives : improving the economic efficiency of rail and reducing its burden to the taxpayer. We try to compare the cost for public finances of the rail systems and its evolution in five European countries : Germany, Sweden, Switzerland, Great-Britain and France. These countries were chosen because they are the three largest rail systems in Europe and two polar systems : Sweden because it was the first to undergo structural reforms and to introduce competition, Switzerland because it is the one with the largest passenger rail usage in the world but yet did not undergo any major structural reform. They were also chosen because they show a wide diversity of the options that were used by the European governments when they reformed their rail sector. The comparisons are done at a sectoral level : figures from the infrastructure manager, the incumbent and new train operating companies are added and considered as a whole.

2. Literature and framework

(2.1) Literature

Several efficiency or productivity studies were conducted to compare European railways. Merkert et al. (2010) provides a list of 16 of such studies between 1994 and 2010 using a range of more or less sophisticated approaches. None of these productivity studies focuses on public funding but some other studies have this precise focus.

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To date, NERA (2004) is the most comprehensive study on public contributions to European rail systems. It was commissioned by the European Commission. It looks at all EU members, Norway, Switzerland and the then 10 candidates to EU membership. It provides a complete set of 7 indicators for the year 2001, for each country : traffic units, commercial revenue per traffic unit, total railway staff, ratio of staff costs to operating costs, cost per employee, unit operating cost and ratio of commercial revenue to operating costs. It also looks at levels of public contributions per traffic unit (eg passenger.kilometer + train.km); data is summarized in the following figure :

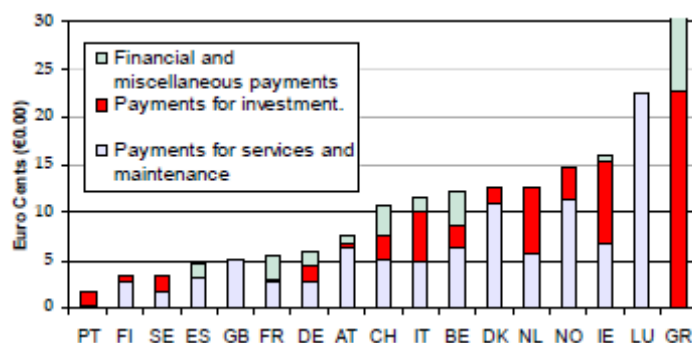


Fig. 1: Public contributions per traffic unit in 2001 (source : NERA, 2004)

The report also provides a list of all measures taken by governments in order to restructure the finances of their railways, reduce debt and improve financial sustainability. For the five countries in our sample, the following figures of public contributions are found in the report for year 2001:

| | Great-Britain | Germany | France | Sweden | Switzerland |
|---------------------------|---------------|--------------|--------------|------------|--------------|
| PSO | 1 727 | 4 300 | 1 731 | 165 | 346 |
| Freight | 57 | | 76 | | 63 |
| Infrastructure operations | 1 201 | | 1 608 | 463 | 787 |
| Capital investments | | 2 649 | 263 | 419 | 599 |
| Staff/pensions | | | 2 131 | | |
| Debt service | | | 1 067 | | 770 |
| Other | 106 | 2 091 | | | |
| Total | 2 985 | 9 530 | 6 876 | 897 | 2 565 |

Table 1: Public contributions to rail sector in 2001 (source : NERA, 2004)²

Civity (2011) was commissioned by the British Department for Transport and the Office of Rail Regulation as a base for the Rail Value for Money Study (also known as the MacNulty Report). It compares the cost of rail in five countries : Great-Britain, France, the Netherlands, Switzerland and Sweden, and focuses on three sides : infrastructures, (passenger) train operating companies, freight operating companies. Regarding infrastructure costs, the study is very detailed with a thorough methodology which includes purchasing power parities (PPPs) adjustment and normalization for network characteristics (single/double tracks, electrification, switch density...). Methodology is less sophisticated for other aspects. The results however are anonymized for the three non-GB countries.

| all figures adjusted for PPPs 2009 value | unit | country | | | | | comment |
|---|---------------|---------|------|------|------|-----|-----------------------------------|
| | | GB | A | B | C | D | |
| total income | £ / k pass.km | 230 | 95 | 127 | 127 | 116 | incl. public funding, excl. CAPEX |
| passenger revenue | £ / k pass.km | 127 | 67 | 86 | 88 | 67 | excl. ancillary revenue |
| infrastructure cost | k£ / track.km | 166 | 90 | 125 | 41 | 119 | 2009 fully normalized |
| train operating cost | £ / train.km | 10.7 | 13.3 | 11.0 | 10.9 | 9.5 | 2009 partly normalized |

Table 2: Civity performance indicators (source : Civity, 2011)

Citing this study, McNulty (2011) estimates that the efficiency gap between British rail against the four benchmarks to be close to 40%. It also estimates that the British rail sector should aim at achieving a 30% unit cost reduction within the next 8 years.

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² Some of this data is not consistent with our findings for year 2001. Regarding France, NERA does not take into account investment subsidies to the infrastructure manager (only operation subsidies), while it does for Germany. On the other hand, for France public contributions to the rail pension fund is taken into account, while it is not the case for Germany. These are examples.

(2.2) Categories of public contributions to railways

In most European countries, about half of the funding required by the rail sector (incl. operation and investment costs) are public funds. There are however many different types of public contributions to the rail sector :

- infrastructure funding : public authorities (usually central Governments) provide subsidies to the infrastructure manager in order to finance network maintenance or development. This appears to be the most important form of public funding used across Europe. This support can be either a generic subsidy to the infrastructure manager or it can be targeted towards specific investments programs (many countries have both) ;
- transport public service obligations : organizing authorities compensate train operating companies for their fulfilment of public service obligations. This usually relates to regional and commuter train services, where public authorities can pay more than half the total operating costs – but countries like Sweden and Great-Britain (and lately France) also have PSO compensations for some long distance passenger services;
- debt relief : most European national rail operators were heavily indebted in the 1980's as a result of their nationalization and the discrepancy of the services Governments were asking them to perform and financial means they were compensating them. Most of these debts were thus a consequence of past mismanagement rather than investments in future performance and there was therefore little chance that the railways would reimburse these debts by themselves. Thus most Governments wrote these debts off the balance sheets of the companies at some point : USA (Conrail), Japan (1987, ¥140 000 bn ≈ €140 bn), Germany (1994, €35 bn), Belgium (2005, €7 bn), Spain (1994/1998/2005, €8 bn), France (1991/1997/1999, €11 bn)...
- staff and pensions obligations : reforms in the rail sectors came with two social side effects that needed special treatment : a steep decrease in staff numbers and a transition from protected work contracts (civil servants-like) to common labor law. The decrease in staff numbers resulted in an imbalance between the needs and resources of dedicated rail pension systems. For example, there are currently as many retired as there are active rail workers in France. In some countries (like Switzerland), the incumbent is left with (part of) this imbalance to finance, which raises costs ; in others (like France or Germany), the Government is taking care of that imbalance. There were two reasons to move from status to common work contracts, one on the stock, one on the flow of rail workers : on the stock it would reduce the personnel expenses, on the flow it would restore fair competition between incumbent (with otherwise expensive workforce) and new players (with otherwise cheaper workforce).

Limits between these categories are not fixed and an increase in a given category can result in a decrease in another. For instance, a debt relief program for a given infrastructure manager will reduce its financial costs, therefore reducing its need for public funding. But in such case, a one shot €1 bn debt relief will result in a much lower decrease in annual infrastructure funding since the annual cost reduction only amounts to the level of interest on a €1 bn debt (which interests would, after many years, amount to €1 bn). Another example of the moving limits between these categories is the determination of the levels of direct grants to Network Rail and of TOC access charges in Great-Britain : whatever funding the Department for Transport (DfT) does not make available for Network Rail through direct grants will have to be paid by TOCs through additional access charges ; these additional access charges in turn will need to be compensated to the TOCs by the DfT. Thus the shift over the last 15 years : Railtrack was originally financed exclusively by access charges and did not receive direct subsidies ; it receives now the majority of its funding via direct grants from the DfT.

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(2.3) Performance factors

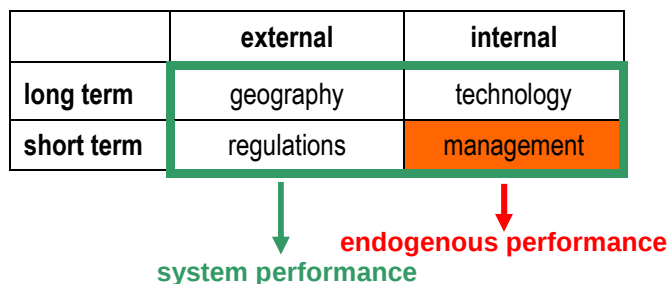
The end objective of benchmarking studies is to compare the efficiency of rail systems. But many dimensions can explain differences between performance indicators across countries:

- geography: urbanization and industrial geography patterns have a great impact on usage of the rail system. Since rail is an industry with high increasing returns, its economic performance is increasing strongly with population or industrial density. Therefore geography plays a big role in railway efficiency. For instance, with time industrial density in France has decreased much below Germany's level; therefore a good part (not all) of the French decrease in rail freight traffic is independent from railway performance, as well as a good part (not all) of the German increase in rail freight traffic cannot be explained by railway performance ;
- regulation: regulations on work contracts or safety can have a dramatic impact on the operating and investment costs in the rail sector. Especially, most countries had implemented protected work status in the

railways after nationalization that are not compatible with market opening; thus many States across Europe gradually dismantled that protected status (Germany, Great-Britain, Sweden) while others still have it (France). Additionally, the organizational structure of the rail sector can by itself produce more or less efficiency: in Great-Britain, Civity (2011) argues that the lack of competition and regulation on the rolling stock leasing market leads to massive rolling stock overcosts; in France, there is a consensus at the moment that a two-sided infrastructure manager (RFF, subcontracting all maintenance tasks to SNCF) is a source of massive transaction costs (up to 10% of maintenance overcosts);

- **technology:** like in most industries, railway performance depends a lot on asset technological condition. Some technical choices have a dramatic impact on performance. The best example of that in railways is the development of high speed rail (HSR). While increasing speed, this new technology allows in the same time to increase customer prices, to increase patronage and to decrease operating cost through improved staff and rolling stock productivity. It could be argued that implementation of HSR has had a more positive impact on railway performance than most structural reforms in the last 30 years. Smaller programs than HSR can have a big impact, like bidirectional tracks, informatized signalling, electrification. In addition to technology choice, the current condition of a given technological system is a major driver of railway performance : many countries are now faced with the consequences of a lack of track renewal investments in the 1980s and 1990s (Great-Britain, France, Sweden): these countries are now paying double for the freeriding they did in the last 30 years (when they were using the network without properly maintaining it), thus a degraded operational and financial performance today;
- **management:** given the network they have inherited and the regulatory framework, the level of effort and the effectiveness of this efforts by the operators in place has of course a major impact on systemic performance. This comes to how well the trains are cleaned or whether they run on-time (independantly from the actual number of trains and the timetabled travel time). Structural reforms launched by the European Union aimed specifically at this fourth dimension of railway performance.

This set of four categories can be envisioned in a more systematic way: railway performance is the result of factors that could be past and external³ (geography), past and internal (technology), current and external (regulation) and current and internal (management). Therefore even the best railway operator will not be able to overcome elements that it inherits, eg geography, technology and regulation, thus the difference between system performance and endogenous performance.



Benchmark data must be interpreted with caution: differences between countries could result from any of these four categories of factors, with sometimes one of the factors offsetting the others (see France: comparatively higher labor costs are offset by higher productivity resulting from the TGV technology).

However, regarding public contributions data specifically, extra caution needs to be taken since differences can result not only from performance gaps but also from the different reform paths that were taken. Therefore, two countries with the exact same industrial performance (same output, same operating costs, same asset structure) could well have different public contributions level for years in a row because of differences in the financial structure of the sector. For instance State A could have taken over €20bn of railway debt 15 years ago while State B would have left that debt within the rail sector. All other things being equal, this would result in the need for annual public contributions being approximately €1bn lower in country A – but railway performance in the two countries would be strictly the same.

Such factors that need to be considered prior to linking intensity in public contributions with railway performance are:

³ By external, we mean elements that are not controlled by train operating companies or infrastructure managers.

- perimeters: figures do not recoup the same perimeter of activities in different countries. Public private partnerships, tax systems (sales tax, special taxes...), investment in high speed lines induce differences in public support to railways that do not necessarily reflect efficiency differences;
- history: the fact that the Swedish infrastructure manager is now part of the administration de facto removes most of the debt and most of the financial costs from the rail system. It does not however mean that the Swedish rail system is automatically more efficient than another sector where rail debt has not be transferred to the State;
- structural deficits: not all railway systems receive appropriate resources that cover their operating and capital costs. Therefore a low level of public contributions could reflect either a high economic performance of the system or insufficient public funding to cover the difference between commercial revenue and total costs.

Therefore higher figures of costs or public contribution per unit of output do not necessarily mean that one system is more productive or efficient than another.

3. Case study

In this section we provide a brief description of the regulatory reforms and public contributions to railways in the five countries of our sample : Great-Britain, Germany, France, Sweden, Switzerland. For each country, we try to describe in a few words the regulatory reforms that were undertaken by each railway and their impact on public funding. Figures in the chart representing the financial flows in the different railway systems relate to year 2009.

(3.1) Germany

Available data. Germany was the country where it was most difficult to identify precise figures of public contributions and where the most assumptions had to be made. Therefore our findings need to be taken with caution at this stage. To our knowledge, available data about public contributions to German railways are rather scarce. However, the ministry of transportation provided detailed information about its support to the transport system upon direct enquiry.

Reforms. After the reunification of East and West Germany and the subsequent merger of DR (East) and DB (West), massive overstaffing was an issue that the Government decided to solve at once. The Government decided to open the rail sector to competition but to allow for fair competition between DB and other companies without dismantling the incumbent. The instrument of that reform was the *Bundeseisenbahnvermögen* (BEV), an *ad hoc* structure that was created by 1994 as a buffer between the old and the new rail systems. Since then, competition is open on all markets: regional (*for-the-track* competition, 27 local authorities in charge of defining and compensating public service obligations, free to contract directly with DB or local inhouse operator or to tender the PSO contract, see Lalive, 2008), long distance (*on-the-track* competition, with very scarce open access operators, see Seguret, 2009), and freight (competitors hold a 25% market share in 2009, see KCW, 2011).

Debt relief. The *Bahnreform* in 1994 included the transfer of €34 bn of DB's debt to the BEV, whose cost is born directly by the Government.

Pensions. The BEV is in charge of financing the pensions of the retired rail workers. Therefore rail operators do not bear any "undue" pension costs.

Structure of public contributions. Responsibilities are shared between Central Government and local transit authorities : the Bund is mostly responsible for the funding of infrastructure investments and the Länder (or special authorities) are in charge of defining and public public service obligations.

Regarding regional transport, it is the responsibility of the organizing authorities to award the PSOs directly to any operator (DB or local operator) or to organize a competitive tender. Central Government is funding the Regionalisation Fund (RF) to provide federal resources to regional organizing authorities. It is worth underscoring however that the RF is not used only for railways, so that it is not possible to conclude much about public contributions to rail when looking at the RF.

Regarding long distance passenger transport, rail does not benefit from any public support or PSO program. Thus between 1999 and 2003, DB reduced by 20% its passenger long distance supply with approximately 30 cities of more than 40,000 inhabitants losing long distance connections (Holzey, 2011).

Regarding infrastructure, Government transfers (€4.2 bn in 2010) fund most of infrastructure investments, including 80% of renewal investments and all development investments. Access charges are enough to finance operations and maintenance (€1.5 bn) and a share of renewal investments (€0.5 bn).

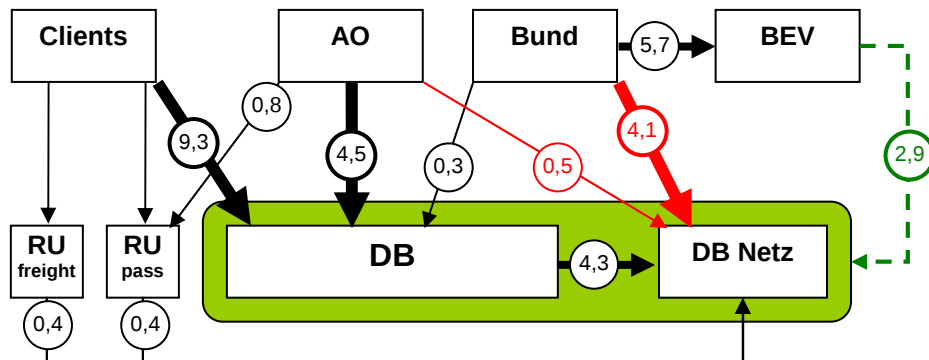


Fig. 2: Financial streams in German rail (2009, €bn)

Time series. Public contributions have been remarkably stable in the last 9 years. We could not find any reliable information relating to any year prior to 2002; operating subsidies given by organizing authorities to DB competitors were guessed, assuming that the amount of subsidy per train.kilometer was the same for DB and for competitors (which probably overestimates the amounts). KCW (2009) estimates that the competitive tendering allowed, when implemented, a 26% decrease in the costs of tendered services for the organizing authority.

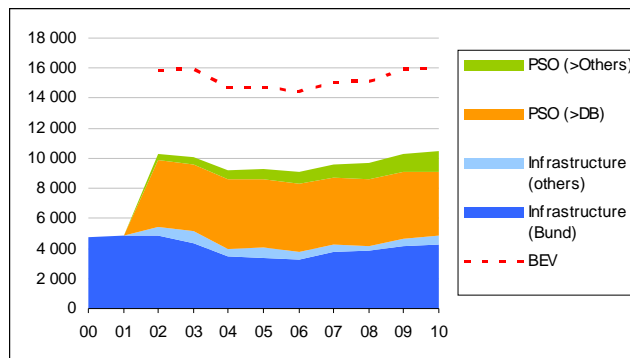


Fig. 3: Public contributions to German rail (€m, nominal)

In real terms, these public contributions are now decreasing, especially if one accounts for the increasing levels of traffic.

(3.2) Great-Britain

Available data. The Office of Rail Regulation annually publishes the National Rail Trends which provide detailed operational and financial data.

Reforms. Great-Britain probably launched the most ambitious reform package in Europe in 1993. British Rail was dismantled into more than 30 independent companies, all of them private :

- infrastructure was given to Railtrack, an independent infrastructure manager, that was privatised in 1996,
- passenger train services were divided into 27 geographical packages that were franchised and tendered after 1996, with private train operating companies (TOCs) taking over the operation (18 of 25 coming from the bus industry, 17 from 7-year franchises) ;
- rolling stock was divided into 3 rolling stock companies (Roscos) that were privatised and which would invest in the renewal of the rolling stock and its leasing to the TOCs ;
- freight services were divided into two separate private freight operating companies.

Two independent public bodies were set to oversee the sector : the Office of Rail Regulator (ORR) was in charge of economic and safety regulation (mostly the regulation of Railtrack), the Office of Passenger Rail Franchising (OPRAF) was in charge of letting the passenger franchises (replaced by the Strategic Rail Authority in 2001 and the Department of Transport (DfT) in 2005).

Railtrack was replaced by Network Rail in 2002 after it went bankrupt in the aftermath of the Hatfield accident and the subsequent speed restrictions that blossomed over the whole network. Since then, massive investments programs were launched in order to offset 30 years of very limited investments.

The DfT launched a Value for Money Study in 2010 in order to design the future of the British railways. The final report estimates that a 30% reduction of unit costs could be achieved by 2018, thus reducing public contributions to the rail sector by 30% in real terms (prior to any traffic increase).

Structure of public contributions. The funding structure of the British rail system is relatively simple, since the DfT is both responsible for infrastructure and public service obligations and almost all passenger services are franchised. Originally, Railtrack would charge full costs of infrastructure to TOCs and would not receive direct grants from the DfT. In the aftermath of the Hatfield accident however, the DfT started granting Network Rail direct subsidies that now constitute most of its revenue : in 2009, Network Rail received £3.9 bn in direct grants but only £2.0 bn in track access charges.

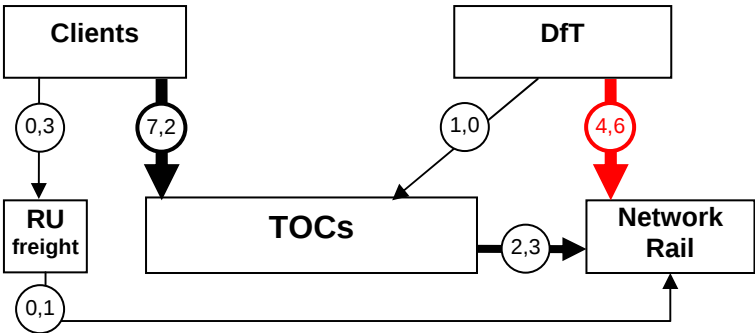


Fig. 4: Financial streams in British rail (2009, £bn)

Time series. The National Rail Trends (produced by ORR) allow to observe the evolution of public contribution to the British rail sector. For the first year after privatization, it was thought that the reform process would allow for a net reduction in public subsidies to the rail sector, and this is what was observed between 1995 and 2001. That tendency however was reversed between 2001 and 2006 for two reasons :

- after the Hatfield accident and the subsequent creation of Network Rail however, renewal investments increased insignificantly when it appeared that what the sector had been experiencing in the last 20 years were not savings were not savings but maintenance postponements ;
- the unit costs of passenger TOCs rose sharply between 2001 and 2006. Smith et al. (2010) shows that the productivity level was 2006 close to its pre-privatisation level despite the cost reductions in the 1997-2000 period. This negative evolution can be explained by four factors : (i) some failing franchises were put under direct or cost plus management by the SRA, which reduced the performance incentives, (ii) wages rose, possibly as a consequence of rigidities on the train drivers job market, (iii) energy costs escalated, (iv) TOC related quality (measured by PPM) increased, which may explain part of the cost increase.

Trends improved in the recent years (after 2006), mostly because of a reductions in the need for TOC operation subsidies. Smith et al. (2010) concur, showing that TOC productivity increased significantly in recent years.

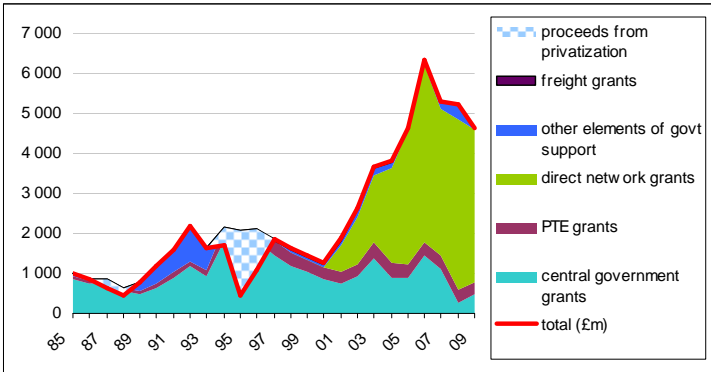


Fig. 5: Evolution of public contributions to GB rail (£m, nominal) (Source : National rail trends)

(3.3) Sweden

Available data. SIKA (now replaced by the Transport Analysis agency) provides an annual set of operational data, which does not include any information on funding issues. Nilsson (2002) provides data for the 1980 – 2000 period and annual reports by Banverket/Trafikverket provide data for 2005 – 2009. There is therefore a disruption in our series for 2001 – 2004.

Reforms. Sweden was the first European country to undergo structural reforms of its rail system. In 1988, it decided to dismantle the national monopolist SJ into an infrastructure manager, Banverket, that was incorporated as a state administration, and SJ AB, a transport operator. Regional authorities were given the right to tender competitively public service contracts for regional services. According to Nilsson (2002), there were three main reasons to undergo such a structural reform : (i) put rail infrastructure management under the direct responsibility of the State in order to ensure proper funding, (ii) clarify the relationship between organizing authorities (in charge of the definition and funding of public service obligations) and train operators (in charge of performing public service obligations as defined and funded by the organizing authorities), (iii) transform the incumbent into an independant and profitable company. Competition was subsequently opened on rail freight transport in 1996, on franchises long distance passenger transport in 1999 and on open access long distance passenger transport in 2009/2010. Sweden was one the main sources of inspiration for the reforms that were later to be introduced by the European Commission.

Structure of public contributions. There is a clear repartition of roles among the Swedish public authorities : the State is in charge of the infrastructure, the local authorities are in charge of public service obligations. The infrastructure is almost entirely financed by the State budget (€1.6 bn in 2009) and only marginally by access charges (~ €0.05 bn). Therefore net compensations for public service obligations are very limited in Sweden : only €0.1 bn when one discounts farebox revenue (0.2) from the total PSO compensations (0.3).

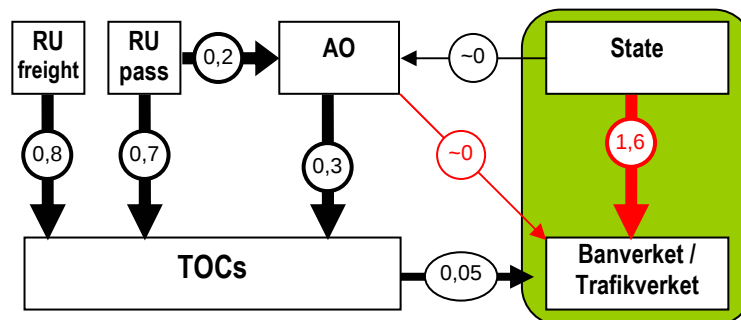


Fig. 6: Financial streams in Swedish rail (€bn, 2009)

Time series. Nilsson (2002) provides data on public contributions between 1980 and 2000; Banverket/Trafikverket published data on appropriations since 2005; data on PSO compensations had to be extrapolated from a single figure in Banverket (2009). This data show that the total amount of public contributions to the Swedish rail sector grew heavily in the last 30 years. The spike in 2008 is due to a change in accounting rules and the early repayment of loans worth SEK 13 bn (Banverket, 2010). Recently, the infrastructure manager indicated that the network will need an strong increase in network maintenance investments (€2.6 – 3.1 bn over the next 5 years, e.g. +30% compared to current levels) in order to keep constant the performance of the network (Trafikverket, 2011).

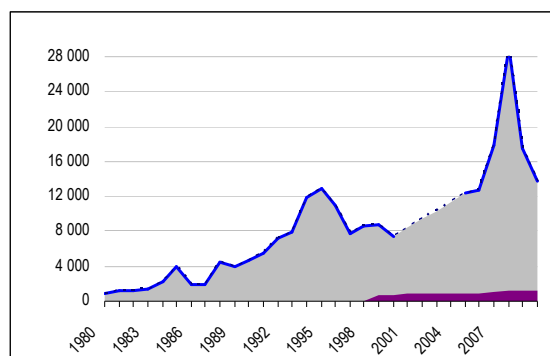


Fig. 7: Public contributions to Swedish rail (SEKm, nominal)

(3.4) Switzerland

Available data. The federal statistics office publishes annually detailed operational and financial data.

Reforms. Switzerland did not undergo any major regulatory railway reform. Instead, the Confederacy got very involved in the definition of public service obligations, especially with the Rail 2000 plan and its sequels. In 1999, SBB was transformed into a limited company and its balance sheet got cleaned up, with some debt being written off. Prior to 1999, public contributions would compensate the losses of the previous year. Since 1999, public contributions are agreed in advance as part of a multiannual plan that includes public service obligations on both the infrastructure and the transport sides (hence the spike of public contributions in 1998). SBB is not the only operator : other local operators (BSL being the largest among them) own infrastructure and/or operate freight or passenger services. Competition is open on freight services.

Debt relief. SBB was transformed into a limited company in 1999. To this end, it received a direct support from the Government, including some debt relief, hence the “spike” of public contributions in 1998. The total amount received on this occasion could be close to CHF 15,0 bn (€12 bn)⁴.

Pensions. Pensions of the railworkers are financed by the rail operators themselves. This leaves them with the burden of the demographic discrepancy between active and retired rail workers. SBB estimates that regular pension contributions cover only 79% of the total pension burden, which leaves SBB with a cost that is borne by the Government in other countries (SBB, 2009).

Structure of public contributions. Public contributions to the rail sector are made through two independent channels, whether they are related to conventional services operating on the existing network or to new major infrastructure projects. Major infrastructure investments are funded by a special Public Transport Fund, whose resources are direct affected taxes: levy on commercial trucks (65%), oil tax (25%), sales tax (10%); neither SBB nor any other operator is involved in that funding scheme. The Confederacy is both overseeing the infrastructure and acting as organizing authority, hence a complex structure of public contributions to SBB and other operators.

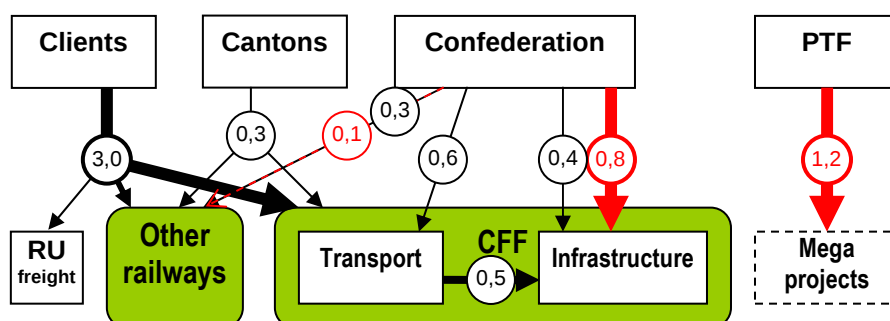


Fig. 8: Financial flows in Swiss rail (2009, €bn)

Structure of public contributions. Public contributions to Swiss railways have grown steadily over the last 20 years. The spike in 1998 is due to the status change of SBB into a limited company : in 1998 CFF received deficit compensations for both years 2007 and 2008. The chart however does not show the debt relief program that took place in 1999.

⁴ See press release from Federal Finance Office, June 14, 1999 : <http://www.admin.ch/cp/f/3764D884.C4A07F0A@gs-efd.admin.ch.html>. Retrieved on Nov. 16, 2011.

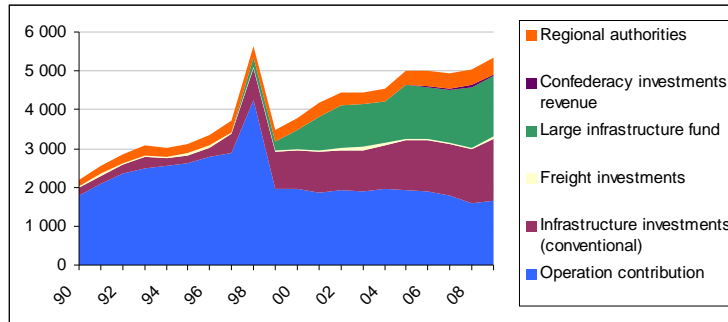


Fig. 9 : Public contributions to Swiss rail (CHFm, nominal)

(3.5) France

Available data. The statistics division of the French ministry of transportation establishes and publishes an annual set of data covering the whole transportation sector. Annual reports since 1954 are available online⁵ and provide all the necessary data for this study.

Reforms. The most significant structural reform in the French rail sector was the creation of the regional organizing authorities in 2002. By retrospect, the creation of an infrastructure manager (RFF) in 1997 did not change have a significant impact in the performance of the overall sector, since RFF subcontracted most of its activity to the incumbent SNCF. But another aspect that had a significant impact of the economic performance of the French system was the implementation of the most ambitious high speed rail program. This allowed for great efficiency gains, which reduces significantly unit operating costs while increasing average yields.

An intense concertation process is currently underway (and this study is a piece of that process) about the future of French rail. Discussions are currently held about the future of infrastructure management, about competition opening in franchised passenger services, about the level of public contributions to the sector.

Debt relief. The Government underwent a partial debt relief program in 1991, creating the *Service annexe d'amortissement de la dette* (SAAD – Special debt amortization service) where a total of € 10.7 bn of SNCF debt got transferred between 1991 and 1999 (5.78 in 1991, 4.31 bn in 1997 and 0.61 in 1999). Following Eurostat's recommendation in 2008, the SAAD was dismantled in 2008 and its debt incorporated in the public debt. No other debt relief program was implemented.

Pensions. Until 2007, the Government was giving an annual contribution to SNCF in order to cover the demographic gap between the number of active and retired rail workers and SNCF was in charge of pension payments. Since 2007, this contribution is given to an independent rail pension fund to which SNCF is paying annual contributions for the active rail workers.

Structure of public contributions. Responsibilities are split between the State and the Regional councils : the State is responsible for the infrastructure and Regions act as the organizing authorities of franchised transport. Since 2011 however the State is acting as organizing authority of some long distance interregional passenger services, in much the same way as the Swedish Government is in charge of franchising unprofitable long distance domestic services. By 2004 the Government created AFITF, an independent agency (Agence de financement des infrastructures de transport de France), that was supposed to collect highway tolls and use them to finance major transport infrastructure projects, most of them in the rail sector. That system would have been comparable to the RPLP system in Switzerland. That agency was created, but with the highway privatization of 2005 most of AFITF funding is coming directly for the State's budget.

One can estimate that the French public authorities are currently freeriding since there is currently a consensus in the French rail sector that €1 to 1.5 bn are currently missing for the system to be in a steady state (meaning that RFF is currently financing half of its maintenance investment emitting debt rather than using its cash flow).

⁵ http://temis.documentation.equipement.gouv.fr/temis/document.xsp?id=Temis-0033855&qid=sdx_q1&n=5&q=

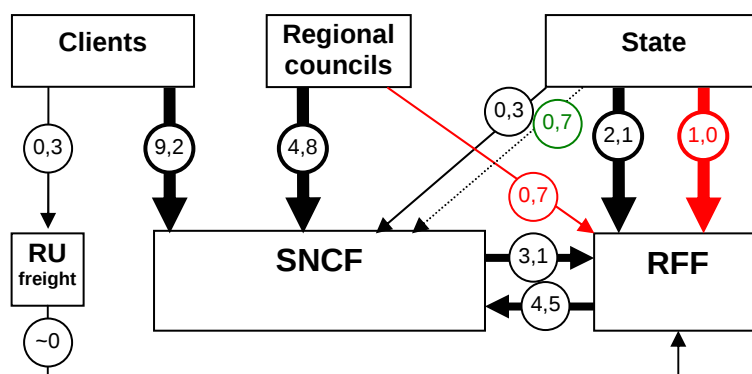


Fig. 10: Financial streams in French rail (2009, €bn)

Time series. Data from CCTN allows to observe the evolution of public contributions to the rail sector. These contributions have grown steadily over the last 30 years.

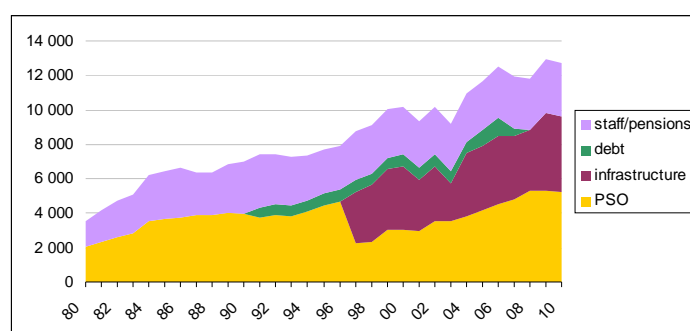


Fig. 11 : Public contributions to French rail (€m, nominal)

This increase is driven by two factors : the increase in support from Central Government to HSR infrastructure projects and the increase in support from Regional Councils (organizing authorities) to public service obligations. Meanwhile, public contributions to the existing (conventional) rail network have decreased in the last 15 years in real terms.

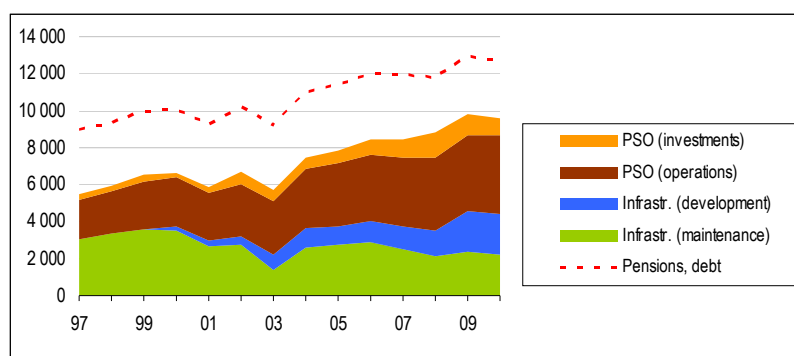


Fig. 12: Public contributions to French rail by category (€m, 2010 value)

4. Data analysis

(4.1) Introduction : traffic patterns⁶

The countries we are comparing have very different levels of traffic : Germany and France are by far the two largest rail systems in Europe by their volume of traffic (respectively 82,7 and 81,4bn pass.km in 2010), with France growing slightly faster in the recent years. Traffic is catching up very quickly in Great-Britain (54,1bn pass.km vs 30,3 by 1995, eg +78% in 15 years). So is it in Switzerland, despite smaller traffic volumes (19,2 bn pass.km), growth rate are similarly high (+64% in 15 years).

⁶ Figures in this section differ from the Transport and Energy in Figures data produced by the European Commission : we found many discrepancies between national and European statistics and therefore decided to stick to national statistics whenever discrepancies happen.

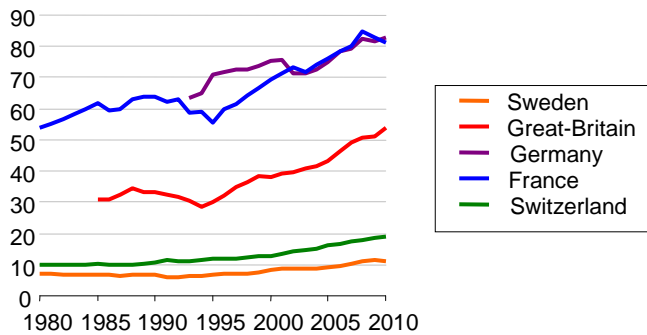


Fig. 13: Passenger traffic (pass.km, bn)

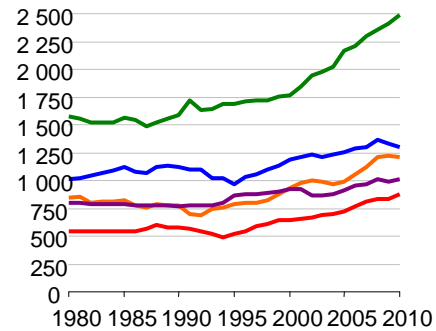


Fig. 14 : Rail usage intensity (pass.km/inh)

Rail usage per person is maximal in Switzerland, with a very high 2 490 km per inhabitant in 2010 – this sets Switzerland as the world leader, Japan ranking second (~2000), Denmark and France third (~1300), according to UIC statistics. Besides Switzerland, other countries in our sample score between 880 and 1300 km/pers/year in 2010.

Data can be summarized in the following table :

| | pass.km (bn) | | | pass.km / inh. | | |
|----------------------|--------------|------|-----|----------------|-------|-----|
| | 1995 | 2010 | Δ | 1995 | 2010 | Δ |
| Great-Britain | 30,2 | 54,1 | 79% | 517 | 878 | 70% |
| Germany | 71,0 | 82,7 | 16% | 869 | 1 009 | 16% |
| France | 55,6 | 81,4 | 46% | 963 | 1 304 | 35% |
| Sweden | 6,9 | 11,2 | 62% | 786 | 1 212 | 54% |
| Switzerland | 11,7 | 19,2 | 64% | 1 694 | 2 491 | 47% |

Table 3 : Passenger traffic evolution 1995 - 2010

The picture is slightly different when one includes freight in the analysis. Sweden performs comparatively much better, while freight in France has nearly been divided by 3 in 20 years (event including new competitors to incumbent SNCF).

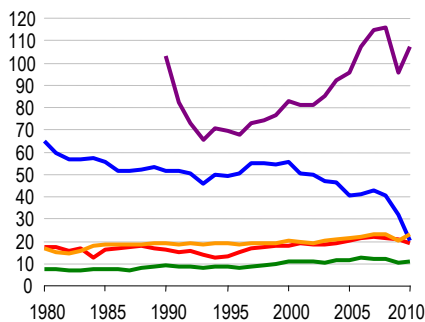


Fig. 15 : Freight traffic (ton.km, bn)

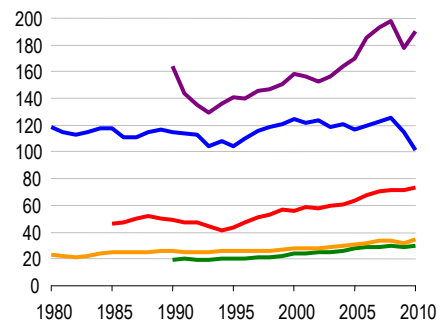


Fig. 16 : Aggregate traffic (tk + pk = uk, bn)

(4.2) Raw figures

NERA (2004) made a precise categorization of public contributions to rail sectors. In order to make a good comparison of these contributions through our sample, we need to exclude some of these categories. Otherwise we would compare Germany where most of the debt was removed from DB with France where it was merely transferred to RFF : by doing so, drawing conclusions about economic performance would be very difficult and would distort any conclusion on systemic efficiency. Therefore in the following section we will restrict our analyses to two categories : infrastructure compensations and PSO compensations. In section 5, we will discuss further refinements to this approach.

In this paper, we focus on two ways to look at rail performance : either by dividing the level of public contributions by passenger traffic (expressed in pass.km) or by dividing it by aggregate traffic (expressed in unit.km). At first glance, it would seem obvious that the second is a more relevant indicator since it takes into account the global output (traffic) and the global input we are focusing on (public contributions). However it is possible to question the neutrality of simply adding pass.km and ton.km, in a similar way as we would add apples and oranges. Many

things indicate the cost of infrastructure management is driven mostly by its need to accommodate the passenger, hence specific reliability, capacity and safety requirements. Freight only rail systems are generally much cheaper than mixed systems because they do not require positive train control, train stations, expensive rolling stock... Therefore the ratio 1:1 that is used between pass.km and ton.km in the calculation of unit.km may be questioned. For that matter, we keep providing both analysis (pass.km and unit.km) in the remainder of the paper, and we leave it to the reader to choose the one (s)he sees more appropriate.

Fig. 17 and Fig. 18 show that in most countries in our sample public contributions to rail have risen sharply in the last decades (in nominal value). Data about Germany however is too scarce to draw any long term conclusion. France, Germany and Switzerland (except in 1998) seem to have very stable patterns of public contributions, while Great-Britain and Sweden have a much higher volatility. Given this high volatility, it seems not to make much sense to do comparisons for a given year : middle or long term averages need to be utilized.

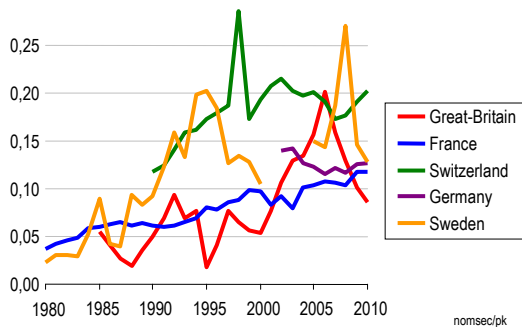


Fig. 17 : Public contributions per passenger traffic unit (c€/pk, nominal value)

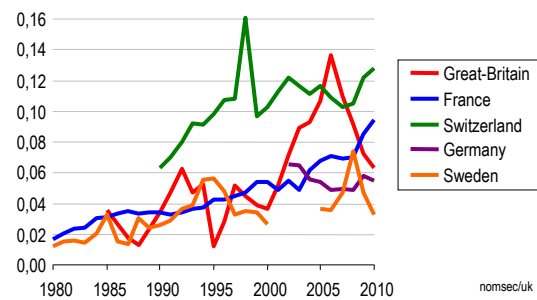


Fig. 18 : Public contributions per aggregate traffic unit (c€/uk, nominal value)

The easiest way to compare prices in different countries is to use regular exchange rates. This will tell what rail system is more costly or where, for a given amount of money, it is able to get more or less delivered. But since all price levels vary across countries, using regular exchange rate may imply wrong conclusions on efficiency : rail operations are expensive in Switzerland, but is it that the Swiss rail system is inefficient or that all prices are high in Switzerland anyway (in which case the rail sector is not to “blame” ?). We therefore normalized our data using GDP purchasing power parities (PPPs). Civity (2011) discusses in length why GDP PPPs is the best option for normalizing prices in the rail sector.

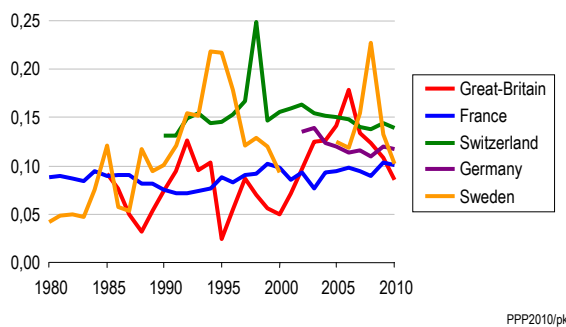


Fig. 19: Public contributions per passenger traffic unit (c€/pk, 2010 value, adjusted for PPPs)

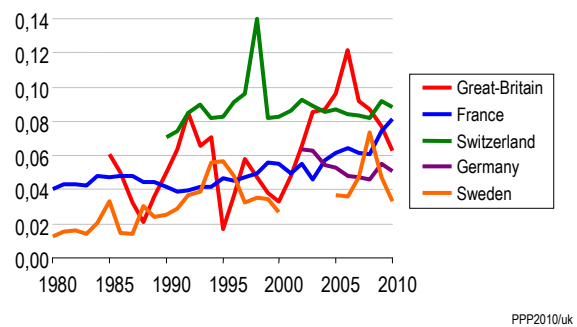


Fig. 20: Public contributions per aggregate traffic unit (c€/uk, 2010 value, adjusted for PPPs)

These figures show there is a lot of volatility, even after adjusting for price differences. Hence it may not be appropriate to look only at a given year (as was done above), but rather at a wider time range, like 2006-2010. Thus we looked at the average contribution per traffic unit (both passenger and aggregate) between 2006 and 2010, expressed in 2010 PPP EUR value. Results are shown in Fig. 21.

If we look at **public contributions per passenger traffic unit**, France has the lowest ratio (9.7 c€/pass.km), then followed by Germany (11.5) and then a group of three : Great-Britain (14.2), Switzerland (14.2) and Sweden (14.8). It is probably not a coincidence that France and Germany are the two countries with an important HS rail

network : HS rail is one of the most productive and economically efficient way to move people (provided that the trains are full).

If we look at **public contributions per aggregate traffic unit**, Sweden (4.8 c€/uk) and Germany (4.9 c€/uk) have the lowest ratio, then followed by France (6.8), then Switzerland (8.6) and Great-Britain (8.6).

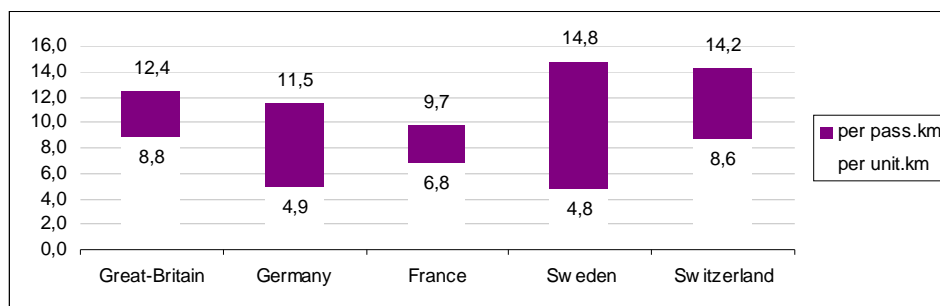


Fig. 21: 2006-2010 average public contributions per traffic unit (c€/pk, c€/uk, PPP value)

The same results can be summarized and ranked in the following table. The last two columns are an attempt to synthesize both rankings by creating a composite indicator that is the average of public contributions per passenger.kilometer and per aggregate unit.kilometer. This indicator is a second best option that tries to answer considerations in page 12 about the opportunity of simply adding pass.km and ton.km.

| | passenger c€/pk | rank | aggregate c€/uk | rank | average c€ | rank |
|----------------------|--------------------|------|--------------------|------|---------------|------|
| Great-Britain | 8,8 | 5 | 12,4 | 3 | 10,6 | 4 |
| Germany | 4,9 | 2 | 11,5 | 2 | 8,2 | 1 |
| France | 6,8 | 3 | 9,7 | 1 | 8,3 | 2 |
| Sweden | 4,8 | 1 | 14,8 | 5 | 9,8 | 3 |
| Switzerland | 8,6 | 4 | 12,2 | 4 | 11,4 | 5 |

Table 4: Public contributions efficiency ranking

5. Discussion

(5.1) Impact of organizational structure

There is a wide diversity of market structures among the countries in our sample. Great-Britain went the furthest by totally dismantling British Rail and franchising most of its passenger trains, Switzerland kept SBB as an integrated operator and only opened competition on freight services. The diversity of organizational structure across our sample is summarized in the following table:

| | unbundling / incumbent | regional trains | long distance trains |
|-----------|-------------------------|-------------------------|-------------------------------------|
| UK | brutal dismantling | brutal franchising | franchises, minimal open access |
| SE | progressive dismantling | progressive franchising | franchises, progressive open access |
| DE | integrated operator | progressive franchising | minimal open access |
| CH | integrated operator | monopoly | monopoly |
| FR | minimal dismantling | monopoly | monopoly |

Table 5: Organizational structures of railways

Our data shows no clear connection between the structure of the rail system and its overall economic efficiency :

- Great-Britain and Sweden have taken similar approaches to dismantle their historic operator and yet they have quite different public contribution intensity, especially if we consider aggregate output. Friebel (2008) argue that reform efficiency is path dependant so that poorer performance in British rail could be explained by the 3 years it took to dismantle British Rail compared to the 20 years it took to fully implement the Swedish reform;

- Germany and Switzerland have both kept the incumbent as an integrated operator, but Germany appears to have much lower public contributions than Switzerland. The extremely high investment costs of the new alpine tunnels could be the lead explanation for this apparently “poor performance” of Switzerland.

This however should not come as a surprise since this analysis is done at a very high level with very limited econometrical sophistication. More precisely, our conclusion should be: if organizational structure were having a net impact on public contributions to railways, this impact could be offset by other factors.

(5.2) Further analysis

This section is preliminary. Do not quote. Comments are welcome.

The analysis however needs to be refined. As was seen in section (2.3), differences in public contributions figures could be the result either of variations in performance or of variations in accounting methods. Ideally, it would be necessary to adjust the figures in order to remove impacts of the second set of variations, so that final figures are influenced only by actual performance. In order to do so, we would have to move from a quantitative and rigorous approach toward a more qualitative and questionable approach.

This detailed analysis has yet to be carried. In doing so, it will be necessary to take the following into consideration for the countries in the sample :

- *Great-Britain*

Despite high amounts of direct grants to Network Rail, its debt has been increasing sharply over the last 15 years. In March 2011, the debt was £25 bn (€29 bn) and generated £1,5 bn (€1,7 bn) in finance costs.

- *Germany*

DB Netz currently holds €11,9 bn of debt, which generate an equivalent €0,6 bn per year of finance costs.

The BEV structure allows DB to pay all of its workers with common work law, while some older rail workers are still paid according to the protected pre-*Bahnreform* status. While there is no point in questioning the interest of such a system, it can be considered as an indirect public contribution to the rail sector for an equivalent €0,2 bn per year.

- *France*

Public contributions to RFF are so defined that RFF ought to be able to self finance all its renewal investments. In 2010 however renewal investments amounted to €1,5 bn when the cash flow available was less than €0,9 bn : at least €0,6 bn are thus missing in the funding of French rail and result in additional non-sustainable debt.

On the other hand, RFF has a €28 bn debt, most of which with little perspective of repayment.

- *Switzerland*

CFF Infrastructure currently holds some debt which generates finance costs. To this stage however, it has not been possible to assess the equivalent cost.

Additionally, a lot of public contributions are used for the construction of the new transalpine tunnels : they are currently taken into account in the analysis, but they do not relate to actual railway performance : the system would run exactly the same today if these investment were not done (impact of these megaprojects will impact performance only in many years, once the tunnel are open for commercial service).

* * * * *

The previous lines are here as an example of what should be considered when trying to “normalize” the public contribution amounts in our sample. The following adjustments would thus need to be made to the data considered in section 4:

| <i>€bn</i> | GB | DE | FR | SE | CH |
|----------------------|-----------|-----------|-----------|-----------|-----------|
| debt | -1,9 | -0,6 | -1,4 | | n.a. |
| staff/pensions | | +0,2 | | | |
| structural imbalance | | | +0,6 | | |

We underline however that these elements are preliminary and would need further analysis and discussion.

6. Conclusion

Literature on railway efficiency and productivity is well developed, with new papers and benchmarking exercises almost every year. Unlike in other industries, prices do not say much of railway efficiency since most prices are regulated by a public authority and do not reflect costs, at least in passenger transport. There are however two categories of customers in the rail industry : passengers and industries are final customers, but public authorities are also client of their railways since they fund infrastructure and they buy public service obligations. This paper focuses on this second type of customers and tries to compare the price of rail for the taxpayer in in Great-Britain, Germany, France, Sweden and Switzerland.

In order to do so, we had to adjust data so that they account for the same perimeters in all countries. For that reason, we removed from the analysis all debt relief programs, all pension or staff funds compensations, but we included development capital investments. Adjusted for purchasing power parities, the main conclusion appears to be that there is no clear link between the level of public contributions and the organizational structure of the railways. We proposed a ranking method : following that method, Germany would be the contry with the lowest public contributions per traffic unit, followed by France, Sweden, Great-Britain and Switzerland. This method is however open to comments and criticisms.

Much additional work is needed in order to improve that analysis. First of all, not all necessary data was available, especially regarding Germany and Sweden. Additionally, it would be interesting to include other countries in the study, like Italy, Spain and the Netherlands. Second, more work needs to be done on the data in order to adjust for external factors that pollute it, like the impact of debt relief programs, funding shortages, public-private partnerships, labor law, development investments. In our view, it would however be necessary to complete such a study before attempting to enforce any new regulatory reform at the European level. So far, it seems that there is no evidence that regulatory reforms led to a significant reduction of the cost of railway to the taxpayer.

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