

Appendix 5



Local and Regional Impacts of High Speed Rail in the UK

Prepared by Professor Tomaney

5 LOCAL AND REGIONAL IMPACTS OF HIGH SPEED RAIL IN THE UK

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Summary

- 5.1 This appendix was written in the Centre for Urban and Regional Development Studies, Newcastle University by Prof. John Tomaney, Dr. Pedro Marques and Penny Marshall.
- 5.2 This appendix addresses claims that HS2 can lead to “*a strategic change in the economic geography of the UK*”, in the words of the Department for Transport. The appendix gathers the theoretical and empirical evidence for this claim from within and beyond the UK. It notes the contradictory and conflicting arguments made by different government departments concerning the role of high speed rail in the “*rebalancing*” of regional economies.
- 5.3 The appendix notes the weight of recent theoretical and empirical academic work which emphasises that high speed rail connections between cities or regions with different levels of development may favour already strong regions at the expense of weaker regions.
- 5.4 The appendix examines evidence of the experience of five countries where HSR has been introduced to assess its impact on their economic geography. Taking this evidence in the round it is very difficult to substantiate the argument that high speed rail is likely to have a positive impact on regional inequalities. Cities which are the location of HSR stations may gain some benefits, but distribution of net benefits needs careful analysis. Some of the benefits accruing to regional cities may be at the expense of neighbouring places, while in countries with dominant capital cities net benefits tend to accrue to these.
- 5.5 Looking at the UK situation in more detail, the appendix examines those arguments which suggest that other kinds of transport investment may make a bigger contribution to the objective of regional rebalancing than HS2, particularly those which improve inter-city connections between cities and regions outside London and the South East.
- 5.6 Overall, the appendix suggests that the impacts of high speed rail investments on local and regional development are ambiguous at best and negative at worst. It is very difficult to find unambiguous evidence in

support of the contentions that are being made by the government about the potential impacts of HS2 on the cities and regions of the UK.

Introduction

5.7 This appendix is concerned with an aspect of the debate surrounding the proposed HS2 high speed railway. The arguments made in support of (and against) HS2 are complex and, at times, contradictory. Our aim in this paper is to focus on one of the more recent, but increasingly prominent propositions in the debate; namely that HS2 will accelerate the regeneration of slow-growing regions in the UK and assist the new policy objective of “*rebalancing the economy*” spatially. There are several other arguments which are deployed in support of HS2 – such as its potential impacts on capacity constraints, congestion and carbon emissions – but we touch on these aspects of the debate only insofar as they bear on our core question of the likely contribution of high speed rail (HSR) to regional rebalancing.

5.8 Claims about the transformative potential of HS2 for regional economies have gained recent prominence in the arguments of proponents. For instance, the Secretary of State for Transport, Phillip Hammond, has asserted recently that HS2 represents:

“A once-in-a-generation chance to reshape our economic geography; bring our key cities closer together; regenerate our urban centres; and tackle the North-South divide that has held this country back for far too long” (2011 <http://www.dft.gov.uk/press/speechesstatements/speeches/hammond20110228>).¹

5.9 A former Secretary of State Lord Adonis has complained recently:

“There is a big debate about the economic benefits of high-speed rail. Bizarrely it has been suggested that HS2 might disadvantage the regions by sucking more economic activity into the south-east than it generates in the regions – a view which has even been expressed in the West Midlands, a telling commentary on the lack of confidence there is in the regional economy. In fact, the evidence is of a fairly clear and positive relationship, among cities and large towns, between journey time to London and productivity. The shorter the journey time to London, the higher tends to be productivity. By bringing Birmingham closer to London, its productivity

¹ In his Foreword to the Department for Transport’s *High Speed Rail: Investing in Britain’s Future* Consultation (February 2011) Hammond reiterates: “By slashing journey times and linking to our major international gateways, it has the potential to help bridge the North-South divide that has for too long limited growth outside London and the South East (Hammond, “Foreword” in DFT 2011: 5).

should rise, which is good for jobs, good for business and potentially transformational for Birmingham's future" (2011: <http://www.opendemocracy.net/ourkingdom/andrew-adonis/birmingham-unleashed-elected-mayor-high-speed-rail-and-academies#>.)

- 5.10 It is noticeable that although evidence is referred to, little of it is in fact deployed in support of these arguments. The aim of this appendix is to examine the basis for these claims by assembling the available evidence. In this appendix we scrutinise the international and national academic literature and other evidence to assess how well-founded the claims are. We outline the case made by the proponents, we examine the international evidence – theoretical and empirical – about the local and regional impacts of HSR, we look at the little available UK evidence about the local and regional impacts of HS2 and outline the regional rebalancing challenge and the potential role of transport in this, paying attention to alternative transport proposals. Finally, we draw some conclusions. We conclude that it's difficult to find robust evidence that HS2 will have a transformative impact on the economic geography of the UK.

HS2 and regional development: the nature of the claims

- 5.11 Claims that HS2 can lead to
"strategic change in the economic geography of Britain, supporting sustainable long-term growth and reducing regional disparities" (DFT, 2011: 12)

have become increasingly central to the HSR proposition. These claims are related to the Government's commitment to the objective of "*rebalancing*" the UK economy. In their Foreword to the Coalition Programme David Cameron and Nick Clegg stated

"...we both want to build a new economy from the rubble of the old. We will support sustainable growth and enterprise, balanced across all regions and all industries" (Cabinet Office, 2010: 7).

The term rebalancing has become central to government rhetoric although it is used in multiple and, at times, contradictory ways. Amidst this confusion, however, it has tended to refer fairly consistently to the notion of an economy less reliant on the contribution of financial services and less concentrated in London and the South East. The Coalition Programme for Government states:

“We want to create a fairer and more balanced economy, where we are not so dependent on a narrow range of economic sectors, and where new businesses and economic opportunities are more evenly shared between regions and industries” (HMG, 2010a: 9).

This perspective underpins the *“Local Growth”* agenda, which has been outlined by the Government (HMG, 2010b).

5.12 Recent commentary has emphasised the scale of the rebalancing challenge (e.g. BIS, 2010; Ward, 2011; PwC, 2010; SQW Ltd., Cambridge Econometrics Ltd., Centre for Urban and Regional Development Studies and Institute of Employment Research, 2011). Regional inequalities in the UK are longstanding, comparatively wide and entrenched. Moreover, the nature of the Government’s deficit reduction plan focused on historically unprecedented and rapid reductions in public expenditure, according to most analyses, will impact heavily on employment, output and income in the northern regions, which have tended to rely disproportionately on public sector jobs (see especially SQW Ltd., Cambridge Econometrics Ltd., Centre for Urban and Regional Development Studies and Institute of Employment Research, 2011.)

5.13 The Department for Transport’s consultation document *High Speed Rail: Investing in Britain’s Future* places heavy emphasis on the contribution that HSR can make to the objective of rebalancing – although it does not use this term directly (see DFT, 2011, especially Chapter 2). Among other things, it argues:

“By bringing the major cities of the Midlands and the North closer to the capital, and by ensuring that capacity is available to handle high levels of demand growth, high speed rail could benefit thousands of businesses by improving access to the huge and internationally-competitive markets of London and the South East – just as service sector firms in Lyon have benefited from enhanced access to Paris. And by bringing the major regional conurbations closer together, boosting productivity and enabling greater economic specialisation, high speed rail could put them in a strong position to compete effectively in those markets. High speed rail would also act as a catalyst for regeneration, as has been seen in cities across Europe, such as Lille, where the arrival of high speed rail drove the development of the major Euralille complex. A British high speed rail network could contribute strongly to regeneration in our major cities, for example at Old Oak Common in West

London and in the Eastside district of Birmingham. A London–West Midlands line alone could support the creation of around 40,000 jobs” (DfT, 2011)².

5.14 In total, the DfT analysis predicts that HS2 would generate benefits worth £43.7 billion at present value. Since capital and operating costs are expected to be £44.3 billion over the next 60 years (partially offset by forecasted £27.2 billion in fares revenue) the result, according to the government’s calculations is a benefit: subsidy ratio of 2.6. In a study prepared by KPMG (2010) it is claimed that HS2 would create a single market for services and knowledge based activities, through a better connection between core cities in the UK. As a result, GVA would receive by 2040 a boost between £17 billion and £29bn. Due to increased economic activity, HS2 would also generate additional tax receipts valued between £6bn and £10bn. This impact, according to KPMG (2010) would be felt more strongly in the North of the country, thereby effectively contributing to the spatial rebalancing of the UK economy.

5.15 The DfT (2011) provides European examples to support its argument, although it is unclear what its sources of its evidence are:

“International experience supports this view. In Lyon, the high speed rail link to Paris has enabled firms from the city to benefit from improved access to the French capital. The area around Lyon’s Part Dieu high speed rail station now hosts 5.3 million square feet of office space and around 20,000 jobs. Similar patterns have been observed in Japan, where high speed rail has seen a dispersal of investment and economic activity from the main ‘developed region’ towards the periphery. And in Spain, a number of towns and cities have benefited from improved links to the capital – for example, Lleida, whose high speed rail links have helped to attract investment from Microsoft and other high-tech companies.”

5.16 The Government’s main statement on its approach to rebalancing the economy spatially is its White Paper *Local Growth* (HMG, 2010b). This document refers to rail only once as a means of encouraging local growth and this reference is to Crossrail, although there are some generic references to the importance of transport investments. Similarly the accompanying technical paper makes no reference at all to the role of rail (and only two references to transport) as a source of local growth, and here the focus is on the importance of intra-urban transport systems in

² It should be noted that 9,000 of these jobs are anticipated to be construction jobs, while 22,000 of the permanent jobs will accrue to London and 8,300 to Birmingham.

underpinning agglomeration economies rather than addressing inter-regional imbalances (BIS, 2010).

- 5.17 In summary, the current government is presenting high speed rail as a crucial policy instrument that will help address regional inequalities and boost the UK economy. The government also claims that total economic and social benefits will be significantly larger than the subsidy they will require, which will guarantee a positive rate of return in these terms. However as we will discuss next, based on theoretical and empirical arguments, these predictions about the impact of HSR on regional inequalities are founded on assumptions that are difficult to sustain.

High Speed Rail and Regional Development

Theory and Evidence

- 5.18 The “*new economic geography*” (NEG) (Krugman, 1993) seeks to explain the persistence of regional disparities assigning a critical role to the productivity advantages accruing from the agglomeration of economic activity in major cities which are able to attract firms and workers. NEG is a globally influential theoretical framework for understanding the economic processes that produce regional inequalities. It is worth paying particular attention to, because this theoretical framework figured prominently in the technical paper which accompanied the current UK Government’s white paper on Local Growth, which set out its approach to rebalancing the UK economy spatially (HMG, 2010b, BIS, 2010). According to NEG the location of each individual business is the result of a trade-off between transportation costs and increasing returns to scale. The latter suggests that the marginal cost of production decreases as total production increases. In other words, once a firm invests in the necessary physical and human infrastructure the more it produces the cheaper the cost of each individual good or service. Therefore the firm has an incentive to locate its activities in the same place, even if that implies transporting some of its output. Naturally the benefits of increasing returns to scale disappear once transportation costs exceed its benefits.
- 5.19 This is an important principle but it still does not explain why firms tend to locate in cities, where land and labour are more expensive, instead of locating in isolated or rural areas. The emergence of cities is the product of localisation and/or agglomeration economies. Both are based on the same three principles, but the former explains the concentration of firms in specialised clusters, whereas the latter explains their presence in cities with

a diversified economy. The three principles are: scale economies in intermediate outputs, labour market pooling, and knowledge spillovers. These principles are mutually reinforcing and therefore they lead to exponential gains in productivity and competitiveness. The combination between the benefits of agglomeration and the principles underlying the location of businesses explains the pull effect exerted by core cities. This pull effect has remained strong (and according to some authors has even increased) despite the proliferation of information and communication technologies and an overall decrease in transportation costs. It explains why cities such as London and the South East region of England continue to prosper and diverge from the rest of the country, despite higher land and property prices (plus other costs, such as increasing commuting times or pollution).

- 5.20 Much of the NEG literature surveyed for this appendix does not focus specifically on high speed rail but its conclusions are nonetheless relevant. A recent paper by Lafourcade and Thisse (2008) for example develops the theoretical elements in NEG theory concerning the mobility of capital and labour, increasing returns to scale and transport costs to understand the potential impact of infrastructure investment. The authors argue that lower transport costs are likely to benefit core regions to the detriment of poorer ones. The positive externalities generated by agglomeration economies are mutually reinforcing and therefore the more productive cities or regions are likely to provide a more competitive business environment. As a result, when firms located in the core city compete with those located in peripheral ones the former have a comparative advantage. This is particularly the case for isolated areas, which are the most likely to suffer from transport improvements, even if this assumption is counterintuitive.
- 5.21 There is nevertheless an assumption that the impact of transport costs on the regional economies follows a bell curve i.e. after a first period, when a fall in transportation costs leads to concentration of economic activity in the major agglomerations, lower transportation costs are likely to facilitate a redistribution of economic activity towards the periphery, particularly of manufacturing activities. This would however imply that transportation costs became almost negligible.
- 5.22 A similar argument is developed by Puga (2002) who has drawn on these insights to examine the trends in regional inequalities and regional disparities in the EU who notes that:

“A better connection between two regions with different development levels not only gives a less developed region better access to the inputs and markets of more developed regions. It also makes it easier for firms in richer regions to supply poorer regions at a distance, and can thus harm the industrialisation prospects of less developed areas. New economic geography models not only point out this potential ambiguity of lower transport costs on less developed regions, they also tells us that the overall effects depends not just on the characteristics of the projects, but also on certain aspects of the economic environment. For instance, if there is little interregional migration, and if wages do not vary much between regions – even when regions differ widely in their attractiveness to firms – then investment in infrastructure can do little to help poorer regions catch up, and may even widen their lag with respect to richer regions” (2002)

5.23 Puga (2002) suggests that the main (potential) impact of high speed rail is on the location of business services and headquarters suggesting that an increased ability of business service providers and headquarters’ operation to serve remote locations leads to a further concentration of these activities in fewer, larger cities. One effect of this can be to raise costs in those cities which make them less attractive to manufacturing firms. This accelerates the shift in economic geography from a specialisation by sector to a specialisation by function. Puga provides evidence of this shift in US and of the emergence of this trend in France, where the construction of the Lyon-Paris TGV led to the relocation of headquarters activities from Lyon to Paris in contradiction to the claims made in the DfT consultation document (DfT 2011). DfT claims that the development of a new office complex adjacent to the Part-Dieu station in Lyon points to the positive effects of HSR, but this statement does not address the net impacts on growth and employment. The balance of evidence assessed here and below points to a negative net impact for Lyon.

5.24 De Rus therefore concludes:

“New economic geography models not only point out this potential ambiguity in the impact of lower transport costs on less developed regions, they also tell us that the overall effect depends on certain aspects of the economic environment (such as mobility and wage rigidities) and on the characteristics of the projects. On this respect, the Trans-European Transport Network will give much of the EU better access to the main activity centres. However, the gap in relative accessibility between core and peripheral areas is likely to increase as a result of the new infrastructure, which reinforces the

position of core regions as transport hubs. The emphasis on high speed rail links is also likely to favour the main nodes of the network, and is unlikely to promote the development of new activity centres in minor nodes or in locations in between nodes” (2008: 14).

- 5.25 Puga distinguishes between different types of rail investment, for instance between those that facilitate trade between regions and those that facilitate trade within regions (see also Martin and Rogers, 1995). He concludes that while improvements in the former may harm rather than help peripheral regions, improvements in local infrastructure appear to have no negative impacts. Similarly hub-and-spoke type high speed rail systems appear to produce particular effects. Multiple spokes connected to a single hub tend

“to promote agglomeration in the hub of the network, as firms located there face lower transport costs to spoke locations than firms in one spoke to another. Furthermore, they also tend to trigger disparities between spoke regions” (Puga, 2002: 397; see also Puga and Venables, 1997; Fujita and Mori, 1996).

- 5.26 This phenomenon is demonstrated clearly in the work of Vickerman et al (1999) which shows that the development of the European high speed rail network has tended to increase the accessibility of core cities within Europe whereas peripheral regions gain some improved accessibility but markedly less than core cities. Nodal cities gain the most from improvements to the high speed network while places between nodes or on the edge of the network do not make gains as might be predicted by the new economic geography (see also Lafourcade and Thisse 2008).

- 5.27 In a highly cited and influential study, which used cross-sectional and panel data to assess the impact of European Structural Funds expenditure on Objective 1 regions, Rodríguez-Pose and Fratesi (2004) show that despite the concentration of EU investments in new infrastructure (notably roads, high speed rail, etc.) there was no noticeable impact on regional convergence. Only in the case of investments in education and human capital – which represented about one eighth of the total commitments in the period under review – was it possible to identify positive and significant returns. Rodríguez-Pose and Fratesi consider a number of reasons for this disappointing performance but conclude that the main reason is that the relationship between infrastructure investments and regional convergence is inherently weak.

5.28 They suggest:

“Since ... roads, railways, and telecommunication networks run in two directions, a strategy strongly skewed towards specific regional characteristics that are at the root of the development of infrastructure in regions with relatively vulnerable local production structures, weak entrepreneurship levels and technological base, and an often weaker human capital endowment, may solve an important development bottleneck and reduce the infrastructural gap with the rest of the EU, but may leave these regions more exposed to competition from stronger and more technologically advanced firms in core areas. Spain provides an example of where this mechanism may already be at work. The strong recent investment on transport infrastructure in Objective 1 regions devoted to the construction of road and high-speed rail links between the periphery of the country and Madrid – has probably helped to boost the phenomenal growth rates that Madrid has experienced in the second half of the 1990s, but has left many of the Objective 1 regions, whose economic prospects rail-links were supposed to increase, struggling to catch-up” (2004: 109).

5.29 One of the factors contributing to these outcomes is that rail in general – and high speed rail in particular – is generally patronised by higher income groups, as demonstrated by the Sustainable Development Commission (see Table 1), using UK data. These groups are overrepresented in London and the South East and underrepresented in the Midlands and the North. Regional income inequalities and the relatively high costs of using high speed rail are therefore likely to shape the net regional benefits of HSR: *“There are potential fairness benefits for regional economies. It is argued that a high speed rail network would help to rebalance the UK economy and could allow existing rail lines to be dedicated to improved local rail services. However, others have suggested that rather than bolstering the economies of the Midlands and the North it will further imbalance the national economy towards London. High speed rail could also divert funds away from investment in local rail services ... those in the highest income quintile are the greatest users of rail. Despite commitments to ensure that new high speed services would not be offered at premium prices it could therefore be argued that higher income groups would stand to benefit most from large scale investment in a high speed rail network. Ultimately, the fairness impacts of a high speed rail network will depend on the detail of implementation plans, how it is integrated into the existing transport*

network and what complementary transport policies are included” (SDC, 2011: 59).

- 5.30 Taking these arguments into consideration, it further emphasises the need to consider carefully whether high value, high-speed inter-city rail investments represent the best means of addressing regional inequalities.

FIGURE 5.1 DISTANCE TRAVELLED BY MODE BY INCOME QUINTILE (NATIONAL TRAVEL SURVEY)



Source: cited in SDC (2011)

International Examples

- 5.31 There are six countries worldwide (other than the UK) where high speed rail lines have received a significant amount of investment: Japan, France, Germany, Spain and, more recently, Italy and China. Italy completed its first high speed line in 2006 and rail’s share there remains well below the EU average so it is difficult to evaluate its impact for the purposes of this study. China is currently investing heavily in this mode of transportation (the first line opened in 2008) and is en route to have the most extensive HSR network in the entire world by 2012. Despite the size of its network and of its investments, the fact that is a rather recent development also makes it

difficult to assess its impacts on the economic geography of this country³. Therefore we will focus on the remaining five aforementioned examples⁴.

- 5.32 Japan was the first country to build a HSR line between Tokyo and Osaka in 1964. Since then three more lines have been built and the system currently serves over 300 million passengers per year, a value above demand forecasts. The time savings generated by the existence of HSR are estimated to be 400 million hours a year. Nevertheless, original expectations about economic benefits from these lines led to political pressure for the creation of more stations, which in turn endangered the economic viability of the Japanese HSR system. By 1987 debt was so high (\$US 200 billion) that the Japanese government decided to privatise the system. At the same time evidence from 1997 indicated that HSR had not necessarily contributed to long-term regional dispersion of economic activities (Sasaki et al. 1997). It is true that the cities served by it grew at a faster pace than those excluded, but the HSR routes had been designed taking into consideration expected growth, independently of its impacts. Therefore faster growth happened where it was already expected, even before the line was built.
- 5.33 The French high speed rail system is one of the most successful in financial terms and in the impact it has had on the cities served. It was built under strong governmental intervention and had from the beginning a strong focus on cost containment and commercial viability. For that reason it is mostly a mixed system: the construction of new separate rails was restricted to congested areas, while in the rest of the service conventional lines were upgraded to accommodate higher speeds. HSR lines account for only 37% of the total network. Regarding its impact on regional development, there is some evidence that cities such as Lyon and Lille have benefited from the creation of a HSR line. The former, for instance, was capable of attracting several regional offices of firms headquartered in Paris. Nevertheless, the French capital has gained the most from the creation of a network that has Paris as its central node. For instance, according to Albalade and Bell (2010) on the Paris-Rhône-Alpes route, flight and train journeys to Paris increased 144%; those in the opposite direction have increased 54%. Intra-organisational trips that have Paris as their destination

³ Recent commentary has suggested that the main driver behind the growth of the Chinese high speed rail has been the pursuit of prestige and the desire to develop a railway export industry. Moreover there are signs that the rate of investment in high-speed new lines is likely to slow ("China: Off the rails? High-speed trains might be forced to go a little more slowly", *The Economist*, 31st March 2010.)

⁴ US literature is sometimes cited in the debate about HSR in the UK, but given the absence of any meaningful investments in this technology this literature tends to have a speculative character.

increased 156%, while trips originating in Paris increased by 21%. Survey based analysis also indicates that the impact of HSR on business location was negligible, according to the same authors (Albalate and Bell 2010). Therefore, despite some business creation, there is no evidence that HSR led to overall economic decentralisation from Paris (Marti Hennenberg 2000 cited in Albalate and Bell 2010). Furthermore, as in other countries, there is evidence that HSR reduces the number of overnight stays from business travellers. This has a negative impact on one of the industries that is usually most likely to benefit from HSR: tourism⁵.

- 5.34 In Germany the construction of HSR had two objectives: 1) to improve the North South connections, that had been neglected in the period before WWII, when the priority were west-east links; 2) to combine freight and passenger service in order to serve the industrial centres. According to Heinisch (1992) the main concern in Germany was not faster passenger traffic but better connections between the North Sea ports and the industrial and consumer markets in South Germany. The end result is that the German HSR network is mostly based on the upgrade of previously existing lines, with commercial speeds remaining lower than in other countries. Also, due to high costs resulting from a difficult terrain, the country's urban structure, political and legal obstacles and low ridership, there have been questions about the financial and environmental justification for investing in high speed rail (Albalate and Bell 2010). There have been no significant impacts on the economic geography of Germany resulting from HSR, partly because there is not a central city dominating the urban system, but also because it transports less people than HSR systems in France or Japan, making it a less relevant factor in influencing regional development.
- 5.35 In Spain the first HSR line between Seville and Madrid was finished in 1992. It was built mostly as a tool to achieve territorial cohesion since this was not a heavily congested route. Later the country inaugurated the Madrid-Barcelona line that links the two major cities in this country, plus lines

⁵ DfT (2011) offers the development of the EURALILLE business district as further evidence of the development impact of the TGV. EURALILLE certainly represents a major property development and Lille benefitted from its strategic location in northern Europe and as potential node between Paris and London close to the Channel Tunnel. However, even in these apparently favourable conditions, Moulaert et al (2001) highlight the ambiguous local impact of these developments suggesting they have accelerated intra-regional inequalities as neighbouring towns such as Roubaix, Tourcoing and Villeneuve d'Ascq experienced few development gains and may have lost economic activities to EURALILLE. It should be noted, Moulaert et al observe, that to produce the observable effects, the construction of EURALILLE was supported by very large public investments. This is also true of Part-Dieu in Lyon.

linking Cordoba to Malaga, and Madrid to Valladolid. Due to the small size of Spain's urban agglomerations, ridership has remained low in comparison with France and Japan. These lines have therefore been deemed to deliver negative economic results. Moreover, there is some evidence that Madrid has benefited the most from the connection to Seville (Gourvish 2010), contributing to a greater centralisation of businesses and population in the Spanish capital. According to Gourvish (2010), there are concerns that a similar process might happen between Madrid and Barcelona, with the latter losing out to the former. Nevertheless Spanish governments have repeatedly vowed to continue expanding the HSR network, mostly because it has a very positive image with the country's population, as a sign of progress and modernity (Albalate and Bel 2010).

- 5.36 In general, evidence from these countries suggests that HSR is likely to generate or reinforce territorial polarisation (Albalate and Bel 2010). This fact is acknowledged in at least two of the documents requested by HS2 Ltd as part of its project development (Gourvish 2010; Urban and Regional Policy 2009). Both admit the paucity of evidence to support the contention that high speed rail infrastructure tends to contribute to the rebalancing of regional economies. Additionally, the prediction that HSR will generate growth in peripheral cities (supported by data from KPMG 2010) is mostly based on assumptions which are difficult to sustain after close scrutiny. The report prepared by KPMG in 2010 indicated that rail makes places more productive and on this basis the construction of HS2 would lead to economic growth in London and the other UK cities. But on the one hand this impact is difficult to prove, because it is almost impossible to isolate the impact that rail has in a city's productivity, from the impact exerted by other means of transportation, or even by the other elements that sustain agglomeration economies (such as active labour markets, positive knowledge externalities, increasing returns to scale). On the other hand this line of causality itself is problematic: when KPMG suggests that rail makes cities more productive, it may only be capturing the fact that the more productive places have better transport connections, including rail (Laird and Mackie 2010).
- 5.37 Taking this evidence in the round it is very difficult to substantiate the argument that high speed rail is likely to have a positive impact on regional inequalities. Cities which are the location of HSR stations may gain some benefits, but distribution of net benefits needs careful analysis. Some the benefits accruing to regional cities may be at the expense of neighbouring

cities, while in countries with dominant capital cities net benefits tend to accrue to these. In the German case the evolution of a high speed system based on the existing rail network may have underpinned an already dispersed German settlement structure (Ahlfeldt and Pedersen, 2010).

Implications for the UK

- 5.38 Turning directly to the situation in the UK, the most authoritative recent review of transport policy, the Eddington Review, questions whether so-called “*step change measures*”, such as HS2, would have major transformational economic impacts:

“Step-change measures intended to transform the economy are not, in a world of constrained resources, likely to be a priority. The available evidence for step-change projects in the UK, such as a new high-speed North-South rail line, shows wider BCRs [benefit-cost ratios] at the lower end of the distribution before accounting for landscape and carbon effects. Furthermore, BCRs of alternative options to solve these problems are not available. However, it is often argued that such measures miss transformational economic impacts, such as a radical shift in the economic geography of the UK brought about by new levels of connectivity. The evidence for transformational benefits is at best unproven, and ... the UK’s urban areas and regions are already well connected. Another potential benefit (which should be included in the wider BCR) is that of freeing up capacity on existing rail lines. Whilst this is true, it is not at all clear that creating new networks is the most appropriate or cost-effective method to achieve increased capacity: high speed options should be assessed coldly alongside other policies for achieving the same objective. Other transport investments are very likely to offer superior returns compared to where projects rely on new and largely untested technologies” (Eddington, 2006a: Vol. 3: 133).

- 5.39 Eddington maintained instead that a greater priority should be attached to investments in urban transport systems where it is possible to demonstrate clearer returns:

“Given that agglomerations in a service-based economy tend to be found in major urban areas; that urban networks are particularly heavily used and shared by a wide range of users; and that economic growth and congestion are disproportionately represented in urban areas, projects in urban areas might have been expected to offer very high returns. It is not unreasonable, at the strategic level, to consider that the costs of congestion and

unreliability are likely to have a far greater direct impact on the economic success of the UK than might be the case for some other parts of the transport system” (Eddington, 2006a: Vol. 3: Fig 1.9)⁶.

- 5.40 Although not yet meeting EU interoperability standards, the UK already has a high speed rail system based on upgrades to the West Coast Main Line and the East Coast Main Line, the experience of which is worth considering. The objective of the current government is to invest in a new purposely built high speed line called HS2. There are therefore two elements that need to be discussed: the first is the impact of the current high speed lines on the UK’s economic geography, and the second is the expected impact of the new HS2.
- 5.41 According to research by Chen and Hall (2009) high speed rail in Britain had the positive effect of integrating the economy of London with some cities located within a two hour range. This was particularly the case for Bristol, Leeds, Cardiff and York, that witnessed an improvement in their relative GVA. As a result the authors ask if allowing more cities to be within a two hour distance of London would allow them to achieve similar results. Some questions, however, remain unresolved: did places such as Leeds and York grow at the expense of places like Newcastle or Middlesbrough? If they did what opportunities are there for the latter to benefit from a similar process if their travel times to London were reduced? Another question is whether these cities benefited from better rail connections due to their specific economic structure (e.g. financial services in Leeds, tourism in York, centralisation of public services in Cardiff)? If this was the case then a similar process might not happen in other urban centres without the same characteristics. Finally, despite the results presented by Chen and Hall (2009) regional data for the UK shows a consistent divergence between London and the South East in relation to the rest of the country. This would indicate that whatever positive benefits have been gained from high speed rail, they have not been sufficient to reverse the long term trend of increasing regional inequalities, especially given the evidence cited earlier that current economic trends point in the direction of accelerating regional inequalities.

⁶ Eddington also argues: “... the UK’s economic geography means that the principal task of the UK transport system is not, in comparison to the needs of France or Spain, to put in place very high-speed networks to bring distant cities and regions closer together, in order to enable trading and facilitate economies of scale. Instead, because the UK’s economic activity is in fact densely located in and around urban areas, domestic freight routes and international gateways, the greater task is to deal with the resulting density of transport demand” (2006b: 22) .

- 5.42 Regarding the future impacts of HS2 in the UK, the expected benefits announced by the UK government are mostly based on economic growth resulting from a more integrated economy. However as argued above, these benefits are calculated on the basis that cities with good rail links are more productive, which as we have demonstrated is difficult to prove. Based on previous experiences from other countries, the most likely outcome is that economic growth at the national level would result from an increasing concentration of population and economic activity in London and the South East. The overall objective of higher growth would still be attained, but not the one of reconfiguring the UK's regional economic disparities. The only possible solution to guarantee a more equal distribution of resources, as argued by Urban and Regional Policy (2009), would be to put in place effective governance mechanisms that would complement the existence of a better infrastructure. This is however unlikely to happen as a result of current constraints on the public budget, nor is it likely that such governance mechanisms as exist currently in the UK would be capable of reversing the powerful agglomeration effects of London and the South East. Following Puga (2002), the proposed UK model is a clearly a hub and spoke one centred on London. According to this analysis, there is therefore a high probability that London will accrue the majority of the benefits of the investment.
- 5.43 We have noted several analyses which suggest that intra-regional or intra-urban transport systems have tended to have positive impacts than faster inter-regional connections, especially as far as lagging regions are concerned. Drawing on work by the London School of Economics, the Manchester Independent Economic Review endorsed this perspective: *“Turning to national links, in particular high-speed train links, the LSE study contains strong evidence that the greatest economic benefits are to be gained from focus on improving transport within the travel-to-work areas of cities themselves, rather than between them – and this is the case for Manchester. Thus, transport within MCR is the first and much more important priority.*
- Proposals for expensive enhancements to external links should undergo a thorough benefit-cost analysis (including environmental costs). For additional investments within the North of England as a whole, including Leeds-Manchester, the case is stronger than for additional investments on the route to London. However, there still needs to be clarity about the benefits and costs”* (2009: 26).

5.44 Steer Davis Gleave (2009) for the Northern Way argued that to improve the productivity gap between the North and the rest of the UK, northern cities needed to work together more effectively, and highlighted investment in transport infrastructure within the North as a priority. The Northern Way work suggests that improved cross-Pennine rail links would be necessary to derive benefits from improved North-South links. Moreover, removing bottlenecks, providing increased capacity and reducing journey times would all deliver benefits to large and small cities across the North. Mann (2006) concludes that improvements to commuter services also have the potential to deliver significant economic benefits, highlighting the advantages of wider labour market catchment and agglomeration benefits. For the Northern Way, improving the Leeds – Manchester rail corridor is a priority and it could be argued that it is packages of schemes such as this which form the real alternative to HS2⁷.

Conclusions

5.45 Puga has noted:

“Road and rail tracks can be used to travel both ways. A better connection between two regions with different development levels not only gives firms in a less developed region better access to the inputs and markets of more developed regions, it also makes it easier for firms in richer regions to supply poorer regions at a distance, and can thus harm the industrialisation prospects of less developed areas” (Puga, 2002: 401).

5.46 Our aim in this appendix has been to assess the claims concerning the local and regional impacts of high speed rail in general and HS2 in particular. We noted that claims about the “*transformational impact*” of HS2 on the UK’s economic geography have become increasingly central to the government’s case. However, we observed contradictions in the government’s argument and its use of theory and evidence, with barely any weight given to the role of inter-regional rail investments in contributing to local growth in the analyses of BIS, while they appear central in the arguments of DfT. We

⁷ In transport terms, HS2 will deliver the Government’s objectives for the London – West Midlands corridor. However, investment on the scale required to deliver HS2 could be utilised to deliver a wide range of interventions which would provide significant improvements to the UK’s transport infrastructure, improving reliability, capacity and safety. Arguably, these have the potential to deliver equivalent or higher benefits for outlying regions at lower cost, and an in-depth study of a much wider range of alternatives would have been justified.

reviewed the theoretical and empirical literature on the local and regional impact of high speed rail around the world. The clear balance of this literature suggests that these impacts are ambiguous at best and negative at worst. It is very difficult to find unambiguous evidence in support of the contentions that are being made about the potential impacts of HS2 on the cities and regions of the UK. We noted the theoretical and empirical evidence that suggests investments in intra-urban and intra-regional transport systems may provide more local benefits than high-speed North-South links.

- 5.47 Following our review of the international peer-reviewed and other literature, far from it being “*bizarre*”, as suggested, by Lord Adonis, there are compelling reasons to doubt whether HSR will contribute to “*rebalancing regional economies*”. In fact as we noted earlier, the two substantive treatments of this issue in HS2’s documentation raise broadly similar questions (Gourvish, 2010; Urban and Regional Policy, 2009).
- 5.48 This appendix has restricted itself to a review of the evidence on the urban and regional impacts of high speed rail. We have not presented a general critique of HS2, but have raised serious questions about the evidence upon which the case is being made about the HS2’s transformational impact of the economic geography of the UK.

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