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Structural reforms in the railways: Incentive misalignment and cost implications

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ABSTRACT

In Europe, many countries have completely separated their railways into totally separate infrastructure managers and railway undertakings (train operators) and the European Commission has sought to make such complete vertical separation a legal requirement.

This study used both quantitative and qualitative methods to investigate the impact on costs of vertical separation. We find the impact to vary with circumstances, but for more densely used railways and those with a higher proportion of freight traffic, vertical separation raises costs. It appears that the main reason for this is the misalignment of incentives, leading each player to seek to optimise their own costs rather than those of the system as a whole. Various approaches are used to try to overcome this misalignment, through track access charges, performance regimes and various forms of partnership, but none is fully successful. We also find no evidence that complete vertical separation leads to more competition, or indeed that such an increase in competition reduces costs, though we consider that further work is needed to better measure the extent of competition in different markets. From a policy perspective our findings suggest that alternative railway structures will suit different railways with different patterns of usage and therefore a policy that seeks to impose complete vertical separation on all EU members would increase costs.

1. Introduction

Starting with Directive 91/440, for more than twenty years, the European Commission has pursued a policy of seeking to introduce competition within the rail sector by opening access to new operators. Initially this was solely for certain categories of international freight, but current directives require complete opening of the market for all freight – domestic and international – and for international passenger traffic (Nash, 2010). The currently proposed fourth railway package intends to extend this to all passenger services, either by competitive tendering for franchises or by open access for commercial services.

For such competition to work, it is necessary to ensure that new entrants are not discriminated against in terms of charges for and allocation of capacity on the infrastructure. Thus legislation already requires that these functions must be undertaken by a body which is independent of any train operator. Moreover, the infrastructure manager must publish separate accounts and legislation requires there to be a regulator to whom appeals can be made if discrimination is suspected. However, these requirements have not prevented some European countries (notably Germany, Austria and Italy) from maintaining a structure in which infrastructure and train operations remain separate subsidiaries of the same holding company.

In its original proposals in the 4th railway package, the Commission proposed making the holding company model illegal, and

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requiring complete separation of infrastructure and operations into totally different companies. In the face of opposition from some member states, it has now revised the proposal to accept the holding company model with even stricter conditions to prevent discrimination.

It remains the case that, outside Europe, the most common structure of the rail industry is for it to comprise one or more vertically integrated railways. It is argued that vertical integration enables optimisation for the system as a whole, and that this is difficult to achieve in a vertically separated railway (Pittman, 2007). Firstly, there are transactions costs involved in negotiating and enforcing the contracts necessary for a vertically separated system to operate. The only study to try to quantify these to date (Merkert, Smith, & Nash, 2012), found them not to be large, with the holding company model reducing them by around 1% of total systems costs compared with a completely vertically separated system (Of course they might be reduced further by complete vertical integration). But more importantly, there are issues of misalignment of incentives, as each player tries to optimise their own part of the system regardless of the impact elsewhere. These were emphasised by the McNulty Report in the UK (McNulty, 2011).

Past studies on this issue are inconclusive. Some studies (e.g. Growitsch & Wetzel, 2009) have found increased costs as a result of vertical separation and others either no impact (Asmild, Holvad, Hougaard, & Kronborg, 2009; Cantos, Pastor, & Serrano, 2011) or the reverse (Cantos, Pastor, & Serrano, 2010). Most interestingly, one of the most recent studies (Mizutani & Uranishi, 2013) brought together data for Europe with that for Japan and South Korea, and found that the most cost effective structure depended on the density of traffic, with densely used railways benefitting from integration but less densely trafficked railways benefitting from vertical separation.

The EVES-Rail project (van de Velde et al., 2012) was commissioned by the Community of European Railways and Infrastructure Companies (CER) to investigate these issues further. Specifically it built on the work of Mizutani and Uranishi to examine in depth the impact on costs of vertical separation or the holding company structure, whilst also undertaking a review of the qualitative evidence on the degree to which it is possible to achieve systems optimisation in vertically separated railways and on the methods used to do it. The authors are grateful to CER and its members both for the provision of data and information and for comments on an earlier draft; however, responsibility for the views expressed in this paper lies with its authors alone.

This paper seeks to summarise the policy implications of the research undertaken for that report (available on: http://www.cer.be/publications/studies/) and as set out in the associated technical academic paper (Mizutani, Smith, Nash, & Uranishi, 2014).

The structure of the paper is as follows. Following the introduction, in Section 2 we describe and summarise the results of the econometric model comparing the cost of vertical separation with vertical integration and the holding company model. Section 3 examines the qualitative evidence on misalignment of incentives. Finally, Section 4 brings together the theory and evidence contained in Sections 2 and 3, and concludes.

2. Econometric cost model

The main purpose of this section is to draw conclusions on the impact of vertical and horizontal separation (as well as intermediate forms) on rail costs. It is divided into four sub-sections. In Section 2.1 we position the paper within the previous literature and explain the methodological and data innovations undertaken. In Section 2.2 we outline the model and dataset. Section 2.3 contains the core results and explains the policy implications of the work. The focus here is on results and the policy conclusions and we therefore do not describe the details of the alternative models tested and all the diagnostic tests undertaken. For further details of these see van de Velde et al. (2012) and Mizutani et al. (2014). In Section 4 of the paper the results and policy implications of Section 2 are combined with those from Section 3 and wider conclusions drawn.

2.1. Contribution to the literature

We note that the literature mainly contains studies based on physical input measures that may not properly capture the inputs used by railways (e.g. using track-km or route-km as a measure of capital). As another example, physical measures of the staff input (staff numbers) can be highly misleading, given the very different degrees of subcontracting found in different railway companies. A cost based study, which produces an overall measure of a railway companies inputs, and which is not affected by sub-contracting, thus has a number of advantages and that is the approach used in the model reported here (though we recognise that further data improvements are still required; see Section 2.4). Specifically the model used builds on the previous paper by Mizutani and Uranishi (2013), updating and enhancing the data and methodology in a number of important ways. For a detailed literature review of past studies in this area see Nash (2013).

First, from a data perspective, Britain is added to the sample. Most previous studies have excluded Britain due to lack of data (we were able to assemble data for Britain with help from the rail industry). The addition of Britain is important given the very radical approach taken to rail reforms and the ensuing cost increases that occurred. The dataset has also been updated beyond 2007, up to 2010 (where possible). Further improvements to the data, for example in pinpointing the exact dates of key reforms, were made by asking Community of European Railways and Infrastructure Companies (CER) members to check and improve our dataset.

From a methodological perspective, the previous literature, including Mizutani and Uranishi (2013), only compared vertical separation against vertical integration. The model reported here considers also the holding company model and, in addition, enhances the way in which competition effects are modelled (reflecting actual, rather than potential entry, and taking into account the degree of passenger entry).

Finally the approach to modelling the relationship between industry structure and train density, set out in Mizutani and Uranishi (2013), is developed to reflect the fact that railways with a high proportion of freight traffic could be considered different to those with a lower proportion in respect of the impact of railway structure on costs.

The above developments to data and method mean that the approach addresses a number of limitations in the previous literature. In particular, and relevant to European rail policy, it enables policy conclusions to be drawn on the cost implications of the holding structure as well as of vertical separation and full integration (see van de Velde (2012) and Mizutani et al., 2014 for further detail). Importantly we combine the quantitative results of the econometric model with qualitative analysis in reaching our overall findings.

2.2. The model and dataset

Here we set out the main features of the data and the model. Further details can be found in Mizutani and Uranishi (2013), van de Velde et al. (2012) and Mizutani et al. (2014).The dataset, which comes predominantly from the International Union of Railways (UIC), includes three extra countries compared to the original