

Progress in implementing the Commission’s targets for mode split

Chris Nash,* Andrew Smith* and Hana Fitzová**

The 2011 European White Paper on transport foresaw rail becoming the main means of medium-distance passenger transport and of long-distance freight transport. This paper reviews progress in achieving these targets and with implementing the policies the Commission foresaw to influence mode split. It concludes that progress has been slow in implementing these policies. In particular, the pace of innovation in rail must be accelerated in the light of developments in other modes.

Introduction

According to the 2011 White Paper (European Commission, 2011), rail was to become the main means of medium-distance passenger transport and long-distance freight transport as part of the EU policy to achieve a 60% reduction in greenhouse gas emissions from transport by 2050. This policy was reiterated as part of the EU Green Deal (European Commission, 2019), which tightened the target for transport to 90%.

It put forward a set of policies to achieve this:

1. Complete reforms to introduce competition within the rail mode;
2. Improving rail infrastructure
3. Internalisation of externalities in all modes;
4. Innovations in rail transport driven by a major research programme.

However, the European Parliament (2018) concluded that “*The modal share of road, rail and inland waterway transport remained substantially unchanged between 1996 and 2016.*”

In the following we first discuss what has actually happened to the rail mode split in the last ten years. We then discuss progress on each of the four policies intended to increase the rail mode share. We finally make some concluding comments.

What has happened to mode split?

In the last 10 years, rail in the EU has achieved some increase in the passenger market share from 7.33% in 2009

to 8.08% in 2018. However, the growth has been far from evenly spread.

Figure 1 shows the rail share of the passenger market in four groups of countries: western Europe, eastern Europe, the Baltic states and the small rail systems in Ireland, Luxembourg and Greece. It is clear that growth is confined to western Europe and (slightly) the Baltic States, with a sharp decline in eastern Europe followed by some recovery and stagnation overall in the small countries.

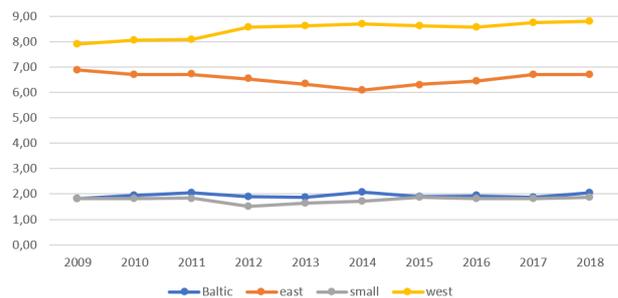


Figure 1: Share of rail in passenger transport in the EU by region (in % of total)

Source: European Commission. *EU transport in Figures: Statistical Pocketbook 2020 + own computations.*

*Passenger transport includes rail, buses and coaches, and individual cars

In eastern Europe every country experienced a decline in market share except Poland, the Czech Republic and Slovakia. There are some obvious reasons for these differences. Car ownership in eastern Europe is still climbing from the low level it was at in the communist era. Several western European countries have benefited from investment in high-speed rail. It is interesting that the three countries in eastern Europe with rapid growth in rail demand are

* Institute for Transport Studies, University of Leeds, UK and Masaryk University, Czech Republic

** Masaryk University, Czech Republic

the three countries which have experienced the most open access competition.

Turning to freight, the rail freight market share recovered sharply from a low of 16.9% in the recession in 2009 before falling back to 17.8% in 2018 (Figure 2).

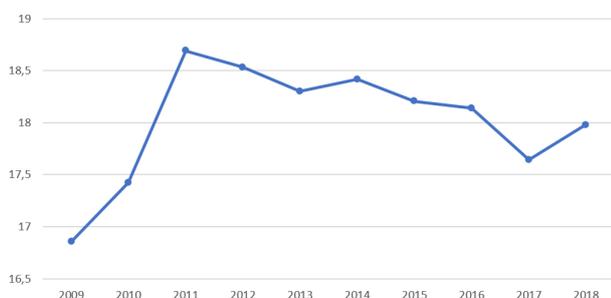


Figure 2: Share of railways in freight transport in the EU 28 (in % of total tonne km)*

Source: European Commission. *EU transport in Figures: Statistical Pocketbook 2020*.

*Freight transport includes road, rail and inland waterways.

Only Slovenia and Hungary in eastern Europe have shown growth since 2009, while a handful of countries in Western Europe do (European Commission, 2020).

In the following sections we consider progress in the policies to achieve an increased rail market share.

Complete reforms to introduce competition within the rail mode

In 2007, the rail freight market was completely opened up to competition, and in 2010 international passenger services followed. With the fourth Railway Package, competition for commercial passenger services followed in 2020 and competition for services operated under public service contracts will be opened in 2023.

There is extensive literature reviewing the impacts of the various reforms on costs and productivity. Reducing costs would hopefully ultimately lead to an improvement in rail competitiveness and therefore mode share, but the results of different studies are not consistent. There is a strong finding in a number of papers indicating that horizontal separation of passenger and freight services has reduced costs (see, for example, Mizutani et al., 2015). However,

regarding vertical separation of infrastructure and operations, the results in different papers are contradictory. Some studies conclude that costs have only been reduced on less densely used systems while on densely used systems vertical separation has actually increased costs. On competition, there are also conflicting results, although one recent study, Fitzová (2020), finds that competition improves productivity (suggesting lower costs).

There are only a few econometric studies using panel data to examine the direct impact of European rail reforms on modal split. The most recent (Tomeš, 2017) concludes that “There is no evidence that the principal European reforms (vertical separation and competition entry) increase the modal shares of European railways. The impact of vertical separation was weakly negative and the impact of competition was insignificant. A more promising strategy is horizontal separation, especially when it is followed by privatisation of freight operations”. Although there have been studies of demand in individual countries where strong demand growth has followed reforms (e.g. Britain and Sweden), there were other factors at play and the precise impact of reforms on demand is therefore not clear.

Overall then, while a number of countries have opened up their markets ahead of legislative deadlines, the results so far have been disappointing in terms of both the impact on costs (except perhaps for lightly utilised railways) and modal share.

Improving rail infrastructure

The European Commission foresaw an important part of the increase in rail mode share coming from improved infrastructure and particularly high-speed rail, where it foresaw a trebling of the length of high speed lines in Europe by 2030. This would not only improve passenger service quality and capacity but, to the extent that it involved building new lines, it would release capacity on existing lines for expanding freight traffic. By 2011, 8790 km of high-speed lines in Europe were open (including conventional lines upgraded to speeds of 200 kmph or more). By 2020 a further 3028 km had opened (UIC, 2021). This suggests a rate of opening falling well short of that needed to achieve the European Commission target (European Court of Auditors, 2018).

High speed rail has been particularly successful in taking medium distance traffic from air (Nash, 2015) but it is very expensive and can only be justified for very dense

flows of traffic. It may be more important to examine further the potential for upgrading existing lines, particularly in central and eastern Europe, where rail speeds are often below those found in Western Europe.

Internalisation of externalities in all modes

Internalisation of externalities in all modes of transport has been EU policy since 1998 (European Commission, 1998). However, progress has been slow as a result of opposition from member states, which fear that the resulting increases in transport costs will damage their economies. Short-term marginal social cost is required for rail in a series of directives (Nash et al, 2018a) although application has varied and mark ups are permitted where marginal social cost pricing does not meet the revenue requirements of the infrastructure manager. By contrast, legislation on charges for the use of roads stipulates the rules charges must follow if they are introduced but it does not require their introduction. Traditionally, use of roads has been charged with annual licence duty and fuel tax. Some countries have also had tolls on motorways, which may be distance-based or time-based (where the lorry owner pays a fixed charge for the vehicle to use the motorway system for a fixed period of time). There are two circumstances in which these charges typically fall short of covering the full marginal social cost. First, this is the case for congested roads, particularly in big cities, where external congestion costs are not reflected in charges. Second, it is the case for heavy goods vehicles used for long distance traffic, particularly where there are no motorway tolls or such tolls are time based.

The ideal solution to this would be a system of charging per kilometre travelled differentiating the level of charge by the type of vehicle and by where and when the vehicle is used. While developments in GPS are increasingly making this a realistic possibility, no European country has such a system for charging for the use of roads yet. Congestion charging is confined to charging for entering the central area of a few cities. Kilometre based charges for heavy goods vehicles on all roads are confined to Switzerland, but a handful of other countries have such charges on motorways (Nash and Link, forthcoming). Discussion of making such charges compulsory and extending them to all types of vehicles has so far yielded no agreement.

The other area where a failure to charge adequately for externalities is significant in terms of competition with rail is air transport. As a result of international agreements, air transport generally does not pay fuel tax or value added

tax. Although air transport is a part of the European emissions trading scheme and is also subject to specific passenger duties in some countries, it appears that – given the low price of carbon – these fall far short of covering the external cost. A failure to charge water transport for its infrastructure and external cost is also significant in the freight market in some countries.

The European Commission has funded a great deal of research on how to value transport externalities and compiled the results in a handbook. When the most recent update was published (Van Essen et al., 2019a), a parallel exercise was undertaken to establish how far on average externalities are now covered by charges in Europe (Van Essen, 2019b). The conclusion was that rail came closest to doing so. For both road and air transport, less than half the sum of variable infrastructure costs and externalities is covered by charges. For water the margin is even greater. Therefore, had the aim of fully covering external costs by charges been achieved, rail would have been considerably more competitive with other modes.

Technical change

Finally, the Commission foresaw a substantial contribution to rail's winning market share coming from innovation and technical change. To achieve this, jointly with the industry the Commission established the Shift2Rail programme, a major research programme currently being undertaken as a public-private partnership. Shift2Rail has set ambitious targets of a 50% reduction in system lifecycle costs, a 50% improvement in reliability and a 100% improvement in capacity. A successor programme – Europe's Rail – is expected to start shortly.

There is substantial scope for improving the efficiency of the European rail system through technical change. Full implementation of the European Train Control System removes the need for lineside signals, enables the full potential capacity of the track to be exploited and improves reliability and safety. It opens the way to full automation of main line railways. Virtual coupling would enable trains to join and separate sections while moving and could ultimately massively expand capacity by removing the need for trains to remain a stopping distance apart. Together, these technologies could revolutionise rail service quality and enable frequent services by short trains, each one serving a variety of origins and destinations. Remote monitoring and automated repairs of track and trains could reduce costs and disruptions.

However, these visions of the future face major barriers in their implementation. Rail managers and engineers are naturally risk averse, particularly regarding safety. There are big advantages to standardisation, so that trains can run anywhere on the system rather than being confined to particular routes or countries. This brings economies of scale in manufacturing and flexibility in operating. However, it may hamper the introduction of innovations which do not confirm to current standards. The migration path from existing to new systems is often difficult, with major capital costs and disruption along the way. Moreover, rail asset lives are so long (typically 30–40 years for rolling stock and longer for track and signalling) that if innovations only come when assets are replaced they may be slow to permeate through the system. There are also problems with the structure of the industry as it has evolved over the past 20–30 years (Nash et al, 2018b). Fragmentation has damaged the research capability of the industry and may hamper incentives to undertake innovations which have short-term costs but long-term benefits. It also makes more difficult projects which require investment by a number of different bodies, and where the benefits are not shared in proportion to the costs. The solutions to these issues often require public sector action.

Conclusion

The 2011 White Paper saw increased rail mode share as an important element in its policy to achieve its target reduction in greenhouse gases. But progress in achieving this has been slow in passenger transport, while after a sharp recovery from recession in 2008 freight has declined.

This is at least partly due to slow progress in the policies designed to influence mode split. While rail freight was totally liberalised in 2007, progress in liberalising the passenger market has been slow and there is no clear evidence of beneficial effects on mode split. Investment in high-speed rail is running substantially below target. Only a few countries have made the necessary moves to internalise externalities. While substantial investment has been made in research into improved rail technology, progress in implementation is slow.

If innovation were able to achieve the objectives of the Shift2rail programme, including doubling capacity and halving life cycle costs, it would make an enormous contribution to the competitiveness of rail transport, although obviously other modes will not stand still. Electrification of road transport, autonomous vehicles and virtually con-

nected convoys of heavy goods vehicles threaten to damage the position of rail unless it moves forward fast to innovate. The approach of Shift2rail seeking to bring the industry together in a concerted programme of research with a mix of government and private sector funding appears to be more promising than previous fragmented efforts, and has already thrown up exciting and innovative possibilities. However, continuing to understand how best to turn these into real projects with a sound business case and a secure path to implementation remains the most important effort needed to secure an improved rail market share.

Acknowledgements

This article is the output of the project “New Mobility – High-Speed Transport Systems and Transport-Related Human Behaviour”, Reg. No. CZ.02.1.01/0.0/0.0/16_026/0008430, co-financed by the Operational Programme Research, Development and Education.

⁴ Finger, M., Bert, N., and Kupfer, D., (2014), Making effective use of technology in SESAR deployment, https://cadmus.eui.eu/bitstream/handle/1814/39128/ETR_Observer_2014_04.pdf?sequence=1&isAllowed=y

References

- European Commission. (1998). White paper: Fair payment for infrastructure use: a phased approach to a common transport infrastructure charging framework in the European Union, Brussels.
- European Commission. (2011). White Paper: Roadmap to a Single European Transport Area – Towards a Competitive and Resource Efficient Transport System. Publications Office of the European Union. <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0144:FIN:en:PDF>
- European Commission (2019). COM(2019) 640 final Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. The European Green Deal.
- European Commission. (2020). *EU transport in Figures: Statistical Pocketbook 2020*, Publications Office of the European Union, Luxembourg [online].
- European Court of Auditors. (2018). A European high-speed rail network: not a reality but an ineffective patchwork.
- European Parliament (2018) Research for the TRAN Committee – Modal shift in European transport: a way forward, Study requested by the TRAN Committee, Policy Department for Structural and Cohesion Policies, Directorate-General for Internal Policies, PE 629.182 – November 2018.
- Fitzová, H. (2020). The impact of the European railway reforms on railway efficiency (PhD thesis). Masaryk University, Brno.
- Mizutani, F., Smith, A., Nash, C. & Uranishi, S. (2015). Comparing the costs of vertical separation, integration, and intermediate organisational structures in European and East Asian railways. *Journal of Transport Economics and Policy (JTEP)*, 49(3), 496-515.
- Nash, C. (2015). When to invest in high speed rail. *Journal of Rail Transport Planning & Management*, 5(1), 12-22.
- Nash, C., Crozet, Y., Link, H., Nilsson, J. E. & Smith, A. (2018a). Track access charges: reconciling conflicting objectives. *Report, Brussels: CERRE*.
- Nash, C., Matthews, B. & Smith, A. (2018b). The impact of rail industry restructuring on incentives to adopt innovation: A case study of Britain. *Proceedings of the Institution of Mechanical Engineers, Part F: Journal of Rail and Rapid Transit*, 234(3), 331-337.
- Nash, C. and Link, H. (forthcoming) Europe. In Alejandro Tirachini, Daniel Hörcher and Erik Verhoef (Eds) *Handbook on Transport Pricing and Financing*.
- Tomeš, Z. (2017). Do European reforms increase modal shares of railways? *Transport policy*, 60, 143-151.
- UIC. (2021). Atlas – High-Speed Rail 2021. UIC, Paris. Table 1.2
- Van Essen, H. et al. (2019a). *Handbook on the External Costs of Transport*. European Commission, Brussels.
- Van Essen, H. et al. (2019b). State of play of internalisation in the European transport sector. European Commission, Brussels.