

Appendix 3



Independent Review of HS2 Business/Economic Case

Prepared by CEBR

Executive summary

This is the summary of an interim report reviewing the official economic and business cases made for the proposed new high speed rail network HS2.

The report is aimed at informing the 51m consortium of local authorities about the strengths and weaknesses of the economic and business cases made for the proposed new network.

The key issues identified in the report are:

- The demand forecast is wildly overstated, both by assuming an overoptimistic GDP and income growth forecast and by assuming excessively high responsiveness of rail demand to GDP growth
- The likely benefits are overstated by a very high valuation put on business time savings, a valuation that assumes high value of business time and a huge loss of productivity on trains compared to alternative uses.
- The wider economic impacts are overstated both in scale and direction.

The overstated demand forecast affects both the business and economic cases.

In addition, the valuation of the potential social benefits of HS2 are overstated, since first, the comparisons are made with a 'straw man', a suboptimal and unrealistic alternative that even fails to include investments that have already been made.

Some of the excessive valuations of time have an impact on the forecasts for induced demand and hence on the business case, but their main impact is on the economic case that has to be made to justify the proposed subsidy.

The wider economic impacts that are assessed in the official studies are also high in relation to the analysis carried out by the main acknowledged expert in the field, though this is a relatively minor factor in the overall evaluation.

Our own assessment suggests that far from having a strong ratio of benefits to costs – the latest estimate is 1.6 excluding wider economic impacts and 1.9 including wider economic impacts, on more realistic assumptions the ratio, even including the wider economic impacts, falls to 0.7.

Not only will the lower demand growth which we expect have an impact on the economic case but also on the business case.

On more realistic assumptions, the forecast NPV of costs net of revenues rises from £13.8 billion on the latest revised assumptions to £18.1 billion. At a time of constrained public finances this is potentially a key issue.

Part of the case for HS2 assumes that it will boost regional economies. The most detailed analysis of this suggests that the majority of the benefits are most likely to flow to London, since such wider economic impacts accrue mainly to the service sector of the economy, which is especially well developed in London, and not in Birmingham, Manchester or Leeds.

Also it appears that the time for heavy investment in high speed rail in the UK may be about to pass. In retrospect a strong case could have been made 20 years ago, but there is a considerable danger now that the technology, which is mainly about providing faster business travel, may be overtaken by communications technology. In particular, telepresence is likely to cause a major reduction in long distance business travel, while lifestyle choices seem to be increasingly discouraging key workers from wanting to make long business trips.

Methodology and assumptions

The study used the following methodology:

- Desk research, studying the official reports on the economic and business case and the underlying assumptions
- Analysis of alternative views as provided by various consultants working with the 51m consortium of local authorities and a more limited assessment of the arguments made by the HS2 Action Alliance
- Identification of key assumptions that need to be tested
- Rough quantification of likely scale of forecasting error for demand forecast.

1. INTRODUCTION AND BACKGROUND

- 1.1 Centre for Economics and Business Research Ltd (Cebr) has been commissioned by Buckinghamshire County Council on behalf of the 51m consortium of local authorities affected by the potential High Speed Train service HS2 to conduct an independent review of the business and economic cases made by the Department of Transport (DfT) for the proposed service.

Background to the study

- 1.2 The government has set up a company, High Speed Two Ltd (HS2), to consider the case for new high speed rail services between London and Scotland.
- 1.3 The company has reported to government and the report was published in March 2010. The incoming coalition government on 28 February 2011 launched a consultation on the Government's proposed high speed rail strategy and on the proposed route for the first part of the HS2 link from London to Birmingham.
- 1.4 The Government claims that the UK's current railway system dates back to the Victorian era and will not be sufficient to keep Britain competitive in the twenty-first century.
- 1.5 It argues that the proposed new high speed rail network would transform the country's economic geography, bringing cities closer together, enabling businesses to operate more productively, supporting employment growth and regeneration, while at the same time providing a genuine alternative to domestic aviation.
- 1.6 A Y-shaped national high speed rail network linking London to Birmingham, Manchester and Leeds, and including stops in the East Midlands and South Yorkshire, as well as direct links to the HS1 line and into Heathrow Airport is proposed.
- 1.7 HS2 estimate that this would cost £30 billion to construct but that it would generate benefits of around £44 billion, as well as revenues totalling a further £27 billion. The latest independent audit has reduced the revenues expected and estimates now that the net cost (net of revenues) has grown to £13.2 billion. Our own estimate is that the net costs are nearly £18 billions.

- 1.8 This review looks at the underlying assumptions behind these figures to assess the plausibility of these estimates.

Structure of this report

- 1.9 This report is structured to reflect the issues covered. Section 2 looks at the demand forecasting in more detail and considers the issues associated with it. Section 3 looks at the potential alternatives to the route and whether the evaluation is compared with a straw man. Section 4 looks at the valuation of the wider economic and other benefits while Section 5 quantifies the impact on the business and economic cases and draws conclusions.

2. DEMAND FORECASTING AND ASSUMPTIONS

- 2.1 This section looks at the forecasts for demand and the underlying assumptions and reviews these.

Underlying forecasting methodology

- 2.2 HS2 on its website makes great play of the fact that it was formed in January 2009 and reported to Ministers by the end of 2009. Given the scale of the project and the requirements for innovative analysis, this is a remarkably quick turnaround.
- 2.3 It is not surprising, therefore, to find that the demand forecasting used for the business and economic analysis uses conventional tools which were not necessarily designed to be used in such an extreme case and extrapolated over as long a period as that to 2043.
- 2.4 The forecasts are based on the National Travel Survey data for 2008. This has some validity, but of course means that the impact of the very changed economic circumstances since 2008 are not taken into account.

The impact of recent performance

- 2.5 The UK economy has had a difficult period in the past 3 years with a fall in GDP of 5% in 2009 and very sluggish growth thereafter. Official forecasts have proved highly overoptimistic – the newly formed Office for Budgetary Responsibility has had to cut its forecasts twice already in only a few months. Its forecasts remain higher than those of outside bodies.
- 2.6 Meanwhile, Cebr's forecasts have been roughly unchanged for 18 months and those of other outside bodies have gradually come into line with those of Cebr. In the circumstances, the views of what is a highly reputable forecasting body with a track record of accurately forecasting GDP growth that is used by many of the top businessmen, retailers and other senior people in commerce who have to 'put their money where their mouth is' has to be taken extremely seriously.
- 2.7 Cebr's analysis is that the underlying structural changes that have been exposed by the financial crisis and the economic recession mean that many traditional assumptions need to be revisited and that simple trend extrapolation from pre crisis rates of growth are no longer appropriate.

2.8 In particular, it is likely that the ‘new post crisis paradigm’ will comprise a number of elements including:

- More sluggish growth in economic activity generally;
- Depressed real income growth in countries like the UK which have traditionally sustained much higher real incomes than those in emerging economies
- Increased use of IT and other solutions to enhance productivity and reduce cost.
- Rising real costs of materials and energy leading to changing consumption patterns away from energy intensive uses. One of these energy intensive areas where consumption is likely to grow more slowly is transport.
- Some reductions in hours worked and an increasing unwillingness to spend time and effort in difficult and stressful activities like travel.

2.9 The total distance travelled per head of population in the UK peaked in 2002 and edged down slowly till 2006 before starting to fall more sharply as is shown in Table 2.1. This happened even before the recession and the decline has accelerated since the recession started.

TABLE 2-1 TOTAL DOMESTIC TRANSPORT PASSENGER KM PER HEAD OF POPULATION UK (INDEX 2000 = 100)

1985	76.4
1986	79.4
1987	84.3
1988	89.2
1989	95.1
1990	95.6
1991	94.0
1992	93.4
1993	93.1
1993	95.9
1994	96.4
1995	96.8
1996	97.4
1997	99.0
1998	99.4
1999	100.5
2000	100.0
2001	103.1
2002	106.1
2003	105.7
2004	104.7
2005	103.5
2006	104.5
2007	104.6
2008	103.4
2009 p	102.7
2010 estimated	101.4

Source: Cebr – population data from ONS, Transport data from Transport Statistics of Great Britain, 2010 estimate from vehicle usage data and rail and air data.

- 2.10 Meanwhile, long distance travel has been more buoyant, but even this has fallen since 2006.
- 2.11 Rail travel however has proved more robust and from a very small market share of 5.0% in 1994 has grown much more strongly than that for other modes to reach an estimated 8.0% in 2010. This growth has been even stronger for long distance travel. Moreover the growth has continued in recent periods, even with a relatively weak economy.

Assumptions to be considered

- 2.12 We have looked at a series of the underlying assumptions that are built into the forecasts. In particular we have considered:
- the assumptions for UK GDP growth;
 - the assumptions for real incomes in relation to GDP;

- the regional distribution of GDP and real income growth;
- the impact of technology and in particular the impact of ‘telepresence’ and other communications technologies; and
- the elasticity of travel and rail demand with respect to incomes and other factors.

Assumptions about GDP growth

- 2.13 The forecasts for travel and rail demand are based on forecasts of changes in income which are assumed to be in line with growth in GDP per capita. It is therefore first appropriate to consider the assumed forecast for GDP growth.
- 2.14 This is shown in TABLE 2-2 for the short term for both the latest modelling numbers from HS2, compared with other forecasts¹.

TABLE 2-2 GDP GROWTH FORECASTS

GDP growth forecasts (per cent growth)	2010	2011	2012	2013	2014	2015	Cumulative 2010 to 2015
Used by HS2	1.2	2.3	2.8	2.9	2.7	2.7	15.5
OBR's latest	1.3	1.7	2.5	2.9	2.9	2.8	14.9
Independent average	1.3	1.5	2.1	2.4	2.5	2.5	12.9
Cebr	1.3	1.0	1.6	1.9	2.2	2.4	10.8

Sources: HS2 documentation (revised 2011 estimates)², OBR, HM Treasury's comparison of independent forecasts June 2011 and for 2013 to 2015 May 2011

- 2.15 It can be seen that the OBR has already revised down its forecasts since the previous predictions. This is in fact a continuation of 8 successive downward forecast revisions that has been made by the OBR and the Treasury, its predecessor organisation.
- 2.16 Despite this, as soon as it moves from the immediate future the forecast ‘blue skies’ the outlook with assumed strong growth beyond the short term.
- 2.17 By comparison, the average of the independent forecasters is much lower, and, Cebr’s forecast – which has in recent years had the best track record – is lower still, predicting on average two thirds of the economic growth predicted by the OBR.

¹ The forecasts applied by HS2 are contained on page 46 of HS2 London-West Midlands Consultation Model Development and Baseline Report; Report for HS2 Ltd by MVA Ltd in association with Mott MacDonald.

² Modelling and Appraisal Updates and their impact on the HS2 Business Case, Atkins Ltd for High Speed Two Lrd Ref /5082342 WPO Impact of Updates_Final_v1_issued. Undated but refers to work reported in March 2011 so must have been issued in April or May 2011.

- 2.18 Looking further ahead, the OBR assumes growth in *GDP per capita* of around 2 per cent from 2015 onwards. This would imply GDP growth 2¾%.
- 2.19 Cebr would judge that – in the light of the probable sluggish growth of the Western economies – this is on the high side and would recommend the use of a more cautious figure for *GDP growth per capita* of around 1.5%. This would imply GDP growth around the 2¼% rate which is close to the historic average.
- 2.20 The potential impact of this is dramatic. In ‘A summary of Changes to the HS2 Economic Case’³ the ‘impact of modelling changes on the HS2 economic case’ is assessed to reduce the ratio of benefits to costs from 3.24 to 1.60. It would appear that the major changes are the reduced economic growth assumptions from the OBR and treatment of fare increases.

Assumptions about real income growth

- 2.21 In addition to overoptimistic assumptions about GDP growth, the demand forecasts also assume that real incomes per capita will grow in line with GDP per capita. This is in line with the traditional approach. But in the modern world where living standards are behaving very differently,⁴ Cebr’s analysis suggests that this is unlikely.
- 2.22 Because of the impact on the terms of trade of the strong growth in the emerging economies, real incomes are likely to be affected by a combination of downward pressure on wages in relation to GDP which is likely to hold back real income growth and upward pressure on prices through high demand in emerging economies pushing up the prices of energy and other commodities and competitive exports holding down the sterling exchange rate.
- 2.23 It would be prudent to assume that real income growth will be 0.4% per annum lower than growth in GDP per capita to take account of the likely

³ HS2 Ltd April 2011, page 9

⁴ The Governor of the Bank of England, Sir Mervyn King GBE, has been consistently warning of this. For example he was quoted in the Daily Telegraph of 25 Jan 2011 as warning that ‘Households face the most dramatic squeeze in living standards since the 1920s’.

pressure on real incomes from the changing structure of the world economy.

Regional impact on GDP growth

- 2.24 While the London and South East economies are likely to be able to plug into the world economic growth driven by the emerging economies in Asia and elsewhere, it is less likely that regions elsewhere will be able to do so as easily.
- 2.25 Indeed, it is the likely sluggish regional economies that are put forward as one of the key reasons for supporting the High Speed rail links with the Midlands and the North of England.
- 2.26 But for consistency it is also necessary to take account of this in the underlying forecasts for demand.
- 2.27 Cebr forecasts assume that medium term growth in GDP per capita will be 0.3% per annum faster than national GDP growth for London and 0.2% per annum slower than national GDP growth for the Midlands and the North and North West of England.
- 2.28 The net of this does not necessarily change the demand forecast for HS2 but would certainly impact on the likely economic and business cases of alternative areas for rail investment such as better commuter services. prudent to assume that real income growth will be 0.4% per annum lower than growth in GDP per capita.
- 2.29 We have estimated the impact of changed assumptions for GDP and income growth in Table 4.2.

Impact of telepresence and other communications technologies

- 2.30 It is not clear how the impact of technological change is factored into the HS2 projections. But it seems likely that over the period when HS2 is expected to be operating there will be substantial change in technologies, many of which are likely to act as a substitute for business travel. In particular, telepresence is widely expected to have a major negative impact on business travel growth.
- 2.31 Clearly past technological changes have had uncertain effects and the timing of technological take up is also generally uncertain.
- 2.32 Meanwhile, data on hours worked shows an increasing reluctance by employees to work the unsocial hours typically associated with long

business trips. The average hours worked in the UK by full time employees per week has fallen by 90 minutes in the past 15 years⁵. Although there is not a consistent historical time series, this appears to be an unusually sharp fall.

- 2.33 The two main forecasts for telepresence internationally are by Synergy who estimate that growth is now running at 35% per annum worldwide and by Frost and Sullivan who estimate that the worldwide market will grow from \$2.2 bn in 2010 to \$4.7 bn in 2014. This is argued to be largely at the expense of business travel, especially over long distances.
- 2.34 The Cisco annual report (Cisco are the major providers in this area following the Cisco Tandberg takeover) does not show like for like but indicates rapid growth in the marketplace and an expected further rapid growth.
- 2.35 Cebr has worked with two companies who have made a substantial investment in telepresence, Ferrovial and Statoil. In both cases, the business case justification of substantially reduced business travel has materialised. Ferrovial believe that their investment has achieved a 75% return; Statoil a 120% return.
- 2.36 Cebr's chief executive is a former chief economist of IBM UK and has spent some time considering the impact of technology on business. His view is that many types of technology actually boost business contact, but some types – eg internet shopping, are substitutes. His view, which is backed by the case studies referred to above, is that the likely shape of growth in telepresence and other business communication technologies is likely to reduce business travel substantially.
- 2.37 Given this, it would be reasonable to make a very substantial discount to the forecast rate of growth of business travel assumed in the business and economic cases.

Income elasticities

- 2.38 It is a standard convention in economics that income elasticities that are significantly higher than 1 should not be extrapolated indefinitely. This is because they would at some point imply levels of consumption of one specific product or service in excess of the entire income. Clearly the

⁵ Source ONS data (series YBUV)

elasticity should decline as the importance of the item that is being forecast grows.

2.39 It appears that the income elasticity used for the demand forecasts is 2.8. This is taken from the Passenger Demand Forecasting Handbook (PDFH) 4.1. The demand growth is capped in 2043 but at a level twice existing demand. This is an arbitrary choice as is pointed out by the Oxera Report for the House of Commons Transport Select Committee⁶.

2.40 The PDFH approach is not actually designed for such forecasting. Indeed Network Rail has pointed this out⁷ as has the Oxera report⁸.

'.....However, PDFH forecasts do not explicitly reflect the natural limits to rail growth of market share and trip-making saturation. As PDFH tends to extrapolate recent growth forward (on the assumption of continuing 'trend' changes in demand drivers), forecasts are thought to be most suitable for the short to medium-term. For long term forecasting, the DfT recommends that PDFH forecasts are capped in 2026. This approach is not appropriate for appraising interventions with long-term financial payoffs.'

2.41 Unfortunately, even if it had been appropriate to stretch the forecast based on this high income elasticity to 2043, which it is not, the number itself is based on an approach that is now no longer accepted by the Government at a technical level. Webtag 3.15.4d⁹ was issued by the Department of Transport in draft in January 2010 and expected to be ratified in April 2011. Ratification has not taken place but this does not invalidate the use of the report for forecasting purposes since it clearly reflects a more up-to-date technical 'state of the art'.

⁶ Review of the Government's Case for a High Speed Rail programme Oxera, prepared for the Transport Select Committee June 20th 2011 Para 3.16

⁷ Network Route Utilisation Strategy: Scenarios and Long Distance Forecasts' Network Rail, June 2009, Section 4.2 page 30:

'.....However, PDFH forecasts do not explicitly reflect the natural limits to rail growth of market share and trip-making saturation.

As PDFH tends to extrapolate recent growth forward (on the assumption of continuing 'trend' changes in demand drivers), forecasts are thought to be most suitable for the short to medium-term. For long term forecasting, the DfT recommends that PDFH forecasts are capped in 2026. This approach is not appropriate for appraising interventions with long-term financial payoffs.'

⁸ Review of the Government's Case for a High Speed Rail programme Oxera, prepared for the Transport Select Committee June 20th 2011 Para 3.14

⁹ <http://www.dft.gov.uk/webtag/documents/expert/pdf/unit3.15.4d.pdf>

2.42 The document states

“In anticipation of the results from a major primary research exercise currently underway, the external environment recommendations in PDFH 5.0 have changed little from the previous edition of the guidance. However, one important amendment has been made to the GVA/capita elasticities for flows between London and Rest of Country i.e. outside the South East”.

TABLE 2-3

Table 2: Comparison of GVA/capita elasticities					
	PDFH		4.1	PDFH	5
To	London	2+0.0032 per mile			1.9
From	London	0.84 + 0.0032 per mile			0.9

2.43 The PDFH 4.1 recommendations reported in table 2 above resulted in very large elasticities at long distances. As a refinement of their previous study “External Factors Data Extension and Modelling” (Dargay and Wardman, 2007) ITS Leeds were commissioned to re-run their analysis with any distance effect removed. This work forms the basis of the PDFH 5.0 recommendations.

“We agree that the PDFH 4.1 recommendations produced unfeasibly large elasticities over long distances. However, in light of the ongoing research described above we are reluctant to suggest changes to our demand forecasting methodology that may be superseded within a matter of months. As way of compromise we recommend that PDFH 4.1 elasticities continue to be used but that a maximum limit is placed on the elasticity value, in line with most practitioners use. In the absence of further evidence we suggest limits of 2.5 (to London) and 1.5 (from London). Should promoters wish to use the PDFH 5.0 elasticities then they may do so as a sensitivity test to this core analysis”

2.44 What this guidance is saying is that the latest data clearly indicates that the numbers used in the earlier HS2 analysis are inappropriate. There is clearly some doubt about what should be used instead but clear limits are suggested ‘as a compromise’. In practice the Webtag guidance is not expected to be used in the context of such a major adjustment looking out over so long a time horizon as to 2043 and is therefore even more exposed.

- 2.45 Apart from this, we believe that the very high income elasticities assumed, especially in PDFH 4.1, which are inconsistent with economic theory, are probably a result of misspecification, failing to take proper account of a wide range of factors ranging from the rising cost of petrol to the increasing unpleasantness of air travel to the heavy level of investment that has taken place in the rail industry since 1997. The fact that overall travel appears to be decreasing rather than increasing should be taken as indicative that such analysis can lead to inappropriate conclusions.
- 2.46 It is double counting to take transport growth that has happened as a result of past rapid investment in rail as part of the base case for rail demand growth and then to add further growth that is assumed to come from a repeat of that investment. This is because if heavy investment has been an important driver of demand, it would be inconsistent to assume strong demand growth for a base case which assumes relatively little investment.
- 2.47 We have estimated the impact of applying the Webtag guidance and of applying the PDFH elasticities in Table 4.3.

Why has rail travel grown so strongly since 1994?

- 2.48 Cebr has some credibility in examining this information because Cebr actually predicted that rail travel would grow its market share as early as 1994¹⁰. This was at a time when trend extrapolation would have led to further forecasts of declining rail usage. Indeed 1994 was the year when rail's passenger market share bottomed out!
- 2.49 We used what was then considered an innovative methodology – predicting overall transport usage and then predicting modal distribution based on generalised costs. Our argument was that increasing congestion on the roads would encourage people to move to rail.
- 2.50 Our forecasts from the early 1990s were not perfect. Although they got right the key movement from road to rail, they failed to predict the scale of rising energy costs and their impact on travel patterns, the scale of investment in rail and improvement in rail services and the impact of

¹⁰ These forecasts were contained in the original Railtrack demand forecasts 1994, updated several times during the 1990s for Railtrack before it became Network Rail and for the Association of Train Operating Companies in the early 2000s

terrorism and security precautions on reducing demand for air travel by increasing the generalised cost of such travel¹¹.

- 2.51 Clearly, to make a strong case that rail demand growth is likely to slow in the future, one has to explain why the conditions that led to the rapid post 1994 growth are not likely to continue.
- 2.52 We believe that the past growth has reflected a range of factors. First, post privatization, the rail industry moved from being starved of investment (other than the Channel Tunnel which is a separate investment) to being invested in quite heavily with a resulting increase in capacity and service quality.
- 2.53 Second, in the late 1980s and early 1990s there has been relatively low levels of investment in roads. Typically investment in roads since 2002 has been running at between 1.0 and 1.3 pence per passenger kilometre while investment in rail has been running at between 6.6p and 8.4p per passenger kilometre. Increasing congestion on the roads has lengthened travel times and made them more uncertain for road journeys and has encouraged both a shift to rail and a reduction in overall travel.

¹¹ Though Cebr chief executive Douglas McWilliams was one of only 3 so-called intellectuals out of 100 who when asked by 'Prospect Magazine' in 1999 about their predictions for the next decade drew attention to the likely growth in terrorism.

TABLE 2-4 PASSENGER RAIL USAGE SINCE 1995

	Rail usage bn pkm	Rail passenger market share %
1975	36	8.2
1976	33	7.3
1977	34	7.4
1978	35	7.4
1979	35	7.4
1980	35	7.1
1981	34	6.9
1982	31	6.2
1983	34	6.7
1984	35	6.6
1985	36	6.6
1986	37	6.6
1987	39	6.5
1988	41	6.4
1989	40	5.8
1990	40	5.8
1991	39	5.7
1992	38	5.6
1993	37	5.5
1993	37	5.3
1994	36	5.1
1995	37	5.2
1996	39	5.5
1997	42	5.8
1998	44	6.0
1999	47	6.2
2000	47	6.3
2001	48	6.3
2002	48	6.1
2003	50	6.3
2004	51	6.5
2005	52	6.7
2006	56	7.0
2007	59	7.4
2008	61	7.7
2009 p	61	7.7
2010 e	64	8.0

Source: Transport Statistics of Great Britain plus Cebr estimates for 2010 and 2006

- 2.54 Moreover, a proportion of the road investment has been designed to move people away from cars – so called traffic calming measures have been a significant proportion of investments, while another proportion has been dedicated to anti car measures.
- 2.55 The incoming Labour Government in 1997 was very clear that it was attempting to shift transport away from the roads, with the incoming Secretary of State, John Prescott, saying ‘I will have failed if in five years time there are not many more people using public transport and far fewer journeys by car. It is a tall order but I urge you to hold me to it’¹².

¹² John Prescott, quoted in The Guardian, 6 June 1997

- 2.56 It is clear that without some ability to control road usage growth, many of the anti congestion benefits of road investment are lost. But modern technology makes proper congestion charging possible. The Oxera report for the Transport Select Committee asks why investment in roads is not considered as an alternative form of investment.
- 2.57 In the less buoyant economic climate of the 2010 onwards period and with overall demand for travel per head of population falling, the background for continued strong rail demand growth seems much less propitious than in the 1994-2010 period when rail was making up for a backlog of underinvestment.

Overall impact on demand growth

- 2.58 We have made an assessment of the likely growth in demand after taking account of more appropriate values for the variables which have been misforecast by the HS2 analysts.
- 2.59 TABLE 2-5 shows how the different assumptions about GDP and incomes impact on the likely demand growth for the railway post HS2.

TABLE 2-5¹³

Item	With HS2 Phase 1 demand growth % growth in demand 08-43
HS2 revised assumptions	209
HS2 assuming OBR latest	206
HS2 assuming independent latest	195
HS2 assuming Cebr GDP	152
HS2 assuming Cebr GDP and income	121

- 2.60 TABLE 2-6 shows how the different assumptions about income elasticities affect the forecasts for demand growth, assuming the HS2 income growth calculations. TABLE 2-6¹⁴

Item	With HS2 Phase 1 demand growth % growth in demand 08-43
HS2 revised assumptions	209
HS2 with webtag guidance	185
HS2 with PDFH 5.0	153

¹³ Source: Figures relate to DfT Feb 2011 forecasts for 2043 for Phase 1 WCML.

¹⁴ Source: Figures relate to DfT Feb 2011 forecasts for 2043 for Phase 1 WCML.

3. ALTERNATIVES TO THE ROUTE – THE STRAW MAN COMPARISONS

- 3.1 It is a standard assumption that when making cost benefit calculations appropriate comparisons should be made. If inappropriate ‘straw man’ comparisons are made then it is likely that the estimated benefits will be exaggerated.

Webtag guidance

- 3.2 The official Webtag guidance is set out below. Note that this is devised to advise scheme promoters who are promoting relatively minor schemes where the benefit flows are assessed over a relatively short period¹⁵. The interpretation needs to be taken more seriously when the benefit flows are assessed over a longer period, because over such a period ‘do minimum’ might still mean doing rather a lot. In particular, the unrealistic ‘Do minimum’ that is assumed creates substantial crowding reduction benefits from HS2 which would not happen in real life because a realistic comparator would include investment to reduce overcrowding.

Do-Minimum

The future year do-minimum case should represent a realistic view of what is likely to happen in the absence of the proposals. Assumptions should be clearly stated, including fare and service levels. It will usually correspond to maintaining present transport facilities and will take into account forecast changes in population and land-use, modified by committed changes in transport provision. However the do-minimum should also consider small scale changes to the area which may be necessary in the future. These should include for example, minor changes to junctions, road layouts and signal timings. (It is also useful to note that optimism bias (at the appropriate rate) should also be included in the costs of the do-minimum, and needs to be apportioned to the private sector or public sector as appropriate.)

The preferred, 'next best' and lower cost options are all compared relative to this do-minimum case. In all cases the Department will need to agree that the do-minimum case is realistic and credible.

¹⁵ See Footnote 7

The alternatives assumed by HS2

- 3.3 The alternatives used by HS2 for the economic case calculations not only do not assume rail improvements that might be likely, but do not even assume Evergreen 3 which is already committed.
- 3.4 They therefore encourage assertions about capacity which are misleading.
- 3.5 It is critically important that realistic alternatives are developed that can properly be compared with the HS2 project.
- 3.6 We believe that doing this would greatly reduce the assessed net benefits and hence reduce the economic case for subsidy.

The Oxera Report for the Transport Select Committee

- 3.7 Cebr has reviewed the Oxera Report for the Transport Select Committee¹⁶. Probably the main point of this Report is that the appraisal of the Strategic Alternatives has not been properly carried out¹⁷.
- 3.8 Oxera presents its best performing strategic alternatives in Box 2.1 which is reproduced below.

Box 2.1 Best-performing strategic alternatives

According to the analysis undertaken for the government, 'Rail Package 2', and 'Scenario B' are the best-performing strategic alternatives to HS2 and the Y network, respectively. The text below describes the key schemes anticipated as part of these packages, which are additional to schemes in the Do Minimum scenario (against which both the high-speed and conventional alternatives are being compared). The schemes in the Do Minimum scenario are:

- *station upgrade at Birmingham New Street, plus Bletchley area remodelling;*
- *nine-car Pendolino trains assumed to be lengthened to 11 cars;*
- *capacity increases on the WCML via new rolling stock delivered as part of the Inter-City Express Programme; and*

¹⁶ Review of the Government's Case for a High Speed Rail programme Oxera, prepared for the Transport Select Committee June 20th 2011

¹⁷ Review of the Government's Case for a High Speed Rail programme Oxera, prepared for the Transport Select Committee June 20th 2011 Para 2.2

- *capacity increases on the Chiltern Line via train lengthening in the peaks.*

The strategic alternatives are as follows.

Rail Package 2 (RP2)

This package takes the form of a series of infrastructure enhancements on the WCML, including:

- *a Stafford area bypass; grade separation between Cheddington and Leighton Buzzard; three new platforms at Euston station; three extra platforms at Manchester Piccadilly (with grade separation at Ardwick); four-tracking Attleborough–Brinklow (including freight capacity works at Nuneaton); Northampton area speed improvements; and four-tracking Beechwood Tunnel to Stechford.*

Scenario B

These upgrades consist of the WCML upgrade seen in RP2, plus upgrades to the Midland Main Line and East Coast Main Line (ECML).

- *WCML—infrastructure enhancements include a Stafford area bypass; grade separation between Cheddington and Leighton Buzzard; three new platforms at Euston station; three extra platforms at Manchester Piccadilly (with grade separation at Ardwick); four-tracking Attleborough–Brinklow (including freight capacity works at Nuneaton); Northampton area speed improvements; and four-tracking Beechwood Tunnel to Stechford.*
- *Midland Main Line—infrastructure enhancements include electrification from Bedford to Sheffield; a freight loop facility between London and Bedford; reinstatement of four tracks between Bedford and Kettering; reinstatement of two tracks between Kettering and Corby; station area remodelling at Corby; remodelling and four-tracking in the Leicester area; and electrification and increased stabling capacity at depots.*
- *ECML—infrastructure enhancements include throat remodelling at Kings Cross, reinstatement of a third tunnel and six-track approach; four-tracking Digswell–Woolmer Green; four-tracking Huntingdon–Peterborough; Peterborough area works (Werrington Flyover); four-tracking Stoke Junction to Doncaster; provision of a flyover for the Nottingham–Lincoln route at Newark; works to address low-speed*

points and restrictive signalling at Retford; electrification and upgrades for Retford–Sheffield; remodelling and extra platforms at Doncaster; and electrification of Hamble Junction to Leeds.

Source: Atkins (2011), 'High Speed 2 Strategic Alternatives Study: London to West Midlands Rail Alternatives—Update of Economic Appraisal', February, p 11, and Atkins (2011), 'High Speed Rail Alternatives Study—Strategic Alternatives to the Proposed 'Y' Network', February, p. 15

- 3.9 Oxera shows that the 60 year present value calculations for the benefit cost ratio provided by HS2 are 2.0 for HS2 Phase 1 and 2.6 for the Y network; these compare with 1.9 for Rail Package 2 and 1.4 for the Package B Y network. This is before the Cebr analysis, which argues that the HS2 benefit cost ratios are overstated. But even if they are not, the alternative best performing alternatives offer a much reduced level of government expenditure and greater flexibility for their investments, since they can be enhanced or slowed down depending on the demand forecasts.
- 3.10 The viability of the alternative assumptions is much greater given the uncertainty over the demand forecasts shown in Section 2.¹⁸
- 3.11 Moreover, it is likely that there are even better alternatives than Rail Package 2. For example, 51m have developed an optimised alternative which predominantly lengthens trains and reconfigures 1st class carriages at a reduced capital cost from RP2 and this would improve the Benefit Cost Ratio above the 1.9 for Rail Package 2, potentially significantly as a result of the impact of the considerably reduced cost for the denominator of the BCR.

Demand and crowding

- 3.12 Not only are the alternatives that are used inappropriate but they are also considered on a basis that is inconsistent with the evaluation basis for HS2. This is particularly the case for crowding. The HS2 evaluation is compared with a different base case with less capacity than the base case in the evaluation of the alternative. This has the result of overestimating the crowding benefits from HS2.
- 3.13 The evaluation of the alternatives is also likely to be a factor affected by the forecasts for demand growth. The overoptimistic forecasts for

¹⁸ Indeed, even the alternatives presented by Oxera are not necessarily optimised. For example, 51m Appendix1 'Optimised Alternative to HS2 - the Scope for Growth on the Existing Network' by Chris Stokes presents a powerful case for much less costly improvements that can achieve substantial benefits.

demand are an important ingredient in the view that without HS2 the alternatives would lead to lack of capacity and overcrowding.

- 3.14 The inconsistency of approach means that the comparative assessment of the economic and business cases is flawed.
- 3.15 We therefore include a sensitivity analysis which looks at the implications of reducing the crowding benefits by 50%.

4. THE ALTERNATIVES - THE VALUATION OF THE ECONOMIC BENEFITS AND THE OVERALL ECONOMIC CASE

4.1 This section looks at a series of particular items that are reflected in the valuation of the overall economic benefits. These are:

- Assumed income levels for beneficiaries
- Valuation of time savings
- Crowding benefits
- Agglomeration effects
- Regeneration effects

Each of these are analysed separately in the following subsections.

Assumed income levels for beneficiaries

4.2 The major assumed beneficiaries are those who benefit from business time savings, who are predominantly business travellers. These are assumed to have an average income of £70,000 a year at 2009 prices, growing in line with GDP per capita. It is not clear whether the growth in their incomes has been reduced to take account of the reduced GDP growth from incorporating the June 2010 OBR forecasts.

4.3 In any case, there are two additional problems with these numbers. First they are based on average business travellers from an earlier era – it is likely that the expansion in such travel that is assumed would mean that a wider range of business travellers would have to be accessed with salaries much closer to average.

4.4 Second, the forecasts are subject to the difficulties set out in the section on demand forecasting – overoptimism about GDP growth, about growth in incomes in relation to GDP and in the regional distribution of incomes.

4.5 The combination of these is likely to reduce the net benefits.

Valuation of business time savings from shorter train journeys

4.6 The business time savings from shorter journeys generates 40% of the £44 billion estimated benefits. These depend on a view that business time spent on a journey has very little value.

- 4.7 While this is probably an accurate reflection of past history until recently, connectivity for computers has already improved on trains and it is likely that developments in mobile technology will change this radically.
- 4.8 Even just assuming enhanced connectivity for computers and phones would greatly cut the value of time savings.
- 4.9 The Mott MacDonald IWT Consortium study¹⁹ in 2008 found very little loss of productivity (less than 10%) from time spent working on trains as opposed to the normal workplace.
- 4.10 On balance, it does seem that the valuation of business time savings in the HS2 analysis is substantially overstated. In our analysis of the benefits, we have simulated a test of what happens if the valuation of business time savings is halved.

Crowding benefits

- 4.11 The unrealistic alternatives that are assumed mean that the crowding benefits from HS2 are exaggerated. We therefore run a simulation that assumes a 50% reduction in the crowding benefits.

Agglomeration effects

- 4.12 The major elements in the Wider Economic Impacts that are assessed in the study are agglomeration effects.
- 4.13 The actual agglomeration effects that are used in the calculations are relatively cautious and do not contribute substantially to either the economic or business cases. Nevertheless, about £3 billion of gains are alleged to emerge from them.
- 4.14 The publicity in favour of the HS2 investment does however give the impression that these are rather more substantial and that the major beneficiaries will be the Midlands and the North of England. In fact, HS2's own research does not support this.
- 4.15 HS2 commissioned a report on the agglomeration effects by Daniel Graham of Imperial College London²⁰. He is well known as one of the leading world experts in the subject.

¹⁹ The Mott MacDonald IWT Consortium (2008), 'The Productive Use of Rail Travel Time and Value of Travel Time Saving for Travelers in the Course of Work', by Fickling, R., Gunn, H., Kirby, H., Bradley, M. and Heywood, C., p. 9.

²⁰ Evidence on the Assessment of wider Economic Impacts of High Speed Rail for Great Britain, Daniel Graham and Patricia Melo, Centre for transport Studies, Department of Civil and Environmental Engineering, Imperial

- 4.16 His research provides considerable detail about what makes agglomeration effects work.
- 4.17 He shows that these depend critically on the existence of sufficient scale in the base for the agglomeration effects to work their magic. Critically, agglomeration effects work when there exists a developed service sector economy. His research, which includes an extensive review of the literature on the effects of rail concludes that *'even under a very optimistic scenario for the improvement in long distance travel times and the market share of classic and high speed rail trips, the potential order of magnitude of the agglomeration benefits is small'*. His estimates of between £0.3 billions and £1.7 billions are much lower than the £3.0 billion assumed by HS2 although there may be some inconsistency in the assumed price basis for the different numbers.

Regeneration effects

- 4.18 Again, the regeneration effects actually assumed by HS2 are relatively moderate and contribute hardly at all to the economic and business case. Nevertheless, these effects play a large part in the qualitative arguments that are being made for the project including the advertising.
- 4.19 It is therefore important that they are considered on their merits.
- 4.20 The empirical literature²¹ shows that when a major centre such as London is connected to other areas, it permits flows of business in both directions.
- 4.21 In practice about 60-70% of the benefits tend to accrue to the more attractive pole, with the remainder to the other areas.
- 4.22 What this means is that in practice, more business is likely to flow from the regions to London as a result of HS2 than from London to the regions.

College London. Paper presented to the Transport Research Board 90th annual meeting, January 2011
Washington DC.

²¹ See for example Melo, P.C., Graham, D.J. and Noland, R.B., 2009, [A Meta-Analysis of Estimates of Urban Agglomeration Economies](#), *Regional Science and Urban Economics*, 39, pp.332-342

Have there not been considerable wider economic benefits from High Speed Rail in Lille and Lyons?

- 4.23 The detailed academic analysis suggesting that the wider economic benefits are low contrasts with what appear to be strong claims that Lille and Lyons have been revitalised by high speed rail
- 4.24 It is important to look at these claims carefully. Greengauge 21, which is an organisation committed to arguing the case for High Speed Rail, but which is careful about its use of research, argues that high speed rail can generate high wider economic benefits in certain circumstances²²:
- *Both Lyon and Lille, in different ways, have prospered since the arrival of high-speed rail, developing their service economies strongly. These two examples demonstrate several key factors, which have also emerged as being crucial to other cities which have benefited from high-speed services²³:*
 - *Both economic and land use trends are relevant to the development of the high speed line. The best impact is likely if service sector activities already form a key function in the city. But it is possible to achieve success if their development is being pursued in a very positive fashion. The high-speed line then becomes a catalyst for continuing growth. It has to complement an existing strategy; it cannot simply generate activities in a vacuum. Attracting new businesses appears to be easier with a heavy existing service sector economy.*
 - *The selection of the location for the high-speed line station is critical. It must be developed in line with a masterplan, one that fits high-speed rail into the strategy for the city as a whole. The station location has to fit with the city strategy. The opportunity for regenerating rundown and disused areas may include railway land and redundant industrial areas.*
 - *Strong and well directed political leadership, particularly apparent for Lille, forms an essential element. It is equally evident from these*

²² High speed trains and the development and regeneration
Of cities greengauge 21 June 2006

²³ menerault, p (2006) changement d'échelle de l'activité économique et des reseaux – quelle conséquences pour L'aménagement? Cnrs -; helfter, c (1997) effets tgv sur le développement urbain [doctoral thesis]

examples that a consistent strategy, followed over a sustained period, is vital to success.

- *Effective regional and local transport is crucial to tying together the various elements of the catchment.*

- 4.25 Greengauge 21 point out that High Speed Rail on its own will not necessarily produce economic regeneration.
- 4.26 There is a considerable question mark about whether Birmingham, Manchester or Leeds has a sufficiently strong base of service sector activities to be regenerated by High Speed Rail.
- 4.27 At present it seems more likely that the major elements in creating wider economic impacts from HS2 are the freeing up of commuter routes to London, which would boost the already very successful London service economy.

Overall economic case

- 4.28 We have carried out sensitivity analyses to establish the impact of the assumptions that we have considered in our review of the HS2 Ltd economic case.
- 4.29 Table 4.1 below shows how HS2's own economic case has changed from the original analysis in 2010 (Col 1) and the revised analysis²⁴ in April 2011 (Col 2) as a result of the adjustment to the growth forecasts following the independent audit carried out by MVA and Mott MacDonald.

²⁴ These are described in 'WPO Modelling and Appraisal Updates and their impact on the HS2 Business Case' Atkins

TABLE 4.1 IMPACT OF REVISED ASSUMPTIONS ON BUSINESS AND ECONOMIC CASE FOR HS2 BETWEEN MARCH 2010 AND APRIL 2011

	March 2010 Business Case £ billions or BCR ratio Column 1	April 2011 Business Case £ billions or BCR ratio Column 2
Total PVB (2009 prices and values)	28.7	22.2
Rail Benefits		
In veh time	13.1	12.1
Crowding	5.1	4.7
Local leg	4.9	
Wait	3.5	3.3
Non Rail Benefits		
Road	2.0	1.9
Air	-0.1	-0.1
Wider benefits (noise etc)	0.0	0.0
Rounding	3.0	0.3
PVC before revenues	-28.3	-25.4
Revenues	15.0	12.9
Tax	-1.4	-1.3
Revenues net of tax	16.4	11.6
Net PVC	-11.9	-13.8
BCR	2.4	1.6
WEI	4.0	4.0
BCR with WEI	2.7	1.9

4.30 In the Table 4.2 it can be seen that adjusting the GDP growth forecasts to reflect the latest OBR report (Col 2) or the consensus of independent forecasters (Col 3) has the effect of moving the BCR slightly downwards. In taking the more pessimistic Cebr view of GDP growth (Col 4) the BCR reduces significantly from 1.6 to 1.2 without wider economic impacts (WEI) and from 1.9 to 1.4 with WEI. When a further adjustment is made on real incomes (Col 5) this reduces the BCR down from 1.6 to 1.0 without WEI and from 1.9 to 1.2 including WEI. The effect of adjustments in GDP forecasts shows that the economic case can be significantly impacted by such changes and given the current sluggish recovery of the economy the central case should be based on lower growth forecasts with further downside sensitivity test.

TABLE 4.2 IMPACT OF CHANGED DEMAND ASSUMPTIONS ON ECONOMIC AND BUSINESS CASE FOR HS2

	April 2011 Business Case Column 1 £ billions or BCR ratio	With OBR latest Column 2 £ billions or BCR ratio	With independent view Column 3 £ billions or BCR ratio	With Cebr GDP Column 4 £ billions or BCR ratio	With Cebr Income Column 5 £ billions or BCR ratio
Total PVB (2009 prices and values)	22.2	22.0	21.5	19.0	17.0
Rail Benefits					
In veh time	12.1	12.0	11.7	10.3	9.2
Crowding	4.7	4.7	4.5	4.0	3.6
Wait	3.3	3.3	3.2	2.8	2.5
Non Rail Benefits					
Road	1.9	1.9	1.8	1.6	1.4
Air	-0.1	-0.1	-0.1	-0.1	-0.1
Wider benefits (noise etc)	0.0	0.0	0.0	0.0	0.0
Rounding	0.3	0.3	0.3	0.3	0.3
PVC before revenues	-25.4	-25.4	-25.4	-25.4	-25.4
Revenues	12.9	12.8	12.5	11.0	9.8
Tax	-1.3	-1.3	-1.3	-1.3	-1.3
Revenues net of tax	11.6	11.5	11.2	9.7	8.5
Net PVC	-13.8	-13.9	-14.2	-15.7	-16.9
BCR	1.6	1.6	1.5	1.2	1.0
WEI	4.0	4.0	3.9	3.4	3.0
BCR with WEI	1.9	1.9	1.8	1.4	1.2

4.31 Table 4.3 shows the sensitivity of using the different elasticity assumptions described in paragraph 3.68. Column 1 is the HS2 business case. Column 2 shows the impact of following the DfT guidance by placing a maximum limit on elasticity values in PDFH 4.1²⁵, this reduces the BCR from 1.6 to 1.5 without WEI and from 1.9 to 1.8 with WEI.

4.32 When PDFH 5.0 is used (Col 3), which reflects the latest views of the industry on elasticities particularly outside the South East, the BCR reduces significantly from 1.6 to 1.3 without WEI and from 1.9 to 1.5 with WEI.

²⁵ See para 3.68

TABLE 4.3 IMPACT OF ASSUMPTIONS ABOUT DEMAND ELASTICITIES ON ECONOMIC AND BUSINESS CASE FOR HS2

	April 2011 Business Case Column 1 £ billions or BCR ratio	PDFH 4.1 modified Column 2 £ billions or BCR ratio	PDFH 5.0 Column 3 £ billions or BCR ratio
Total PVB (2009 prices and values)	22.2	21.9	20.8
Rail Benefits			
In veh time	12.1	11.9	11.3
Crowding	4.7	4.6	4.4
Wait	3.3	3.3	3.1
Non Rail Benefits		0.0	0.0
Road	1.9	1.9	1.8
Air	-0.1	-0.1	-0.1
Wider benefits (noise etc)	0.0	0.0	0.0
Rounding	0.3	0.3	0.3
PVC before revenues	-25.4	-25.4	-25.4
Revenues	12.9	11.9	10.6
Tax	-1.3	-1.2	-1.1
Revenues net of tax	11.6	10.7	9.5
Net PVC	-13.8	-14.7	-15.9
BCR	1.6	1.5	1.3
WEI	4.0	3.9	3.7
BCR with WEI	1.9	1.8	1.5

- 4.33 We have also looked at the valuation of the benefits in Table 4.4. In particular we have looked at the impact of halving the benefits of reduced times as a result of a combination of reducing the value of the time saved by HS2 and assuming lower incomes for business travellers and the reduced crowding that would occur if an appropriate “do minimum” base case was used
- 4.34 Column 1 shows the impact of the adjustment of time/income benefits on the April 2011 business case, which reduces the BCR from 1.6 to 1.2 without WEI and 1.9 to 1.5 with WEI.
- 4.35 Column 2 combines the adjustment of time/income benefits with the use of PDFH 5.0 elasticities. This reduces the BCR from 1.6 to 1.0 without WEI and from 1.9 to 1.2 with WEI.
- 4.36 Column 3 combines the adjustment of time/income benefits with the use of PDFH 5.0 elasticities and the 50% adjustment to crowding benefits. This reduces the BCR from 1.6 to 0.8 without WEI and from 1.9 to 1.1 with WEI.
- 4.37 Finally in column 4 we show the impact of the time/income benefits, reduction in crowding benefits and PDFH 5.0 in combination with the CEBR growth forecasts. This reduces the BCR from 1.6 to 0.6 without WEI and from 1.9 to 0.7 with WEI.

TABLE 4.4 IMPACT OF COMBINATION OF SENSITIVITY TESTS ON BUSINESS AND ECONOMIC CASE FOR HS2

	April 2011 Business Case Column 1 £ billions or BCR ratio	PDFH 5.0 Column 2 £ billions or BCR ratio	With reduced crowding Column 3 £ billions or BCR ratio	With Cebr demand Column 4 £ billions or BCR ratio
Total PVB (2009 prices and values)	16.2	15.2	13.0	10.0
Rail Benefits				
With cautious valuation of benefits	6.1	5.7	5.7	4.3
Crowding	4.7	4.4	2.2	1.7
Wait	3.3	3.1	3.1	2.4
Non Rail Benefits		0.0	0.0	0.0
Road	1.9	1.8	1.8	1.4
Air	-0.1	-0.1	-0.1	-0.1
Wider benefits (noise etc)	0.0	0.0	0.0	0.0
Rounding	0.3	0.3	0.3	0.3
PVC before revenues	-25.4	-25.4	-25.4	-25.4
Revenues	12.9	10.6	10.6	8.1
Tax	-1.3	-1.1	-1.1	-0.8
Revenues net of tax	11.6	9.5	9.5	7.3
Net PVC	-13.8	-15.9	-15.9	-18.1
BCR	1.2	1.0	0.8	0.6
WEI	4.0	3.7	3.7	2.8
BCR with WEI	1.5	1.2	1.1	0.7

4.38 Table 4.5 shows the impacts of adjusting the Wider Economic Benefits (WEIs) in line with the Daniel Graham estimates referred to in para 4.15. This further reduces the BCR estimates by between 0.1 and 0.2.

TABLE 4.5 IMPACT OF DIFFERENT ASSUMPTIONS ABOUT WEI'S USING DANIEL GRAHAM ANALYSIS

	April 2011 Business Case Column 1 £ billions or BCR ratio	PDFH 5.0 Column 2 £ billions or BCR ratio	With reduced crowding Column 3 £ billions or BCR ratio	With Cebr demand Column 4 £ billions or BCR ratio
BCR with WEI				
HS2 assumptions	1.5	1.2	1.1	0.7
Daniel Graham assumptions	1.3	1.0	0.9	0.6

5. CONCLUSIONS AND THE IMPACT ON THE BUSINESS CASE

- 5.1 The key items that emerge from this are a combination of demand optimism and overvaluation of benefits, combined with the use of a straw man as an unrealistic comparator.

Impact of uncertainty

- 5.2 The Department of Transport has released a substantial amount of detail about sensitivity analyses relating to its demand forecast. The key element is an assumption that if the demand growth is capped at what we would consider a more realistic level, the benefits drop substantially. In addition, one of the key points for the case for HS2 disappears, which is the assumption that existing rail routes will become excessively congested.

Impact on the business case

- 5.3 Our preliminary assessment is that the overoptimism about both the economy and the sensitivity of transport growth to the economy is likely to mean that the revenues are very much lower than is assumed.
- 5.4 First, this means that alternative solutions, which should be evaluated in any case, become even more relevant as the need for greater capacity will be reduced.
- 5.5 Second this means that if the level of demand is much lower than DfT are assuming, then there will be very severe competition between HS2 and existing services, with major impacts on revenue and subsidy.
- 5.6 Even excluding the impact of competition mentioned in para 5.5 above, we estimate a present value of £18.1 billion subsidy would be required as opposed to the £13.7 billion subsidy identified by HS2. The details for this are set out in table 4.2, table 4.3 and Table 4.4 in the 'Net PVC' lines in each table, which shows how the likely lower revenue forecasts affect the overall financing calculations.
- 5.7 Given the likely problematic position for government finances for the foreseeable future, this scale of subsidy looks to be difficult to afford.
- 5.8 The analysis of the benefits shown in the sensitivity tests indicates that HS2 is likely to be very poor value for money.

Conclusion

- 5.9 Our analysis suggests that this project has substantial cost implications as well as a very weak economic and social case.
- 5.10 Given this analysis, we believe that a fuller independent study is likely to be necessary before the government makes a commitment that would have a major impact on its finances and is likely to be poor value for money.

Disclaimer

- 5.11 Whilst every effort has been made to ensure the accuracy of the material in this document, neither Centre for Economics and Business Research Ltd nor the report's authors will be liable for any loss or damages incurred through the use of the report.

Authorship and acknowledgements

- 5.12 This report has been produced by the Centre for Economics and Business Research Ltd (Cebr), an independent economics and business research consultancy established in 1993 providing forecasts and advice to City institutions, government departments, local authorities and numerous blue chip companies throughout Europe. It is based on the study led by Douglas McWilliams, Cebr Chief Executive, with assistance from other members of Cebr staff.

London, July 2011