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Securing our economy:
The case for infrastructure

A report for the Civil Engineering Contractors Association

May 2013

The Civil Engineering Contractors Association is the representative body for companies who work day-to-day to deliver, upgrade, and maintain the country's infrastructure.

With more than 300 members split across Scotland, Wales and six English regions, CECA represents firms who together carry out an estimated 70-80 per cent of all civil engineering activity in the UK, in the key sectors of transport, energy, communications, waste and water.

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Foreword

The economic crisis faced by the UK has renewed focus on the country's infrastructure, and the potential role that improving our national transport and utilities might play in reinvigorating growth.

There is consensus among all main political parties about the need to invest in infrastructure. Meanwhile the business community is crying out for more to be done to address congestion on the roads and to improve energy and communications capability.

Behind the politics there is also widespread evidence of the positive impact that infrastructure creates. However this evidence comes from a wide range of sources, making it difficult to establish a detailed picture of the benefits that arise.

It was for this reason that, as the representative body for companies who maintain and upgrade the country's infrastructure, the Civil Engineering Contractors Association asked Cebr to investigate this existing evidence and assess the economic impact of infrastructure. For the first time we hoped it would be possible to articulate the full benefit our industry provides in a single, robust document.

We believe this report provides that compelling case for our sector, while also offering a warning about the risks associated with any decline in activity.

We hope that it will influence thinking among those who own and manage our national infrastructure. The lessons from this report lead us to a number of clear recommendations, identifying how the UK can secure the future of its economy by achieving the best possible outcomes from investment in infrastructure.

Mark Roper
Managing Director
Civil Engineering Contractors Association

Recommendations

1. UK Government to establish a formal threshold for new infrastructure investment, ensuring that it does not fall below 0.8 per cent of GDP, the level at which significant detrimental impacts are created for the wider economy.

2. UK Government to target new infrastructure investment to be at or above 1 per cent of GDP over the coming five years, to stimulate growth and close up the gap in the quality of UK infrastructure compared to international competitors.

3. UK Government to create an independent body to analyse strategic challenges facing the UK, and to identify how infrastructure can play a part in resolving these concerns.

4. UK Government to promote prudential borrowing for local authorities to address their highways maintenance backlog through a one-off national programme of intensive improvements to local roads, significantly reducing the long-term cost of maintaining the network.

5. UK Government to commit to a clear, long-term energy policy that provides certainty about the types of investment that will be required to update the UK's generation and transmission capacity, releasing significant private sector energy development.

6. UK Government to develop a preparation pool of infrastructure projects that can be rapidly delivered, following a model successfully implemented by the Scottish Government.

7. UK Government to expand the reduced 'project rate' of the Public Works Loan Board from one to three projects per Local Enterprise Partnership in England, and implement by November 2013. Require authorities drawing on the rate to demonstrate substantial private sector co-investment in funded projects.

8. Industry to work with Government in England, Scotland and Wales to identify and resolve non-financial barriers that are blocking construction of local infrastructure projects.

9. UK Government to develop a new model for the ownership and management of the English strategic roads network, focussing on providing long-term certainty over the investment required in the network to ensure that it is able to meet future demand in an affordable manner.

10. UK Government to make an early commitment to commence work to Crossrail 2, having completed existing tube upgrade programme, addressing the long term transport capacity issues in London.

Executive summary

"Average annual GDP could have been 5 per cent higher between 2000 and 2010 if the UK's infrastructure matchedthatofinternational competitors"

This Cebr report, written on behalf of the Civil Engineering Contractors Association, analyses the role that infrastructure investment plays in supporting the UK economy. Our findings show that investment in the UK's transport and utility networks can significantly boost the economy and create jobs.

We also looked at the costs of the UK having infrastructure that falls short of the highest international standards. We find that having relatively low quality infrastructure cost the UK economy significantly over 2000-10. We forecast that improving infrastructure quality could accelerate economic growth in the future.

Cebr's overall conclusion is that there are demonstrable and significant economic and labour market impacts which arise from infrastructure investment. Planned infrastructure projects could also lead to faster economic growth, if they improve infrastructure quality.

Our headline findings are as follows:

- For each 1,000 jobs that are directly created in infrastructure construction, employment as a whole rises by 3,053 jobs;
- For each £1 billion increase in infrastructure investment, UK-wide GDP increases by a total of £1.299 billion;
- Every £1 billion of infrastructure construction increases overall economic activity by £2.842 billion;[1]
- UK GDP could have been five per cent higher, on average, each year between 2000 and 2010 if our infrastructure had matched that of other leading global economies.
- The cost of the UK's having infrastructure which fell short of typical developed economy standards was £78 billion each year between 2000-10.
- If we fail to bring UK infrastructure up to the standard of other developed economies, by 2026 this could create a annual loss to the economy of £90 billion

Introduction

The purpose of this report, written by Cebr on behalf of the Civil Engineering Contractors Association, is to investigate the contribution of infrastructure investment to the UK economy. Cebr takes a holistic approach to analysing infrastructure's contribution, examining how infrastructure investment contributes to the overall size of the economy and to employment. We also quantify how much larger the economy might have been over the first decade of the millennium, if UK infrastructure had met the highest international quality standards instead of being comparatively low quality. We finish by presenting our estimates of how improving infrastructure quality could accelerate economic growth.

Our findings, that infrastructure investment has the potential to benefit the UK economy, tie in with previous findings by the UK Government, Scottish Government and Welsh Government.

HM TREASURY

Policy papers by UK government agencies argue that high quality infrastructure is pivotal to a healthy economy. HM Treasury's 2011 National Infrastructure Plan notes ***"transport infrastructure can play a vital role in driving economic growth … (and) … is essential for future prosperity."*** Citing concerns over future airport capacity, the report also notes that airport infrastructure is required for long-term economic growth.[2]

The Scottish Government's long-term Infrastructure and Investment Plan (IIP), published in late 2011, details 54 major infrastructure projects and £60 billion worth of spending until 2030. The Plan notes that infrastructure investment will support the Scottish economy. Tying in with Cebr's own Input-Output estimates, ***it estimates that in any given year each £100 million of capital spending generates economic activity worth £160 million and supports 1,400 jobs.***

The Welsh Infrastructure Investment Plan (WIIP) states that investment in Welsh infrastructure is economically essential over the next decade. The WIIP notes that the Welsh Government's capital spending power is falling dramatically – by 2014-15 the capital budget will be 40% lower than in 2010-11 in real terms. In order to target infrastructure spending more effectively with a restricted budget, ***the Plan suggests that spending be focussed on those projects most likely to deliver jobs and economic growth.*** It also notes the importance of optimising public value through achieving best practice.

Office for Budget Responsibility

In a recent open letter to the Prime Minister, ***the Chairman of the Office for Budget Responsibility noted that cutting capital infrastructure spending has more of a negative impact on the economy than cutting welfare and public services spending.*** This comment dovetails with our overall conclusion: infrastructure investment has real potential to support the UK economy and increase employment. Insofar as they will raise infrastructure quality, planned infrastructure projects could also lead to faster economic growth in the future.

"Infrastructure can play a vital role in driving economic growth and is essential for future prosperity"

HM Treasury

Infrastructure output has grown... but slumped in the mid 2000s

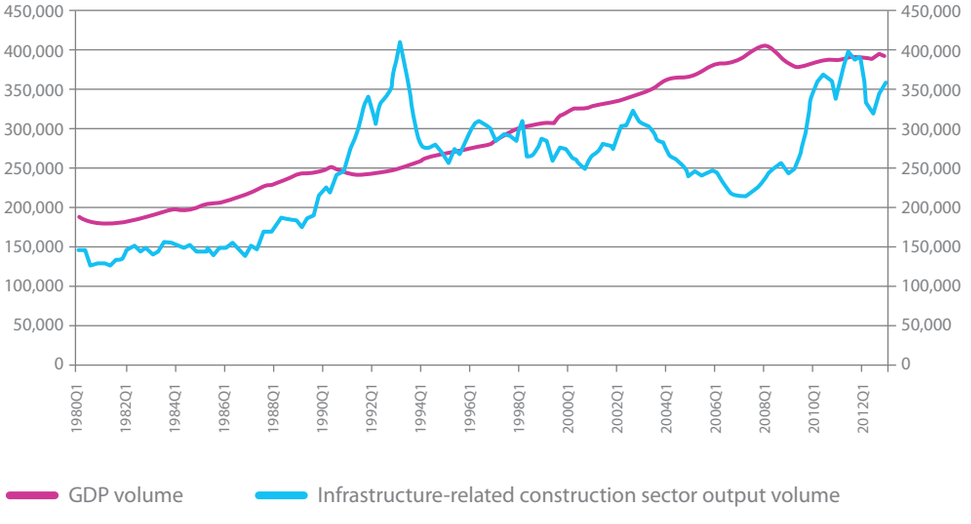
Economic output related to infrastructure construction has risen markedly over the past three decades, albeit with a significant lull between the mid-1990s and the financial crisis.

Output held steady at around £1.5 billion per quarter between 1980 and 1989, as shown in Figure 1.[5] Between 1990 and 1993 this rose dramatically to an average of £3.1 billion, largely due to the construction of the Channel Tunnel, which cost £10.5 billion.[6]

With the completion of the Channel Tunnel, infrastructure-related output declined, averaging £2.7 billion between 1993 and 2007, as investment tailed off. Between 2000 and 2007 the average was just £2.6 billion.[7]

From 2009 to 2012, the average quarterly level of infrastructure-related output rose markedly to £3.4 billion. This increase was partially brought about by the start of construction on Crossrail, which has a total construction budget of £14.8 billion.[8] The London 2012 Olympics also contributed to the rise as London's transport infrastructure was improved to increase ease of access to the Games. Finally, Government fiscal stimulus measures were enacted in late 2008 as the financial crisis began to bite. The £20 billion stimulus package contained measures which stimulated infrastructure development, including bringing forward road and energy capital spending projects.[9] As Figure 1 shows, these fiscal measures will have contributed to the increase in infrastructure-related construction output volumes seen as of 2009.

Figure 1: GDP volume and infrastructure-related construction sector output volume – millions of pounds in terms of 2012 prices



- GDP volumes are levels on a quarterly basis, in terms of the 2012 price level.
- Infrastructure-related construction sector output volumes are on a quarterly basis in terms of the 2012 price level.
- Source: Office for National Statistics, Cebr analysis

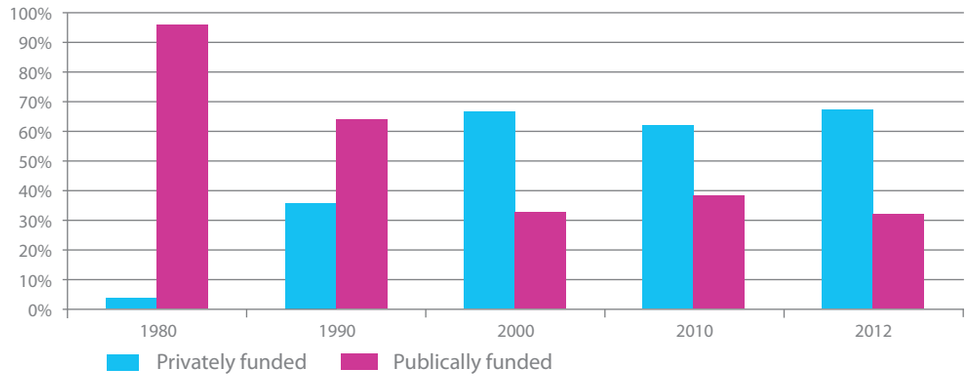
There has been a shift from public to private investment... and road-building has collapsed

The pattern of infrastructure construction output has changed dramatically since the early 1980s, both in terms of funding sources and infrastructure project type.

In 1980, public funding contributed to the overwhelming majority of infrastructure-related construction output, with private funding contributing to just 3.5% of output. By 2010, 61.6% of this output was privately funded, as the share of publicly funded output fell to 38.4%, as shown in Figure 2.[10]

"Road construction is at historic low levels, less than half that seen in the 80s and 90s"

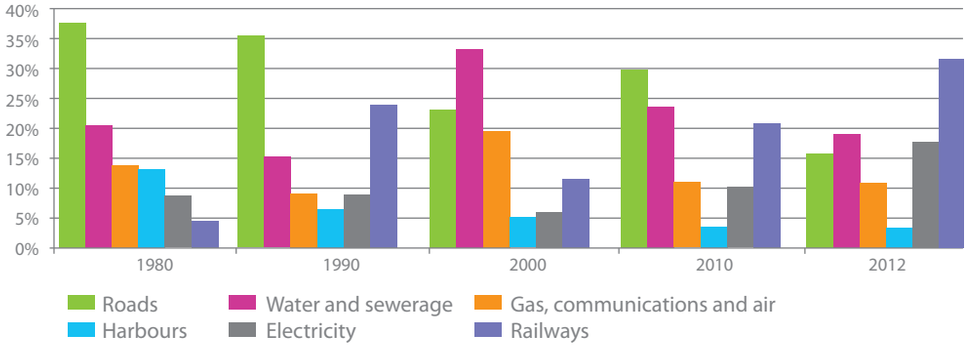
Figure 2: Percentage of UK infrastructure-related construction sector output, by funding source



- "Privately funded" includes output arising under the PFI framework. - Source: Office for National Statistics, Cebr analysis.

The type of projects generating infrastructure-based construction sector output has shifted since the 1980s. In that decade, some 51.2% of this output was brought about by construction of roads and harbours. By 2010, this combined share had fallen to 33.7%. The share of output arising from rail and electricity projects increased over the period, from 13.5% in 1980 to 31.4% in 2010.

Figure 3: Percentage of UK infrastructure-related construction sector output, allocation to different project areas



- Source: Office for National Statistics, Cebr analysis.

A significant 'infrastructure deficit' built up from 2003

Average annual growth in infrastructure output

1980 – 2002 = 3.6 per cent
2003 – 2012 = 1.6 per cent"

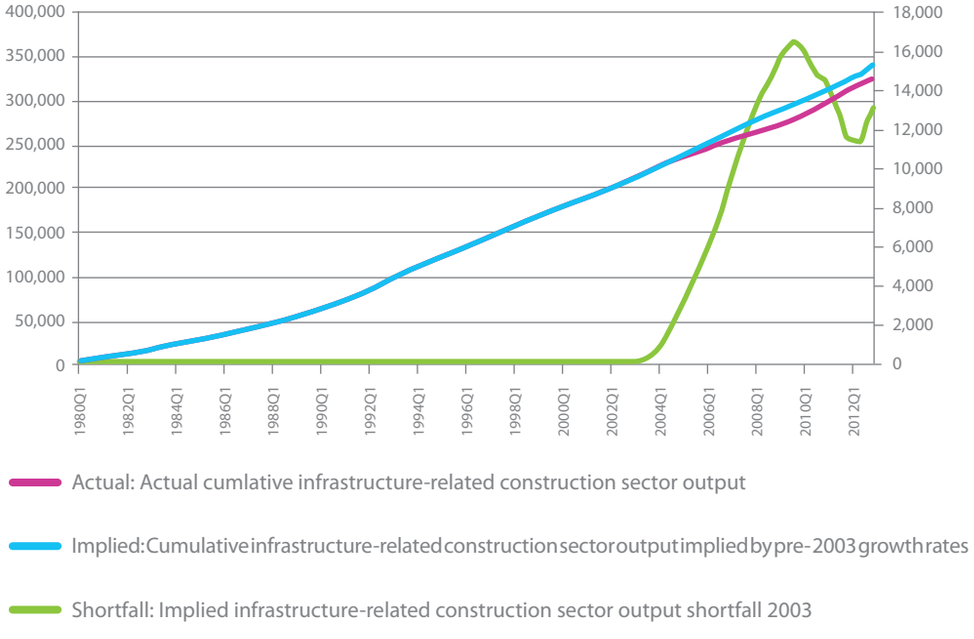
Before 2003 infrastructure construction output had been consistently above 0.8% of GDP since the late 1980s. But in early 2003 it fell below this threshold. This marked the start of a long downward trend; by early 2007, this infrastructure-based output measure had fallen to 0.5% of GDP. Consequently, Cebr dates the shortfall in infrastructure construction output from early 2003.

This measure of output began rising again after 2007, surpassing the 0.8% of GDP threshold in late 2009 and reaching 0.9% of GDP by late 2012. Between 1980 and 2002 infrastructure construction output had an average annual growth rate of 3.6%. Between 2003 and 2012 this fell to just 1.6% per year.

In 2012, infrastructure projects generated output of around £13.4 billion. Had the long-run pre-2003 rate of growth held beyond 2002, we expect this figure would have been £14.9 billion.

Between the turn of the millennium and late 2012, infrastructure projects contributed some £111.2 billion to construction sector output. Had pre-2003 growth trends continued, we expect this figure would have been £124.3 billion. This differential implies that a £13.1 billion infrastructure construction output shortfall has built up since the start of 2003.

Figure 4: Cumulative infrastructure-related construction sector output since 1980: Actual, Implied and Shortfall



- Cumulative infrastructure-related construction sector output volumes are in terms of the 2012 price level.
- Source: Office for National Statistics, Cebr analysis.

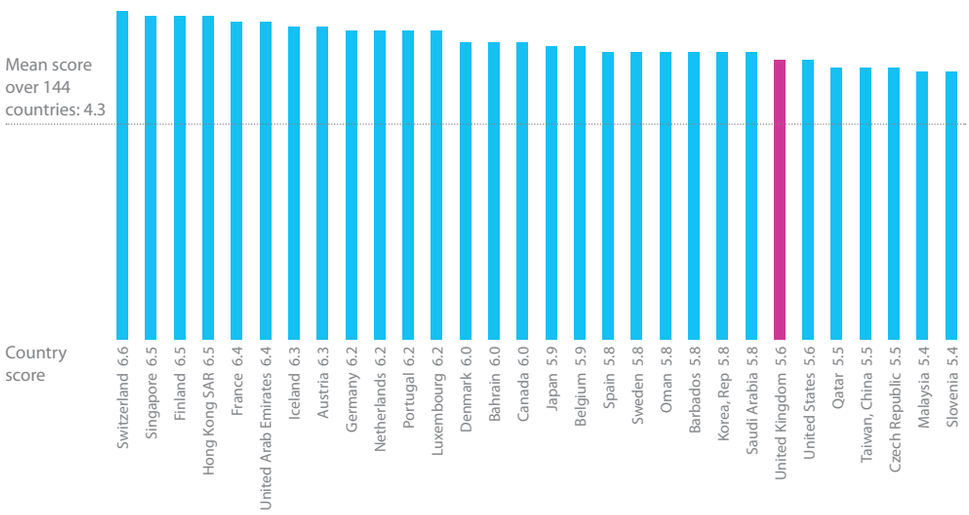
The UK's infrastructure ranks poorly against our global competitors

Over 2000-07, the UK was the lowest investor in infrastructure out of all OECD member states.[11] This stark statistic suggests that an infrastructure investment backlog has built up since 2000.

The World Economic Forum's most recent 2012-13 Global Competitiveness Report ranked the UK 24th out of 144 countries for overall quality of infrastructure due to its comparatively modest levels of infrastructure spending.

"Over 2000-2007, the UK was the lowest investor in infrastructure out of all OECD states"

Figure 5: Quality of overall infrastructure 2012-13, top 30 countries



- The "quality of overall infrastructure", a World Economic Forum measure, is assessed on a 1-7 scale where 1= "extremely underdeveloped" and 7= "extensive and efficient by international standards".
- Source: World Economic Forum, 2012-13, 2012-13 Global Competitiveness Report.

Research by the United Nations Department for Economic and Social Affairs examined how infrastructure affects economic performance. The Department found that lower infrastructure spending and lower infrastructure quality is detrimental to private sector productivity growth.[12] This suggests that the UK's low infrastructure quality ranking is acting as a barrier to private sector productivity growth and, therefore, overall economic growth. Moreover, the UK's overall infrastructure quality (24th), road quality (24th) and air transport quality (22nd) ranks are lower than its overall international competitiveness rank (8th). This disparity implies that the UK's relatively low infrastructure quality indicator rankings are dragging down the headline competitiveness measure.[13] Overall, there is evidence that the UK's low quality infrastructure is acting as a brake on economic growth and international competitiveness.

The economic impact of infrastructure investment

Cebr uses Input-Output modelling techniques to estimate the impact of infrastructure spending on the overall size of the UK economy, measured in terms of Gross Value Added (GVA).[14]

GVA can be thought of as the value of what is produced by a given industry less the value of the inputs used to produce it. Cebr believes that estimating the GVA generated by the industries which benefit from infrastructure spending is the best way to estimate how infrastructure spending impacts the economy.

The Input-Output model for infrastructure investment's economic impact

By quantifying the direct, indirect and induced impacts of infrastructure investment, the Input-Output model enables Cebr to quantify how increased construction sector GVA (which arises from infrastructure investment) affects economy-wide GVA.

Direct impacts

The amount by which infrastructure spending causes construction sector GVA to rise is the direct economic impact of infrastructure spending.

Indirect impacts

When completing a project, the construction sector will increase demand for goods and services from other "supplier" sectors in the UK economy. The construction sector principally relies upon outputs from the following sectors: manufacturing, administrative, scientific and technical, and mining and quarrying.[15] The construction sector also works as its own "supplier" sector. The additional GVA generated by the construction industry's supply chain constitutes the indirect economic impact of infrastructure spending.

Induced impacts

Infrastructure construction boosts employment (assuming there is spare capacity in the economy), and an increased total wage bill. It also raises employment and the total wage bill amongst the industry's supply chain. This leads to increased employee spending in the wider economy. This spending causes those sectors which produce and distribute final consumer goods to increase their own economic activity and sectoral GVA. This is the induced economic impact.

GDP impacts

Beyond these three GVA impacts, our model was also used to calculate the GDP multiplier impact of infrastructure investment. The GDP multipliers estimate how much each £1 billion of increased infrastructure spending raises GDP.

Infrastructure boosts GDP by £1.30 per £1 invested

Cebr's multiplier estimate finds that each £1 billion increase in infrastructure investment raises UK GDP by £1.299 billion. As shown in Figure 6, this impact is attributable to different sectors of the economy. Of the £1.299 billion increase in economy-wide GDP arising from a £1 billion increase in infrastructure investment, 50.5% of the GDP increase can be attributed to the construction sector. A further 8.5% and 6.1% can be attributed to the manufacturing and wholesale and retail trade sectors respectively.[16]

"While concerns have been raised that infrastructure investment takes a long time to generate returns, this indicates that there is a near 30 per cent boost per £1 spent as soon as investment works its way into the wider economy."

Figure 6: Economic GDP impact arising from £1 billion of infrastructure investment

Sector	Economic GDP impact, billions of pounds	Economic GDP impact, percentage
Construction	0.657	50.5
Manufacturing	0.111	8.5
Wholesale and retail trade	0.079	6.1
Professional and scientific activities	0.075	5.8
Administrative and support services	0.069	5.3
Finance and insurance	0.057	4.4
Mining and quarrying	0.025	1.9
Other	0.226	17.4
Total	**1.299**	**100.0**

- In deriving these estimates, Cebr assumed that the construction sector is responsible for the completion of new infrastructure projects, as evidenced by Office for National Statistics, 2007, UK Standard Industrial Classification of Economic Activities 2007 (SIC 2007), elements F.42.11 to F.42.99.
- Source: Office for National Statistics, Cebr analysis.

In the long term, £1 of infrastructure construction raises economic activity by £2.84

Cebr's 2.842 total GVA construction sector multiplier is similar to the multiplier presented in LEK, 2009, "Construction in the UK Economy: The Benefits of Investment". This is simply a coincidence.

Cebr's multiplier estimates are based on more recent Office for National Statistics (ONS) data than were used in LEK's report. Moreover, our method of calculating the multipliers differs from LEK's. See: LEK, 2009, "Construction in the UK Economy: The Benefits of Investment".

Figure 8 presents Cebr's Input-Output estimates of the direct, indirect, induced and total GVA impacts which arise from the generation of £1 of GVA by the construction sector as a result of infrastructure spending (which will be greater than £1 to give £1 GVA). This can be thought of as the total increase in income across the economy which ultimately results from infrastructure spending's impact on production. Figure 8 breaks down these impacts on a sectoral basis.

Figure 8: The economic impacts of a direct £1 billion increase in construction sector GVA arising from infrastructure investment, billions of pounds, nominal

Sector	Direct impact	Indirect impact	Induced impact	Total impact
Construction	1.000	0.412	0.024	1.436
Manufacturing	-	0.194	0.048	0.242
Wholesale and retail trade	-	0.061	0.112	0.173
Professional and scientific activities	-	0.124	0.041	0.165
Administrative and support services	-	0.124	0.028	0.151
Finance and insurance	-	0.053	0.072	0.125
Mining and quarrying	-	0.043	0.012	0.054
Other	-	0.177	0.318	0.495
Total	**1.000**	**1.188**	**0.654**	**2.842**

- In deriving these estimates, Cebr assumed that the construction sector is responsible for the completion of new infrastructure projects, as evidenced by Office for National Statistics, 2007, UK Standard Industrial Classification of Economic Activities 2007 (SIC 2007), elements F.42.11 to F.42.99.
- Source: Office for National Statistics, Cebr analysis.

A total of 3000 jobs are created for every 1000 in infrastructure construction

Spending on new infrastructure projects will raise employment in the construction sector directly (assuming the economy is not at full employment) – the direct employment impact. As a knock-on effect, investment causes the construction sector to increase demand for goods and services from industries in its supply chain (e.g. the mining and quarrying sector). This raises employment in those supply chain industries – the indirect employment impact. Finally, investment leads to an increased total wage bill in the construction sector and in its supply chain. This causes increased employee spending throughout the economy, raising employment in sectors producing and distributing consumer goods – the induced employment impact of infrastructure investment.

Overall, we find that for each 1000 jobs which infrastructure investment contributes directly to the construction sector, a further 2,053 jobs are added to the rest of the economy as indirect or induced effects. Every 1000 jobs which the construction sector gains directly through increased infrastructure spending raises overall employment by 3,053 jobs – the total employment impact of infrastructure investment.

Figure 10: The employment impacts of a 1000 job increase in the construction sector arising from infrastructure investment, thousands of jobs

Sector	Direct impact	Indirect impact	Induced impact	Total impact
Construction	1.000	0.412	0.024	1.436
Wholesale and retail trade	-	0.099	0.181	0.280
Administrative and support services	-	0.220	0.049	0.269
Manufacturing	-	0.202	0.049	0.251
Professional and scientific activities	-	0.149	0.049	0.198
Finance and insurance	-	0.029	0.040	0.069
Mining and quarrying	-	0.030	0.008	0.038
Other	-	0.188	0.323	0.511
Total	**1.000**	**1.329**	**0.724**	**3.053**

- In deriving these estimates, Cebr assumed that the construction sector is responsible for the completion of new infrastructure projects, as evidenced by Office for National Statistics, 2007, UK Standard Industrial Classification of Economic Activities 2007 (SIC 2007), elements F.42.11 to F.42.99.
- Source: Office for National Statistics, Cebr analysis.

This means real job creation as a result of real projects

"Infrastructure can increase the employment rate by enablingagreaterproportion of the population to participate in the economy"
HM Treasury

Looking at infrastructure projects that are expected to have substantial employment impacts while under construction, we can illustrate that the process of undertaking infrastructure projects can boost employment.

High Speed Two (phase 2)
- to extend the high speed over-ground network from the Midlands to the North.
- to be completed by 2033.
- estimated 10,000 construction jobs created.[17]
- we estimate this could generate 30,000 jobs in the wider economy.

Crossrail
- 118 km rail scheme through central London from Shenfield to Maidenhead.
- Due for completion in 2018.
- estimated employment of 14,000 people during peak construction phase of 2013-15.[18]
- We estimate this could generate more than 40,000 jobs over 2013-15, once indirect and induced effects have been accounted for. This is broadly in line with Crossrail's own estimates of 55,000 jobs.

Research by HM Treasury finds that infrastructure investment has the ability to impact overall employment in the economy substantially. The Treasury finds that high quality infrastructure, which is able to satisfy demand can "increase the employment rate, by enabling a greater proportion of the population to participate in the economy, e.g. through improved transport or communication links between suburban and rural areas, and city centres".[19]

In conclusion, evidence from DfT and HM Treasury papers and our Input-Output model indicates that construction work on infrastructure investment projects can raise employment in its own right.

Demonstrating the cost of poor infrastructure

Since the turn of the millennium, the quality of UK infrastructure has generally lagged behind that of other developed countries. Policy literature suggests this has limited the UK's international competitiveness and economic growth potential.[20]

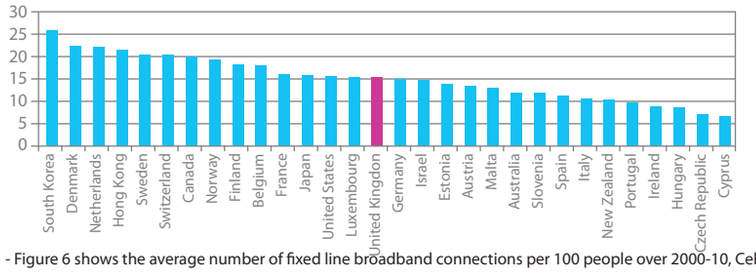
As previously noted, World Economic Forum data suggest the UK's infrastructure quality is comparatively underwhelming. These infrastructure rankings place the UK markedly below comparable developed countries.[21] They also contrast poorly with the UK's position as the world's eighth most competitive economy, meaning that the UK's weak infrastructure quality is dragging down its overall international competitiveness.[22]

The World Economic Forum's findings are supported by the data used in Cebr's model, sourced from the World Bank. This found that:

- As an average over 2000-10, the quality of UK transport infrastructure ranked 10th (out of the 40 countries which Cebr examined).
- Over the 2000-10 period, the quality of UK internet infrastructure ranked 15th (out of the 40 countries which Cebr examined).

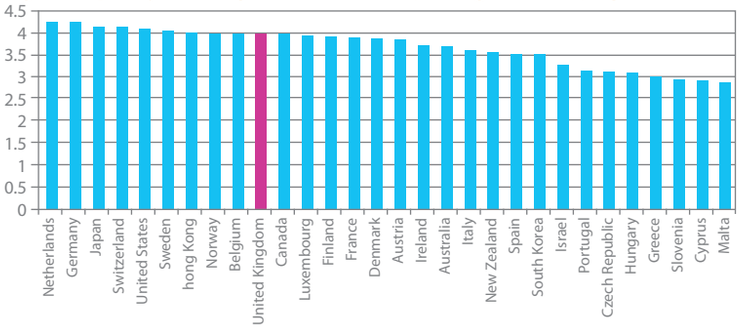
"The UK's weak infrastructure quality is dragging down its overall competitiveness"

Figure 6: Quality of internet infrastructure, average 2000-10, top 30 countries



- Figure 6 shows the average number of fixed line broadband connections per 100 people over 2000-10, Cebr's proxy measure of internet infrastructure quality.
- Source: International Telecommunication Union, World Telecommunication/ICT Development Report and database. (These data were provided in the World Bank Databank World Development Indicators Dataset.)

Figure 7: Quality of transport infrastructure, average 2000-10, top 30 countries



- Figure 7 shows the quality of transport infrastructure in each country on a 1.0 to 5.0 scale, where 1.0 implies transport infrastructure is very low quality and 5.0 implies it is very high quality. These scores are based on survey data by the World Bank and partner organisations.
- Source: World Bank Logistic Performance Index Surveys. (These data were provided in the World Bank Databank World Development Indicators Dataset.)

Billions are lost to the UK economy through poor infrastructure

We considered how the UK's comparatively low quality infrastructure has depressed real annual UK-wide GDP.

We looked at a 'relatively modest' improvement scenario where the UK's infrastructure quality is broadly in line with comparable developed economies, but falls short of international best practice.

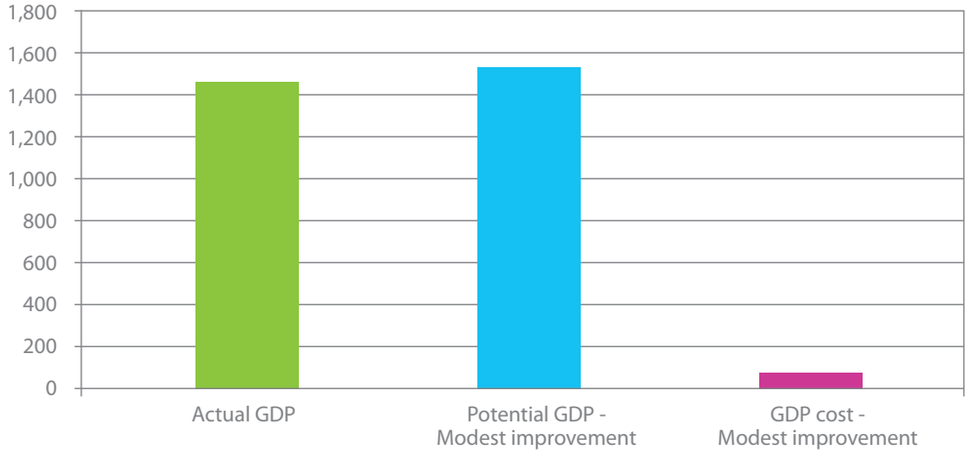
In this case, we estimate average annual UK-wide GDP would have been £1,536 billion over the period, compared to £1,458 billion, which is what it actually was.

Resultantly, we estimate the cost of the UK's relatively low quality infrastructure was £78 billion in terms of real annual GDP over 2000-10 – versus having somewhat higher quality infrastructure which still fell short of the highest international competitors.[23]

Comparison with other sectors

Cebr also considered how well infrastructure growth contributed to growth by comparison with other forms of economic activity. Our analysis found the infrastructure construction was second only to the Electricity and Gas sector in its ability to raise GVA, well ahead of sectors such as manufacturing, transportation, health, education and financial services.[24]

Figure 8: Annual UK GDP and the economic cost of comparatively low quality UK infrastructure under the "modest improvement" counterfactual – billions of pounds in terms of 2012 prices



- "Actual GDP": The actual annual level of UK-wide GDP, average over 2000-10 in terms of 2012 price level.
- "Potential GDP – Modest improvement": The level of UK-wide GDP which would have held under the "modest improvement" counterfactual, as an average over 2000-10 in terms of 2012 price level.
- "GDP cost – Modest improvement": Cost of the UK's having relatively low quality infrastructure, compared to having somewhat higher quality infrastructure which still does not achieve the highest international standards.
- Figures were derived using World Bank Data on GDP in terms of the USD 2000 price level, which were then converted into pounds (in terms of the GBP 2000 price level) using the GBP-USD exchange rate in 2000. We then used our in-house GDP deflator to convert our findings into the 2012 price level.
- Source: Office for National Statistics, World Bank, Cebr analysis.

Closing the gap - the potential for the future

Predicted annual UK growth: with current infrastructure = 1.7 per cent, with modestly improved infrastructure = 2.1 per cent

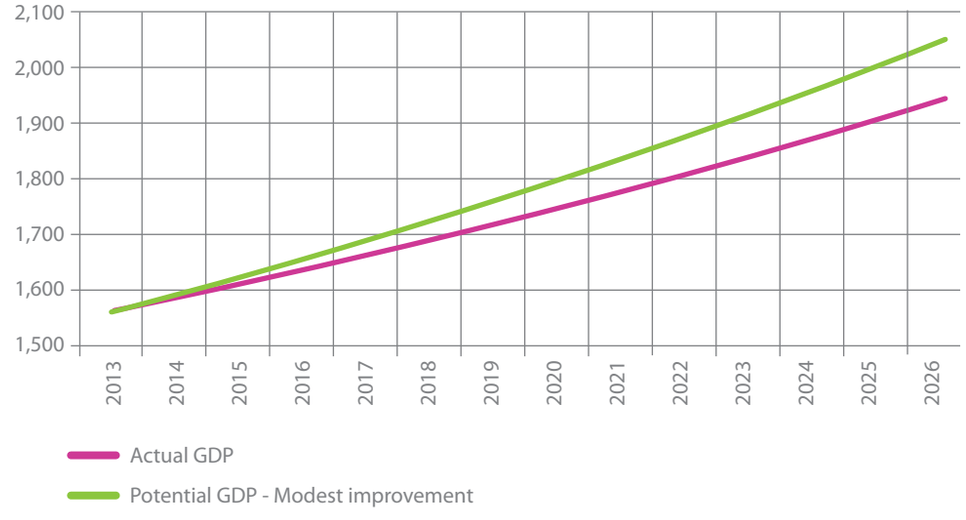
This concluding subsection argues that increasing infrastructure spending would be likely to improve infrastructure quality and, therefore, support the UK economy. Again we consider a 'modest improvement scenario.

We model this scenario against a baseline forecast of how annual GDP will evolve assuming that the UK's quality of infrastructure remains broadly stable. This forecast is highlighted on the graph in blue. In this "baseline" scenario case, we expect the UK economy would grow from £1.6 trillion in 2013 to £1.9 trillion in 2026, measured in terms of the 2012 price level under this baseline scenario. On average, this implies real annual economic growth of 1.7%.

The modest improvement scenario

In pink, we have illustrated how we expect GDP will develop if the quality of infrastructure improves noticeably by 2026, bringing the UK into line with comparable developed economies but not by enough to meet the highest international standards. Under this scenario, we forecast the economy would grow from £1.6 trillion in 2013 to £2.1 trillion in 2026, measured in terms of the 2012 price level. On average, this implies real annual economic growth of 2.1%.

Figure 9: Annual UK GDP under different infrastructure quality forecasting scenarios - billions of pounds in terms of 2012 prices



- "Actual GDP": A forecast of the actual annual level of UK-wide GDP under the "baseline" scenario.
- "Potential GDP – Modest improvement": A forecast of the level of GDP which would hold under the "modest improvement" scenario forecast projection.
- All figures represent UK-wide GDP for each year of the 2013-26 forecast period in terms of the real 2012 price level.
- Figures were derived by applying our regression model estimates to our in-house projections for real the annual level of GDP in terms of the 2009 price level. We then used our in-house GDP deflator to convert our findings into the 2012 price level.
- Source: Office for National Statistics, World Bank, Cebr analysis.

Authorship, disclaimer and notes

Authorship

This report was written and researched by Daniel Solomon, a Cebr Economist.

This report has been produced by 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.

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Definition

This report defines infrastructure investment (or "investment", "infrastructure spending") as spending on the development of new infrastructure projects, or expenditure on the expansion of existing projects, in a given year or quarter. Infrastructure projects occur in the areas of:

- water and sewerage;
- electricity (generation and distribution);
- roads and railways;
- harbours;
- gas (generation and distribution);
- airports and other air infrastructure; and
- communications (largely telephony and internet infrastructure).

Our definition of infrastructure investment covers investment by the public sector, private sector and investment which occurs under the Private Finance Initiative. Our definition excluded spending on infrastructure maintenance.[25]

London, May 2013

[1] In GVA terms. GVA is the value of what is produced less the value of the intermediate goods and services used as inputs to produce it.

[2] In GVA terms. GVA is the value of what is produced less the value of the intermediate goods and services used as inputs to produce it.

[3] Scottish Government, December 2011, "Infrastructure and Investment Plan", Section 1: Why we will invest.
http://www.scotland.gov.uk/News/Releases/2011/12/06104509
http://www.scotland.gov.uk/Publications/2011/12/05141922/0
The 2011 IIP is the most recent Plan; the previous IIP was published in 2008.

[4] Welsh Government, 2012, "Wales Infrastructure Investment Plan for Growth and Jobs 2012". http://wales.gov.uk/funding/wiip2012/?lang=en

[5] All infrastructure investment figures in this section are in terms of real 2012 prices, unless otherwise stated.

[6] The cost was £4.7 billion in 1985 pounds, grown to £10.5 billion using the GDP deflator.

[7] Again, these figures are in terms of the 2012 price level.

[8] This £14.8 billion figure is the nominal funding packet agreed over the lifecycle of the construction project. See:
http://www.crossrail.co.uk/about-us/funding#.UW6wrbWG2n9

[9] HIS, 2008, "IHS Global Insight: U.K. Chancellor Unveils £20-bil. Fiscal Stimulus Package in Bid to Limit Recession".

[10] Office for National Statistics, Jan 2013, "Output in the Construction Industry: January 2013", Table 5.

[11] OECD, 2010, Going for Growth, 2010: Country Notes – UK.

[12] Rodriguez, 2007, "Have collapses in infrastructure spending led to cross country divergence in per capita GDP?", United Nations Department for Economic and Social Affairs working paper 52.

[13] This is because the UK's overall competitiveness ranking can be thought of as a weighted average of several indicators, one of which captures the quality of UK infrastructure. See: World Economic Forum, 2012-13, 2012-13 Global Competitiveness Report, Appendix A: Calculation of the sustainability-adjusted GCI (Global Competitiveness Index).

[14] That is, the value of what is produced less the value of the intermediate goods and services used as inputs to produce it. GVA is also commonly known as income from production and is distributed in three directions – to employees, to shareholders and other financiers and to government. GVA is linked as a measurement to GDP – both being a measure of economic output. That relationship is (GVA + Taxes on products - Subsidies on products = GDP). Because taxes and subsidies on individual product categories are only available at the whole economy level (rather than at the sectoral or regional level), GVA tends to be used for measuring things like gross regional domestic product and other measures of economic output of entities that are smaller than the whole economy.

[15] ONS supply-use tables 2010 (combined use matrix) and Cebr analysis.

[16] GDP is an economy-wide concept; it does not strictly pertain to individual sectors. The data presented in Figures 6 and 7 simply indicate how one might think of the GDP impact of infrastructure investment being distributed across the different sectors of the economy.

[17] Our assumption that the project will raise construction sector employment by 10,000 jobs directly is based on analysis by the Department for Transport. See: Department for Transport, January 2013, High Speed Rail - "Investing in Britain's future - Phase Two: The route to Leeds, Manchester and beyond", paragraph 3.6.

[18] This assumption is based on an estimate by Crossrail. See: http://www.crossrail.co.uk/careers/#.UW10qbWG2n8

[19] HM Treasury, November 2011, "National Infrastructure Plan: 2011", Section 1: Introduction.

[20] See World Economic Forum, 2012-13, 2012-13 Global Competitiveness Report and Rodriguez, 2007, "Have collapses in infrastructure spending led to cross country divergence in per capita GDP?", United Nations Department for Economic and Social Affairs working paper 52.

[21] See Figure 5 in subsection 3.4 of this report.

[22] This conclusion is supported by Rodriguez (2007), the World Economic Forum (2012-13) and OECD (2010).

[23] This infrastructure quality cost is given in real terms, in terms of the 2000 price level.

[24] This infrastructure quality cost is given in real terms, in terms of the 2012 price level.

[25] Office for National Statistics, Jan 2013, "Output in the Construction Industry: January 2013", Table 5 and Background notes.

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