



Friday, 13 September 2013

The Regional Economic Impacts of HS2

[Posted by Prof Henry G. Overman]

In yesterday's blog post I was [highly critical of the latest HS2](#) report on regional economic impacts. That post focused mainly on the fact that the report makes a technical error that makes its estimates of the productivity effects of HS2 impossible to interpret. As these underpin the entire report that is, to put it mildly, a bit worrying.

I also suggested that I thought the scale of the impacts was out by some order of magnitude. As most people are likely to be interested in the answer rather than the method, I thought I would give a little more explanation on why I think that's the case.

As I explained in yesterday's post, to understand the economic impact of HS2 we need to know how changing the connectivity between places affects local economies. The starting point for figuring this out is to recognise that better connected places have higher productivity (i.e. they can produce more goods and services with less resources). The report uses statistical analysis to make this relationship more precise. To do this, it takes data on wages in 235 local areas and data on the connectivity of those places and looks at how closely those things move together. In technical terms, it runs a regression of a wage-based measure of productivity* on transport connectivity (controlling for some other things that you might think would influence both productivity and connectivity). Together with colleagues, I have used a similar approach for the [Northern Way](#) and there is an academic literature that has applied these approaches more widely, albeit in different contexts.

In our work for Northern Way, we looked at the impact of a 20 minute reduction in travel time between Leeds and Manchester. We find that closer integration between Manchester and Leeds could be expected to have a positive effect on wages. Our *largest* estimate, for a 20 minute reduction in travel journey times between Leeds and Manchester, has average wages increasing by between 1.06% and 2.7%.

These numbers seem larger than those for HS2 (which suggest a 0.8% uplift for national GDP). Two points to note. First, these effects were only for 235 Local Authorities most directly effected (the 1.06% is for Tameside, the 2.7% maximum for Wakefield). Second, these were our *largest* estimates. As we go on to explain in the report: "It is important to note that nearly all of these wage effects come about because the composition of the workforce is different in larger, better connected places. This difference in composition may arise through sorting effects – movements in the population in response to economic opportunities, or because people change their characteristics in response to changes in labour market size. It is also possible that the difference could arise because of past decisions to better connect existing concentrations of more productive workers. Whatever the mechanism, the research identifies a particularly important composition effect, in terms of the years of education of the workforce and an even stronger role for unobserved characteristics of workers such as, for example, cognitive ability. The effects for an individual worker, with given and unchanging characteristics (often called place-based effects), are smaller at somewhere between 0.20 and 0.50 of a percent."

This kind of reduction in the effect of connectivity, once we control for composition, is consistent with the academic literature that has considered these issues. In contrast, the procedure that the HS2 report uses to 'correct' for skills has almost no effect on the point estimates. This is, perhaps, not surprising given the quality of the data that the report is using - but it is very worrying (and the HS2 report uses the uncorrected estimates anyhow).

This doesn't of course, tell us which set of estimates we should prefer. To think about this, it's probably worth quoting our Northern Way report at length:

"So what, then, do the larger estimates – those that do not remove the effect of composition – tell us about the likely effect of increased integration? These estimates are best thought of as an upper bound to the overall economic impact of improved linkages. They represent the combined impact of (i) place-based productivity effects on workers with fixed characteristics (ii) movement and sorting of more productive workers into more closely connected places and (iii) upgrading of education and skills for workers. They capture the effects of place, plus sorting, plus education and skill upgrading, once workers have moved around across places in response to reduced transport times and the greater integration that delivers. But caution about this interpretation is required, as the direction of causality may not run from improved connectivity to labour market composition, but in the opposite direction: Productive labour markets may encourage better transport linkages. If this is the case then improving transport linkages will not be effective in changing the composition of the labour market, preventing the realization of overall effects on the scale implied by the higher estimates."

The smaller estimates, taking out the effects of composition, capture the additional benefits to workers who don't enhance their skills or become more educated or able in response to economic changes that occur as a result of improved transport links between Manchester and Leeds. They are also less sensitive to the possibility, outlined above, that transport policy has no effect on labour force composition. For these reasons, and because the effects, net of composition, capture the beneficial impact on individuals, many economists argue that they represent the most appropriate focus for policy. Arguably, the smaller estimates are likely to be the most relevant for the vast majority of people currently working in the two city regions.

Therefore, the role of these findings in the assessment of particular investment propositions will depend on policy objectives. A traditional cost-benefit analysis should exclude the impact on wages generated purely by the sorting of individuals from one place to another. However, the upper-bound, combined impacts (including composition) might be of more interest to some policy-makers. They may be seen as appropriate objectives by sub-national authorities working at regional or local levels aiming to increase average wages or incomes in their specific areas, or - as in the UK – where national government has adopted objectives to address aggregate spatial disparities per se."

In short, you should be using the smaller numbers to think about the national impact and the larger numbers to think about the local impact. Even then

as pointed out by [Robert Peston](#), all that skill upgrading, private capital investment etc is not free, so it is totally incorrect to count this as a benefit of HS2 without thinking about the additional (private and public sector) costs of achieving those changes.

But even those smaller numbers are misleading when thinking about the national impact of HS2, because the change we were modelling - a 20 minute reduction in travel time between Manchester and Leeds is likely to have a much bigger impact on connectivity than HS2. Indeed, according to our way of calculating connectivity (which is similar, but not identical to that used in the HS2 report) the connectivity impact of 20 minutes off Manchester-Leeds is 3 times that of a 40 minute reduction for Leeds-London.

In short, our modelling of a large local connectivity change for Manchester and Leeds gave estimates of a *local* economic impact of between 0.2% and 0.5%. Of course, our analysis isn't perfect. But it is based on better data and is (I hope) technically correct. It produces results that are consistent with academic literature and that seem proportionate to the scale of the project that we were modelling. HS2 will bring some regional economic impacts and they should be counted in the benefit cost case. But on the basis of available evidence they will almost certainly not be anything like 0.8% of national GDP.

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* Correction 05/11: The KPMG report uses an output-based measure of productivity, not a wage-based measure on the left hand side of its estimating equation. That doesn't change the basic point I am making here about the problems of overestimation if skill composition (and other confounding factors) are not controlled for properly.

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