The economic benefits of high speed rail in Europe can now be demonstrated beyond doubt. Now the UK should consider investing in HSR as well

The coalition government is committed to the development of Britain's transport networks, and encouraging low carbon solutions such as railway development. ***Gabriel Ahlfeldt*** *shows how an innovative study of the impacts of a new German high speed rail (HSR) infrastructure clearly demonstrates significant economic benefits for the first time, benefits that the UK now needs to invest in also.*

In terms of infrastructure development one of the biggest challenges that Britain could face during the 21st century would be the development of a competitive high speed rail (HSR) system. HSR has strong comparative advantages in terms of travel time at intermediate distances and is widely acknowledged as eco-friendly. But it comes at the price of construction costs that run into the £ billions. These can be justified on the grounds of radical reductions in travel time, which should promote customer and business relations and economic development, according to economic geography theories.

However, Britain's railways have suffered from chronic underinvestment for much of the last 30 years and have now been named at the most expensive in Europe. For all the money we pay as a nation, we only have one (short) high speed railway line, linking London (and more recently, Kent) with the Continent. This may change in the next decade with the construction of the High Speed 2 (HS2) line from London to Birmingham, due to commence in 2017. The line would cut the journey time to Birmingham from 85 minutes to 50 minutes (a 41 per cent reduction). This high speed corridor would spread the economic prosperity of England's south east, including the greater London area, to the regions further north.

A good way to look at the prospects of these plans is to investigate the economic effects that could be observed for HSR tracks. Starting initially in Japan and France, HSR investments have been implemented in more and more countries since the second half of the 20th century. Unfortunately, the causal effect of HSR on economic performance is hard to disentangle in practice for several reasons.

Image Credit: Jon Curnow

First, the areas connected by new HSR lines are likely to be those that already do best, or are expected to perform best in economic terms. So it is difficult to establish what would have happened in the absence of an HSR line and to separate its effects from the growth that would have occurred in any case. Second, if the largest urban areas are connected, the marginal impact on accessibility of an HSR line may be too small to trigger statistically measurable effects, because of large home-markets and competing transport modes.

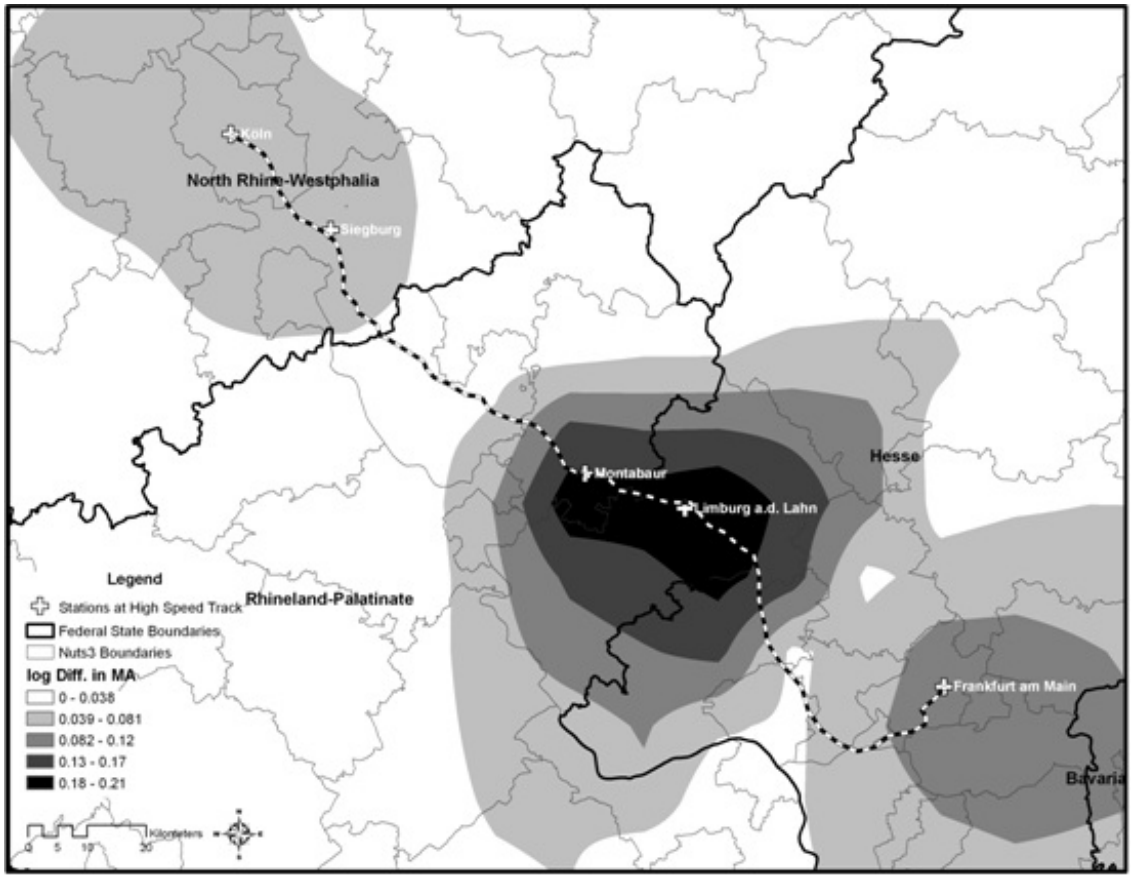
For these reasons the German ICE track running from Cologne to Frankfurt that was opened in 2002 makes a particularly interesting case for a statistical analysis. The line is part of the Trans-European Networks and operates at speeds of up to 300 km/h. The new track reduced train travel time between both metropolises by more than 55 per cent. And compared to travel time by car, the travel time fell by more than 35 per cent. Most importantly, however, two small towns along the track, Montabaur and Limburg, received their own stations on the new line. The connection of these towns was the outcome of long and complex negotiations among authorities at the federal, state and municipality levels, Deutsche Bahn and various activists groups. Rather than resulting from a viable economic interest, the stops were eventually added as a result of heavy

lobbying from the involved federal states to maximize the number of stations within their territories.

We took advantage of this rare setting, where economic motivations for the presence of HSR stations were not present, to conduct a spatial economic analysis of HSR effects under “quasi-laboratory conditions”. Treating the inauguration of the stations in Montabaur and Limburg as a “natural experiment”, we ran an analysis where we compared the economic development of areas that received a “treatment” to other nearby locations that served as control areas. Holding individual county characteristics constant, our most careful estimate indicated that areas adjacent to our treatment stations, on average, grew by 2.7 per cent more in terms of GDP than surrounding areas. A similar increase could be found in terms of employment at workplace. Notably, it took a four-year adjustment period before the new equilibrium was reached.

To arrive at a more generalized conclusion, we calculated the shortest travel times between each pair of about 3,000 municipalities in the study areas for both the situations where the HSR was available or not. We used these travel time matrices to create an index of accessibility for each municipality as the sum of GDP of all municipalities, weighted by travel time. Such an indicator, where locations at farther distances receive smaller weights, is typically used as a measure of market access in economic geography. If the predictions of the framework hold, an increase in market access will trigger a raise in productivity and economic output. The map below shows the accessibility treatment that was identified for the municipalities in our study area.

Market access treatment of different areas



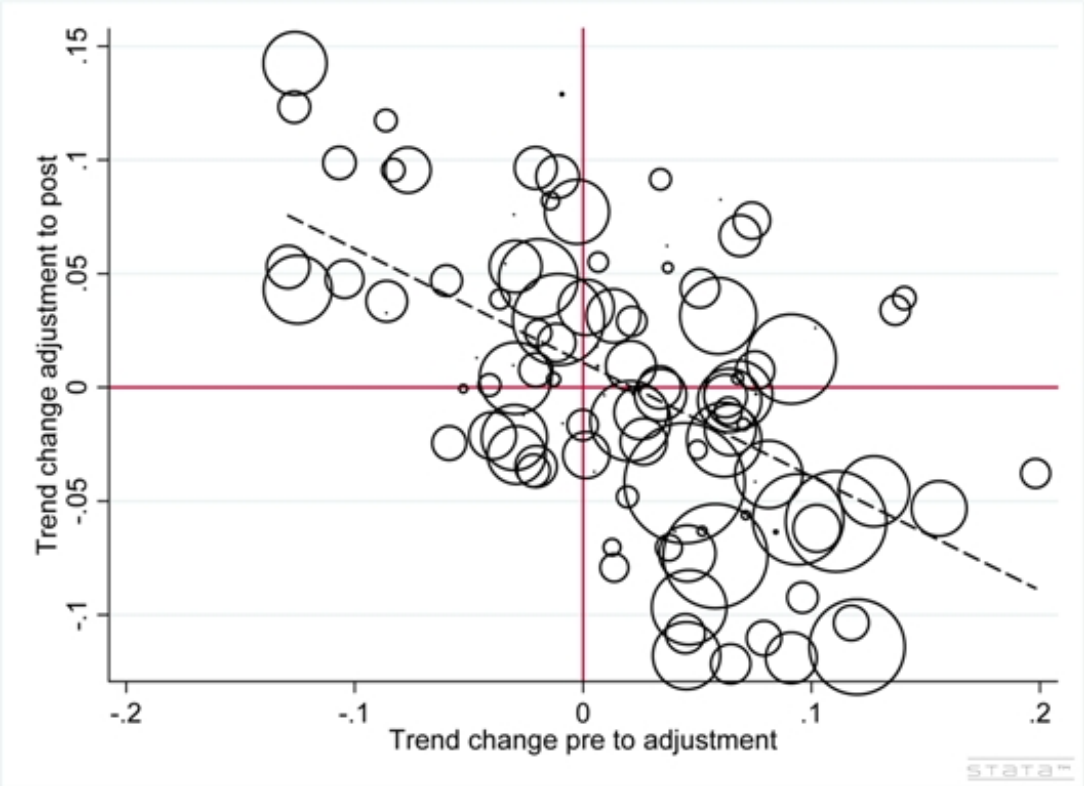
Source: Ahlfeldt, Feddersen (2010).

By comparing changes in market access and in GDP during the adjustment period, we found that for each 1 per cent increase in market access an economic growth effect of about 0.25 per cent was achieved. Our estimates remained stable, no matter whether we considered various local economic and geographical conditions, construction and substitution effects along the old line, local industrial compositions as well as their changes over time, among other tests. Further investigations showed that the economic effects were primarily driven by the attraction of new firms as opposed to population gains, although to a limited degree, an increase in commuting was evident, too.

Our results show that the effects of the economic growth accumulated during the adjustment period were sustainable. Following the economic adjustments to the improved accessibility, regions generally returned to their previous growth trends, though those areas that had benefited remained at a relatively higher level. There was a clearly negative relationship between the change in growth trends when entering and exiting the adjustment period, as my second chart below shows. The counties that benefited most strongly from the new line are shown as the large circles here. Most of these are concentrated in the lower right quadrant of the

chart. This shows that a positive impact on the growth trend when entering the adjustment period, and a corresponding reversion at a higher level when the adjustment was completed.

Trend changes before and after the adjustment for the new HSR line



Source: Ahlfeldt, Feddersen (2010).

Taken together these findings show both that the HSR link had a sustainable, significantly positive economic effect and that the most obvious alternative explanations can be ruled out. If the relationships we have established here can be verified in further research, then the economic effects of future HSR projects all over the world can be predicted with the same methodology – not least for Britain's next generation of rail network.

If you would like to know more, then a working paper by Dr Gabriel M Ahlfeldt (LSE) and Dr Arne Feddersen (University of Southern Denmark) and called *"From Periphery to Core: Economic Adjustments to High Speed Rail"*, has been published soon the IEB working paper series.

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