

Restructuring Sweden's railways: The unintentional deregulation

Jan-Eric Nilsson*

Summary

■ In 1988, Sweden made a vertical cut in its nationalised railway monopoly; since then, infrastructure is handled by a public-sector agency while trains were initially run by a government-owned monopolist. This paper seeks to describe this reorganisation, the subsequent process towards free entry and competition in parts of the sector and the consequences of these changes. It is argued that the policies have not focussed on (ticket) prices and competition issues and have rather been directed towards the sector's inability to recover costs, which seems to be a Europe-wide phenomenon. Some recommendations for further changes of the industry are suggested.■

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In 1988, Sweden was the first country in the world to vertically separate its railway sector.¹ The then incumbent was split into two parts; *Banverket*—the Swedish National Rail Administration, a public-sector agency—with responsibility for the infrastructure, and *Statens Järnvägar* (SJ) running railway services, then still under a monopoly franchise. Subsequent events have come to deregulate the freight market while entry is still restricted for (most) interregional passenger services. In addition, local (commuter), intra-regional and some interregional passenger services that are commercially unviable are procured by different tiers of the public sector and contracted on the basis of least-cost bids.

The purpose of this paper is to assess Sweden's railway policy over the last 15 years, both the original organisational reform and subsequent moves towards deregulation. The perspective taken is that the chain of events should be seen as moves to protect an ailing industry and hold the cost for procuring unprofitable railway services as low as possible. The use of deregulation to strengthen the consumer perspective has at most been of secondary importance.

The 1988 reform and the main steps subsequently taken towards deregulation are detailed in Section 2. Section 3 reviews descriptive data of the reforms' consequences in terms of financial performance, travel and freight volumes etc., Section 4 addresses efficiency aspects of the policy while Section 5 concludes. The paper starts, however, by putting the country's railways in an international context (Section 1).

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¹ Strictly speaking, this may not be the case; there is reason to believe that the joint use of common infrastructure by several operators existed during the first decades of the industry, but evidence is scant.

1. Sweden's railways in an international context

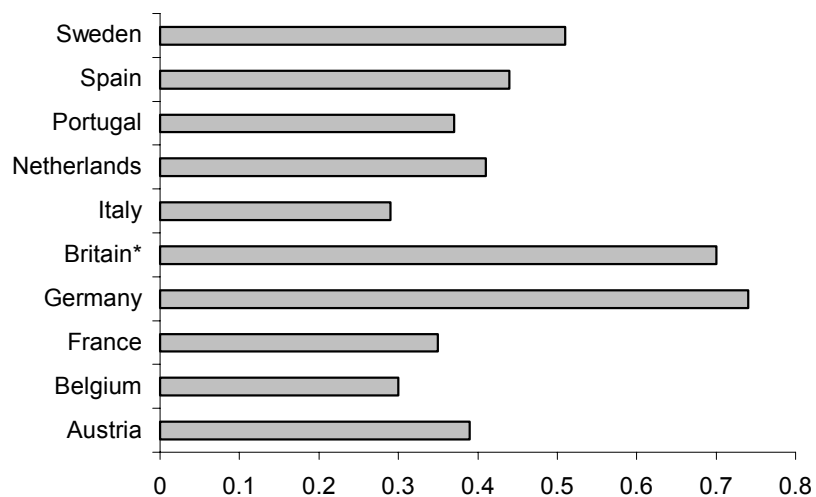
A decline in market share is one of the main reasons cited for political interest in a regulatory reform of railways at large. Between 1970 and 1995, the railways' share of the freight market in Central and Eastern Europe shrank from around 80 to less than 60 per cent; in Western Europe the drop was from about 30 to 15 per cent. During this same period, rail freight transport remained largely constant in absolute numbers in a OECD Europe that saw its GDP increase with more than 80 per cent and freight transport for all modes with about 25 per cent. One important cause of the decline has been the contraction of heavy industry.² In the European Union's fast-growing passenger market, railways' modal share fell from 10 per cent in 1990 to 6 per cent in 1997, mainly due to rising car ownership and the increasing competitiveness of road transport. In absolute terms, rail passenger traffic grew by over 25 per cent during this same period (ECMT, 2001).

The mirror image of this secular decline of market share has been a consistently poor economic performance of the railway industry. Figure 1 demonstrates that in the latter part of the 1990s, the order of the day seems to be cost recoveries below 50 per cent in several EU countries. Railways are a sunset industry.

Table 1 provides some descriptive data that puts Sweden's railways in an international context. The railway network is short relative to the country's size but large relative to its population, reflecting that Sweden is a large, sparsely populated country. This already tells us that the costs for providing services are high: the industry's prime advantage lies in providing large volumes of (freight) bulk transport between a limited number of nodes in a network. Alternatively, it does well in transporting large numbers of people on reasonable distances between concentrated conurbations, Japan's high-speed trains being one example. Excluding iron-ore transport in the north, Sweden's railways serve neither of these types of markets.

² During the same period, the US saw its rail freight traffic increase with about 60 per cent in absolute numbers with a GDP increase of close to 100 per cent; the market share remained constant.

Figure 1. 1997 revenue/cost ratio for selected EU railways



Note: * Mean 1989-94.

Source: ECMT (2001), p 134.

Table 1. Selected railway data for 1998, relative numbers with Sweden=100

	Track length/ Surface	Track length/ pop	Electrif./ total track length	Train km/track length	Travel- ler km/pop	Freight ton km/pop
Germany	431	37	69	249	91	55
Belgium	452	27	103	300	88	46
Denmark	212	34	28	292	128	24
Finland	70	90	52	82	83	119
France	233	43	62	174	138	57
UK	277	22	44	n.a.	77	19
Sweden	100	100	100	100	100	100

Note: n.a.= not available.

Source: UIC (1998).

72 per cent of the network is electrified, which is a higher share than in several other countries, reflecting the industry's high technical standard. More than 60 per cent of the lines are equipped with blockage systems that automate train control and 75 per cent have Automatic Train Control, a technique to enhance safety. This also adds to the fixed costs for the system.

Relative to track length, the intensity of track use in Sweden is below average (cf. "track km/track length" in Table 1), signalling that congestion could be expected to be lower than in several other countries. An important offsetting aspect is, however, that the blend of freight and passenger trains is higher than in many other countries. The larger is the spread of train speed, the more difficult it is—*ceteris paribus*—to provide capacity for a given number of trains. The capacity problem is further accentuated the fact by that the country has two or more parallel tracks only on 16 per cent of the network. Finally, relative to the population, Swedes travel about as much as citizens in other countries, while there is much more freight traffic than in the other countries in the sample (two last columns).

2. The sequence of reforms

By the late 1950s, Sweden's railways were essentially state owned and operated by a single company, *Statens Järnvägar*. Government control over activities was strict. The operator could not decide about rate changes, rates had to be publicly announced—also for freight operations—and line closures had to acquire consent from the Parliament. The 1963 omnibus Transport Policy Act started a series of management changes that had, by the mid-1980s, transferred SJ into a corporation essentially operating on commercial conditions, although still state owned.

The 1988 organisational reform was prompted by SJ's poor results. Ever since state subsidies were first introduced in the early 1960s, the need for support had escalated over the years. When a major financial reconstruction in 1985 shortly afterwards proved to be insufficient to turn performance around, the patience of the government was over, and a more radical transformation was drafted. An additional motive was the fact that policy makers were frustrated by never being able to understand the real reasons behind the weak results. The management of SJ did not have to open the organisation's books to its owner, the government, and was therefore in full control of what information it

dispersed. In particular, the responsible ministry could not understand whether poor demand or increasing costs was the prime performance driver. It was also difficult to disentangle the contribution to costs from spending on infrastructure maintenance and train operations, respectively.

The 1988 reform, part of a comprehensive Transport Policy Act of that year, was given three motives. One was to put railways on an equal footing with roads by organisationally separating infrastructure from service operations. This is one reason why *Banverket* was made a government agency, operated in the same way as the National Road Administration. Secondly, since railways were considered a uniquely safe and environmentally friendly means of transport, the Parliament also voted for continued financial support so that these special benefits could be fully realized. The third given reason for the reforms was to arrange for subsidies to secondary, low-density lines, by way of transferring the responsibility for commercially unviable traffic over these lines to regional transport authorities. This would then be a means of carrying on with operations for regional policy reasons.³

Under the post-1988 organisation, two subsidy techniques are used. The bulk of the support goes to *Banverket*. The revenue raised by charging operators for track use was never intended to fully recover the costs for maintaining the system. The government therefore allocates an annual appropriation to the agency, taking the expected revenue from track user charges into account. Except for maintenance, appropriations have come to include substantial allocations for investment purposes. One alleged reason is the perception that railway infrastructure had been severely neglected over the extended period of deficit years, and now needed upgrading in order to be on equal footing with roads. In addition, the parliamentary situation has given green parties the possibility to boost investment spending.

Subsidies, also go directly to traffic. Since 1978, one transport authority in each county has the monopoly franchise to run subsidised local and regional bus transport. During the 1980s, bus services that had previously been operated by force account successively came to be subject to competitive procurement. In exchange for an annual lump sum guaranteed for a 10-year-period, the government in 1988 also transferred the responsibility for regional rail transport in those

³ More details about the historical record of Sweden's railways are available in Nilsson (1995).

regions that had such lines. Another part of the government's support to traffic goes to non-commercial interregional services. Since 1998, a new government agency, *Rikstrafiken*, administers these subsidies.

The 1988 reform was substantially an attempt to deal with a recurring financial deficit by way of organisational restructuring. The preparations for the reforms were meagre and no background documents analysing alternative strategies etc. were presented. In particular, the possibility of deregulating the industry was never discussed in the Transport Policy Act—which after all deregulated both taxi services and domestic air traffic.

The first move towards market entry was, however, not far away.⁴ Already in 1989, the first competitive procurement of regional train services resulted in a four-year contract being awarded to a private company. *BK Tåg*, at that time an operator of coaches, submitted the lowest bid and could start its services in 1990, using previous SJ drivers that were now given higher salaries. Although the contractor in reality only has control over a few parameters—rolling stock is owned by the regional authority that also controls ticket prices and takes care of all revenue—*BK Tåg* acquired a reputation to deal with the operations in an un-orthodox and largely successful way. This is the first example of competition *for* the tracks, where an entrant is in charge of a certain service for a pre-determined period of time.

When this particular contract was up for renewal in 1993, SJ won it back. *BK Tåg* filed a complaint with the Swedish Competition Authority, however, claiming abuse of dominant position. It asserted that SJ had submitted a bid below costs in order to get rid of the entrant. The complaint was approved, the case was brought to court and in 1998, SJ was fined SEK 8 million for its bid. In 2000, after SJ's complaint against this verdict had been overruled, *BK Tåg* also sued SJ for damages.

The first years of the 1990s saw the establishment of several small-scale freight operators. Many of these were, and still are, subcontractors to SJ on peripheral parts of the network. The development led to a complete deregulation of freight services. From July 1996, anyone “fit, willing and able” can operate freight trains, competing with SJ for contracts with consignors. In 2002, only SJ's long-

⁴ Alexandersson et al. (2000) provide a detailed review of the chain of events during the 1990s, and present a number of case studies.

distance passenger services still operate under the protection of the old monopoly privileges.

During the 1990s several private firms other than *BK Tåg* have competed and won contracts for non-commercial services. The most notable transfer took place in 1998 when the contract for commuter transport in the greater Stockholm area was awarded to an international consortium comprising *BK Tåg*, the French Via GTI and the British Go Ahead Group. When the new operator commenced traffic in January 2000, it had problems in recruiting drivers and it took several months until services were running satisfactorily. Stockholm's commuter trains account for about 15 per cent of the total number of passenger kilometres in Sweden and more than half of the transport provided by the country's commuter trains.

In 1992, LKAB, a mining company, acquired the trackage right for its iron ore transport between Kiruna and Narvik in the northernmost part of the country. To that day, SJ had been the monopoly provider of this service. In view of roads being a costly alternative, it had probably been able to negotiate favourable transport contracts over the years. Since LKAB now owns the right to run traffic over tracks owned by *Banverket*, SJ must negotiate tariffs from a new position and it managed to retain traffic, albeit at the cost of much lower revenue. From January 2000, traffic is operated by a LKAB subsidiary.

During the 1990s, (long distance) coach traffic was gradually opened for entry, but SJ still had the right to block entry for such services that were operated parallel to its commercial railway network. The perceived risk was that railway services would otherwise suffer severe losses. From January 1999, also this restriction was lifted.

The consequences of the coach deregulation for competition on the Dalarna—Stockholm route have been studied by Johansson and Helge (2001). They show that the extent of travelling has increased substantially, both by bus (where initially three different firms competed) and—contrary to expectations—by train. The reason seems to have been that SJ, losing large numbers of travellers to buses, soon reduced its own prices; the incumbent had obviously not realised that the demand elasticity was substantial and the increased patronage came to turn red figures into black. Deregulation has in this case in particular benefited customers in the lower-income brackets—students and pensioners—since these groups can make use of the discount-price schemes on both buses and trains.

In 1994, a Build-Operate-Transfer contract for a railway service to Arlanda airport, 40 kilometres outside Stockholm, was awarded to a private consortium. The group includes two Swedish construction companies (NCC and SIAB) and two British railway equipment suppliers (Mowlem and GEC Alsthom). For most of the distance, the trains make use of the trunk line which was upgraded to four parallel tracks with government money before the Arlanda services commenced. The consortium did, however, have to build some 10 km of new lines and a station beneath the airport. Services were initiated during the fall of 1999 and ownership remains with the consortium for some 40 years. During the first year of traffic, the home-page of A-Train indicates that it had about 2.2 million travellers corresponding to about 2 per cent of the total number of trips on the country's railways.

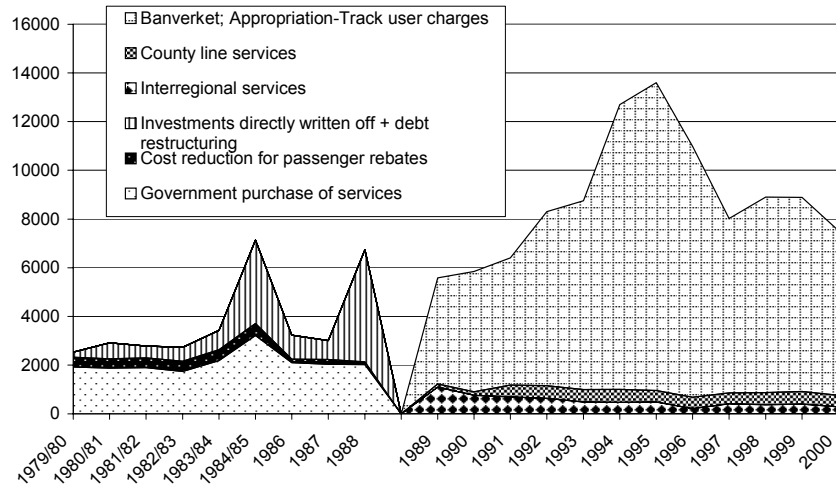
Finally, there is reason also to point to the recent commercialisation of SJ. Over the years, the incumbent has been run as a state business administration (*affärsverk*). This is formally part of the public sector, not an independent judicial body, administering assets on behalf of the government, but based on commercial principles. From January 2001, three independent limited liability corporations have been formed, one running passenger services (SJ AB), another in charge of freight transport (SJ Green Cargo AB) and the third—AB Swedecarrier—a holding company for real estate assets, heavy maintenance, etc. All stock is still owned by the government, but it would—after a decision in Parliament—be technically expedient to sell shares in one or all of the new corporations.

3. Performance indicators

One concern of the government when making the original restructuring was the magnitude of SJ's financial deficits. Up to 1988, all government support to railways was channelled through the incumbent. It was, however, labelled in different ways. A major component was "the government's purchase of (passenger) services" that would otherwise have been closed down, primarily in sparsely populated areas. The government also paid SJ for a specific "passenger rebate" that would otherwise have been discarded and that was offered to all of its passengers. Support for "investments directly written off" was money spent on way-and-structures that would otherwise not have been upgraded.

The annual backing over the pre-reform years of the 1980s was about SEK 3 billion (price level mid 2001; left part of Figure 2). In addition, SJ had its debt to the government—it had no loans on the open market—restructured twice during the 1980s. This way, the firm could reduce its instalments to the treasury; in Figure 2 this is seen as peaks in 1985 and 1988.

Figure 2. Real burden on public budgets from railway subsidies, price level mid-2001



Source: Annual reports from SJ and Banverket.

Post-1988 appropriations for spending on infrastructure are allocated to *Banverket* and never entered into a balance sheet but directly written off. This is the same procedure as in the road sector.⁵ Table 2 details the agency's post-reform revenues and costs. Investment has nominally increased from about SEK 1.1 to SEK 8.6 billion in the 1995 peak year, in real terms a more than fivefold increase. In contrast, maintenance spending has remained approximately constant in real terms between 1988 and 2001.

⁵ There is a clear economic logic in doing so since the opportunity cost is virtually zero after an investment has been carried out. In contrast to most commercial property, railway infrastructure cannot be used for other purposes and historical spending should not affect future decisions about its use.

Table 2. Banverket's revenue from track user charges and spending on investment and maintenance, million SEK, running costs

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Revenue													
Fixed	392	377	337	299	291	288	274	283	273	272	0	0	0
Variable	359	364	350	395	379	396	437	542	761	757	275	442	456
Total revenue	751	740	687	693	670	684	711	824	1034	1029	275	442	456
Costs													
Maintenance	1870	1878	1854	2218	2236	2297	2307	1982	2010	2022	2384	2434	2745
Reinvestment	805	835	702	615	821	1709	1822	1354	1043	859	520	827	858
Investm., main lines	1016	1683	2398	3970	4408	6711	7943	7024	4654	5450	4803	3541	2925
Investm., secondary lines	124	184	176	106	279	853	700	339	229	425	265	239	352
Total costs	3815	4580	5130	6909	7744	11570	12772	10699	7936	8756	7972	7041	6880
Revenue - Cost	-3064	-3840	-4443	-6216	-7074	-10886	-12061	-9875	-6902	-7727	-7697	-6599	-6424

Source: Banverket.

The table also demonstrates that revenue from track user charges only accounts for a small share of *Banverket's* costs. In real terms, about the same amount of revenue was received in 1998 as when charges were introduced ten years earlier. The structure of charges was then revised, one reason being an alleged need to level the playing field relative to trucks that had had their charges reduced, i.e. a second-best argument. As a consequence, the annual (fixed) charge per vehicle was eliminated.

The last line of Table 2 represents the subsidy to *Banverket* after 1988, and this is used as an input in Figure 2. Except for support to the track authority, the public sector contributes to interregional passenger services through a new agency. *Rikstrafiken* procures all long-distance passenger transport eligible for public support—which also includes regional airlines and ferry traffic to the island of Gotland—on a competitive basis. In Figure 2 this is referred to as interregional services. The third category “County line services” refers to passenger services on regional lines, paid for by the regional tier of the public sector, albeit with a lump-sum transfer from the central government to back regional transport at large. Because of problems in allocating revenue from monthly tickets between modes, the subsidy to commuter trains in Stockholm is not included; the entry is therefore a conservative estimate of this cost.

Figure 2 demonstrates that the public sector's financial cost for support to the railway industry has increased substantially, from about SEK 3 billion in 1987 to about SEK 9 billion in 1999 (mid-2001 price level). The bulk of the subsidies goes to investments in new tracks.

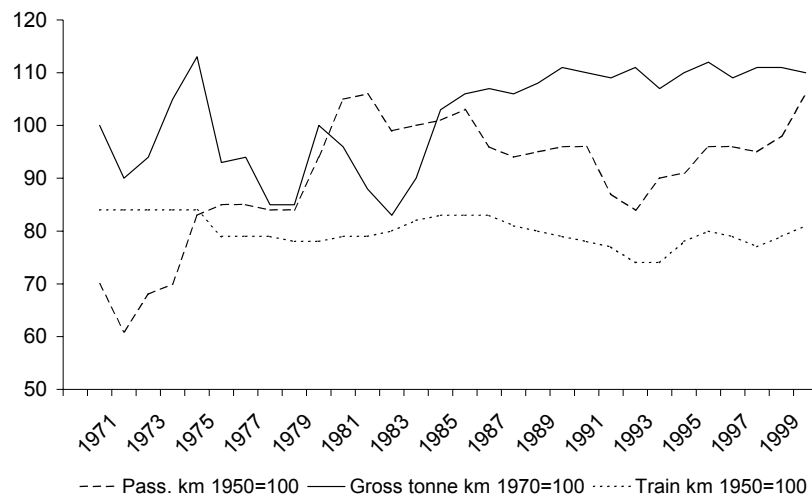
What is then the *quid pro quo* for maintaining and upgrading the country's railways with tax money? “Value-for-money” should in one way or another be related to the extent of use of facilities; the more traffic, the more passengers and freight volumes, the more environmental or safety benefits can be realised. Travel and transport volumes are therefore of relevance to answer the question and Figure 3 displays the change in usage over a 30-year period.

Traffic production measured as train km has remained approximately constant over the 1970–1999 period, and at a level of some 20 per cent below the traffic production in its overall peak year, 1950. Moreover, passenger kilometres in 1970 were about 30 per cent below their peak (1950). Since then, travelling has increased and by the end of the 1990s, it is about 8 per cent higher than in 1950. The previous peak level for freight transport, measured in terms of net ton km, was

reached in 1970; compared to this number, transport volume-distance has increased with about 10 per cent. Travelling and transport around the year 2000 are therefore higher in Sweden than ever before. Moreover, these services are provided with 20 per cent less rolling stock than was needed in the peak years of the industry. Eye-ball econometrics does, however, not indicate that the 1988 organisational reform meant any significant change in these trends. The new organisation has therefore accommodated traffic growth, but did not trigger it.

An aspect of value-for-money more directly related to deregulation concerns the specific subsidies going to commercially unviable operations; have subsidies increased or decreased as a result of competitive procurement? Statistical evidence to answer this question is poor. *Riks-trafiken* has no time-series that could be analysed. Alexandersson et al. (2000) provide data indicating that the real cost per train-couple—i.e. per return trip per day during a full year—has shrunk from above SEK 9 million in 1992 to about SEK 3 million in year 2000 (price level 2001). This figure is too blunt to permit any definite conclusions.

Figure 3. Relative change of traffic activities 1970-1999



Source: SIKA (1999).

Some information is, however, available for county-line services (cf. www.sltf.se). The subsidy has been between SEK 400 and 500 million per year in real 2001 terms between 1991 and 2000; this is the entry that has been used in Figure 2 above. The subsidy per trip has fallen from SEK 27 to 16, and if we calculate the subsidy per supply unit (train km), the cost has fallen from SEK 26 to 11 in real terms. Remembering the missing Stockholm data, the public sector's cost per unit purchased has fallen. Procurement on a competitive basis, and the presence of more than one potential operator, is one possible explanation. While this provides some information about the producer and taxpayer perspective, we still lack information about what the reforms have meant for the price that commuters have to pay.

In an environment where relevant information is missing, productivity comparisons can shed some light on an industry's performance. Such benchmarking is particularly important in businesses with a low number of domestic competitors. Based on data from a World Bank report, Table 3 provides a framework for an international comparison. In this perspective, SJ's labour productivity seems to be high, even if all personnel needed to care for the infrastructure is included, and the traffic production of freight cars seems to be high.

SJ's revenue side of the accounts is less impressive. Average earnings per passenger km is above the target level suggested by the Bank while earnings per (freight) ton km are low. There is reason to remember the bias introduced by the fact that infrastructure spending is not accounted for. To put this in perspective, the gross 1999 earnings of passenger and freight services were about SEK 6.2 and SEK 4.3 billion, respectively, each business branch with a result around break even. The government spent SEK 7.7 billion, net of track user charges, on infrastructure. Sweden's railways would therefore not be able to pay their full costs if asked to do so.

Table 3. Performance comparison

Indicator	Best practice/ desirable	Sweden, SJ (all)
Operational		
<i>Labour productivity</i>		
Net ton km (freight) per employee (1000)	>750	1404 (1049)
Total train km per employee	4 400	9547 (6029)
<i>Capital productivity</i>		
Ton km per wagon, million (freight)	0.9	1.25
Commercial		
<i>Revenues and prices</i>		
Passenger revenue/passenger km (US\$)*	0.04	0.09
Freight revenue/ton km (US\$)*	0.03	0.02
<i>Passengers</i>		
Passenger km per route km, 1000 per km	5237	930
<i>Freight</i>		
Ton km per route km, 1000 per km	>2000	1463
<i>General</i>		
Arrivals with small delays (10-15 min), percent	90-95	>90

Notes: * Exchange rate assumed at SEK 10 per US\$. “Best practice/desirable” based on Campos and Cantos (2001), p 232.

Source: for Swedish numbers: SIKA (1999).

The poor gross earnings per production unit (passenger and ton km) implicitly point to the railway's situation on the transport market. Complementary intuition is provided by Figure 4 where the gross earnings (inflated to the current price level) from SJ's freight and passenger divisions have been divided with annual passenger kilometres and ton kilometres, respectively, for a longer time period. It is obvious that earnings from freight operations are subject to a steady downward trend. Most probably, this reflects the competitive pressure from trucks and partly also (costal) shipping that forces the railway to transform any productivity increase or cost saving into lower prices in order to stay in business. Freight customers seem to have been able to appropriate a large part of the cost cuts—the elimination of infrastructure costs—that the 1988 reform meant to the operator.

Figure 4. SJ's earnings per transported unit 1963 - 2000, price level 2001



Source: SJ's annual reports.

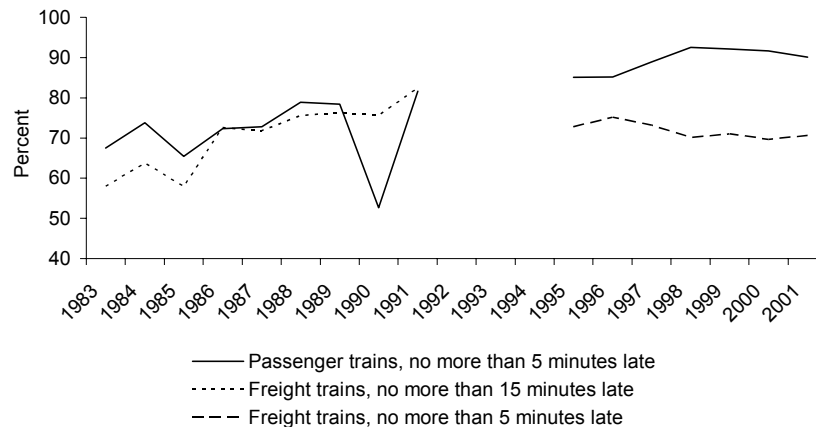
The figure also shows that SJ earns about 15 per cent more per passenger km than it did some 35 years earlier.⁶ Wieweg (2001) argues that the monopolist has been able to appropriate much of the increase in consumer surplus generated by the massive investment program implemented during the last ten years. Price hikes have been particularly excessive on routes where the competitive pressure from domestic air travel is lower. The still protected monopoly position on long-distance passenger transport has obviously been beneficial for the incumbent's earnings. Deregulating long-distance passenger transport may therefore put pressure on ticket prices and further boost travelling.

Table 3 also indicates that the average intensity of track use (passenger and ton km per route km) is well below the target level for both passenger freight services. These two entries point to the fact

⁶ This time series suffers from accounting practices having been adjusted several times during the time period and the business per se having repeatedly been restructured. It should in the first place be seen as pointing to a general trend rather than as being consistent on all individual accounts.

that the troubles for Sweden's railways should be sought on the demand side of the market; the available infrastructure is not used to the necessary extent to recover total costs.

Figure 5. Percentage of trains (almost) on time



Source: BV records.

The ability of trains to stick to their time-table signals the quality the system offers to its customers. A reaction from international railway people when Sweden made its pioneering vertical separation of the industry in 1988 was that this quality aspect would be jeopardised. However, Figure 5 demonstrates that passenger services are timelier today than before the reform; this is particularly noteworthy in view of the steadily increasing number of operators that have to sort out their differences. Passenger services seem to meet the target for arrivals with small delays suggested in Table 3. Because of a change in definition, the conclusions are less obvious for freight transport; performance, however, seems to be improving.

4. Efficiency aspects

Textbooks in microeconomic theory teach students how profit-maximising firms operate on competitive markets. Subject to a price that can be charged to the market, the firm should produce a quantity such that this price equals marginal production costs, at least if the price covers the average variable costs for the production, otherwise it should close down. The standard welfare theorems indicate under

which conditions this also harmonises with an efficient use of scarce resources.

This logic bears over to the use of railway infrastructure. Operators of railway services should be charged for the social marginal costs for track use. If the revenue from these activities is inadequate to cover the variable costs, the line should be closed down. If it covers variable but not full costs, a decision whether the line should be closed or not should be taken in the next instance when the infrastructure is in need of renewal. The qualification that marginal costs should be “social” is motivated by the need to account also for environmental and safety aspects of railway traffic that are external to operators.

To understand whether current charges for infrastructure use are in line with these principles, Table 4 details the existing charging regime. Trackage and shunting fees are ways of recovering the marginal cost for track wear, accident and diesel charges are ways of internalising otherwise sector-external costs while the information fee and the charge for using the Öresund bridge have nothing to do with marginal costs but are rather collected to raise revenue.

Table 4. Charges for using Swedish tracks from January 1999

Type of charge	SEK
Trackage fee, passenger	0.0086 per gross ton km
Trackage fee, freight	0.0028 per gross ton km
Information fee, passenger	0.002 per gross ton km
Accident charge, passenger	1.10 per train km
Accident charge, freight	0.55 per train km
Diesel charge	0.31 per litre diesel
Shunting charge	4 per shunted car
Charge for using Öresund bridge, freight	2 325 per passage

Note: EUR 1 corresponds to about SEK 9.

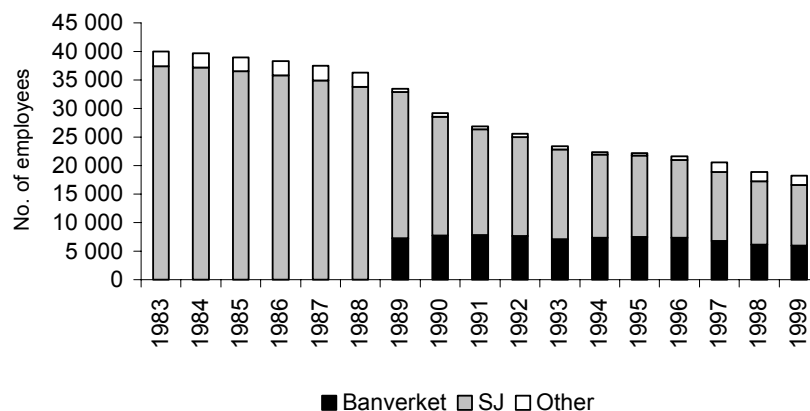
Nilsson (2002a) compares these charges to available evidence about costs and draws the following conclusions. Today's charges are below the social marginal costs for track use. One reason is that they do not incorporate spending on reinvestment; since the timing of reinvestment is affected by traffic load it should, at least on major lines, be seen as a marginal cost for infrastructure use. A second reason is that the charges fail to account for scarcity. A high pressure for use of

available capacity in some parts of the network corresponds to high demand for the products of 'normal' private firms, and signals a rising cost to accommodate demand or that capacity is no longer available; the supply curve is then vertical. The use of these sections of the network should then be priced differently from the use of other sections of the tracks. Nilsson (2002b) reviews how this could be achieved by way of an auctioning technique.

The extent of the railway traffic could therefore today be expected to be (somewhat) higher than if short-run efficient charges had been imposed. In addition, the textbook recommendation to consider disinvestment when the infrastructure has been worn down is not part of the current strategy. The overall length of railway lines, which was 11700 km in 1975 and 11 000 km in 1999, bears witness to this. Only very small savings in track maintenance costs have thus been made by branch-line abandonment, reflecting the deep symbolism of retaining railways also in regions with sparse traffic. Although the cost for allowing additional trains to use the existing infrastructure is low (Johansson and Nilsson, 2001), it would be possible to make substantial cost savings by closing down the line completely. This is the case since the cost for keeping the line open for traffic is substantial, in particular if it is used by passenger services that require better-maintained tracks than freight trains. Closures of marginal lines would, on the other hand, affect the aggregate traffic volume only marginally.

A mirror image of this observation is provided by Figure 6, demonstrating that the number of employees in the industry has been cut by more than half between 1983 and 1999. But at the same time as SJ has shrunk, *Banverket* has only marginally reduced its staff in comparison to its start in the late 1980s. One reason out of several may be that the total track length still is the same as when the agency was established and the staff may consequently still be needed. Parts of SJ's downsizing are, however, due to the fact that some of its activities, such as train dispatching, have been transferred to *Banverket*.

Figure 6. Railway sector staffing



Source: SIKA (1999).

Except for the inability to let the network contract, Table 2 points to the huge amounts of resources that have been spent on new investments. *Banverket* bases its assessments of investment schemes on Benefit-Cost analyses. Investment practice does, however, not seem to be in line with the recommendations from properly made analyses. There are important examples of projects with negative rates-of-return that have been initiated, and spending on railway investment appears to have become a pawn in a larger, political gamble. This is particularly discomfoting in view of the fact that several mega-projects of poor value to the sector relative to their political image have been launched; efficiency-enhancing projects are more often small and do not catch the eyes of the general public (cf. for instance Widlert's contribution in Swedenborg, 2002).

Sweden today heavily subsidises its railway services. The main efficiency problem with this is, however, not the strikingly low charges. It is, after all, highly rational to make use of existing assets with no opportunity use at the price of marginal costs only. More problematic is the fact that the government is not able to take the long-term consequences of the situation into account; marginal lines are probably much more costly to keep open than what they provide in social benefits. Financial records moreover provide poor information about

costs relative to usage on a line-by-line account, and it is therefore not possible to weigh possible regional distributional benefits against these costs. In particular, it is difficult to realise whether maintaining low-density railway lines is the best way to further regional equity.

There may, in principle, be second-best motives for subsidising railway infrastructure: If road traffic is priced below the marginal costs, it is welfare enhancing to boost railway investment as a counter balance (Nilsson, 1992). With two important exceptions, however, road users today seem to be paying for their social marginal costs. One is the inability to charge for congestion in city areas, thus motivating balancing subsidies to infrastructure that benefits commuter services. The other is the appropriate level of CO₂ taxes that—according to some estimates—would motivate much higher taxes on fuel than today. The efficient way of enhancing efficiency is, however, to target the primary concern—the inappropriate pricing of road transport—rather than to take the cumbersome second-best route via support to investments in the competing mode, railways. Disproportionate spending on railways seems to be less of a railway policy issue and more a problem related to the ability of the political system to further efficiency at large.

5. Summary and policy recommendations

Sweden's 1988 railway sector reform was one of reorganisation. The vertical separation that was unique in an international perspective was never considered by, or designed in, any pre-implementation committee, but seems to have been created in smoke-filled rooms. The change triggered similar moves towards vertical separation of a traditionally integrated railway industry in several countries, in particular in Europe.

Subsequent events have come to deregulate many, but not all, parts of the industry. Deregulation as a means to further competition and hold down end-user prices has been less important for the passenger market where prices on average have increased; the price for freight consignments has, in contrast, shrunk over a prolonged period. The process also seems to have reduced the average cost for subsidising commercially unviable services; in part, this cost saving has been used to increase the volume of purchased traffic.

Sweden's path towards deregulation during the 1990s has been trod also by other countries, it has been more piecemeal than the

1988 reform and each step has been preceded by appropriate ex ante assessments. As a result of this process, Sweden today has a flourishing operator market, comprising many small but also several large operators of freight and passenger services. While some of these can be expected to go bankrupt, others will most probably be created instead. The threshold for a major freight transport consignor to switch from buying services from SJ Green Cargo to operating trains under its own account is, for instance, today low and an almighty incumbent can no longer decide what is “appropriate” or not. In this sense, railway operations have become similar to other markets.

Deregulation also of interregional passenger services would further enhance social welfare. It should not be expected that several operators will be able to compete heads-on over each line; demand is too small and the cost structure of train services possibly comprises nonlinearities (cf. Ellis and Silva, 1998, for a similar conclusion for bus services). Different operators may however—after a period with war of attrition or some other dynamic process—come to run passenger trains over different lines. An increasing number of operators would add to the dynamics of the market and put a downward pressure on ticket prices.⁷

Many markets undergoing a process that dismantles rules and liberates economic activities run the risk of a deteriorating safety performance. The reason is that a regulated or state-owned business could be stricter on safety standards than commercial operators, in particular if the government sidesteps this issue when designing a new institutional structure. Railways have, however, had a strict system to control for safety for a long time; Sweden for instance has its own safety regulator, the Railway Inspectorate. Numbers also indicate that the accident risks have kept falling during the period in question (Bäckman, 2002). If anything, the costs for safety enhancement in the railway sector may be above their efficient levels.

At the same time as Europe's railway monopolies are being reformed, the upstream equipment industry undergoes a profound change. Many countries have had their own producers of rolling stock, signalling utensils etc. In parallel with attempts at the European Community level to streamline technological standards, for instance

⁷ In Britain, subsidies are targeted to operations rather than infrastructure. This may increase patronage, but the scale economies, and the consequent market failures, in the train operation business are probably much less pronounced than in the production of infrastructure services.

to introduce a common train control system, these companies are now consolidating. In the long run, this will probably reduce the cost for providing railway services. It is not clear whether or not this process would have progressed at the same pace without the vertical separation.

Around the world, policies towards the railway sector are first and foremost a matter of rescuing an ailing industry. Our review indicates that the poor financial performance of Sweden's railways is not the result of a substandard performance; several productivity indicators rather point to the contrary. The need for subsidies primarily seems to be a demand-side problem. The sharp competition with other modes of transport pushes prices down and gives the (up-stream) infrastructure management poor chances to recover its costs. A large network covering a sizeable but sparsely populated country is a second reason for the deficits. Sweden is in many instances a textbook example of where railways could *not* be expected to provide cost-efficient solutions to transport problems.

By and large, the policy towards charging for infrastructure use, with fees that are set far below a cost recovery level (in the year 2000, revenues covered only 18 per cent of the maintenance costs), seems to have been beneficial for (static) efficiency. We have argued that there is reason to raise the price for running trains, and this would improve cost recovery. The deficit per se is, however, not overly problematic from an efficiency perspective; assets without alternative use should not be priced to recover costs, since this would deter users without saving on costs.

This policy conclusion goes hand in hand with a need to consider downsizing the loss-making activity, however. An important efficiency concern is the absence of critical reviews that could lead to line closures that would reduce the size of the network over time. The government on the contrary spends huge sums on new investment, including several projects with small social benefits relative to their costs. Today's investment spending will further boost future maintenance costs. Total spending on railway activities may therefore be well above a level which could be motivated from an efficiency perspective, even if second-best concerns are accounted for.

The European Union has recently adopted a directive regulating inter alia pricing of railway infrastructure use and the allocation of track capacity (Directive 2001/14/EG) partly drafted with the Swedish charging system as a blueprint. Its proposals are in line with the

basic efficiency prerequisites of the railway industry, at least if the short-run perspective is maintained. The policy is, however, taken out of its larger institutional context and in essence assumes all decision makers to be benevolent maximisers of social welfare. Issues related to dynamic efficiency are bypassed. Moreover, the recommendations give member countries large leeway in the implementation of the recommendations and it has little to say about the long-term efficiency aspects of industry activities.

The literature still gropes for the design of an appropriate institutional structure of an industry with extensive economies of scale and scope operating on a shrinking market. Issues related to intertemporal efficiency is at the core of the problem. It is beyond the scope of the present paper to design this institutional structure. The difficulty in establishing the actual status of activities—which is implicit in the problems that have been met to collect appropriate information for the present study—however points to the need to enhance (political) transparency in an industry where policy makers are decisive for its future. To this end, the National Railway Agency should, for instance, be instructed to account for costs on a line-by-line basis, making it easier for decision-makers to weight the possible merits of keeping a branch-line open against the costs on a disaggregate case-by-case level. In addition, political motives for investment priorities should be clarified to enhance transparency.⁸

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⁸ This same perspective on policy making in Sweden's public sector at large is present in Molander et al. (2002).

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