GRESHAM COLLEGE

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REGIONAL, INDUSTRIAL AND INFRASTRUCTURE POLICIES

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I am going to talk about industrial infrastructure policies, and such an enormous topic, I am going to do little more than scratch the surface, and in some sense, that I think is also my criticism of Government policy in the post-War period towards industrial infrastructure policies - I think they have barely scratched the surface. I do not think we have had a particularly consistent set of policies towards industry in infrastructure. I shall try to give some ideas as to why that might be and talk a little bit about the consequences of those choices for the state of the economy. As you will know, this is the fifth of a series of six lectures about the state of the economy as we head out of the European Union into the next decade, and so what I want to do is set a precursor I think for the final lecture in June, where I will bring together some of the ideas and come up with some form of blueprint of the kind of things that we might need. But I am glad you are able to join me this evening on this journey, as we go through some of the outcomes for the British economy for what I think has been a poorly addressed supply side set of policies.

Before going on, I want to thank the work of economic historians very much, Peter Mathias, who passed away a couple of years ago, but also Nick Crafts, whose insights have been very helpful to me in thinking about some of these issues, and also colleagues at the National Institute who provided some simulations for me to talk about. I will not be talking about them in detail, but we will have a look later on as to what we are able to do.

The first thing I want to draw attention to is a very famous book by Peter Mathias on 'The First Industrial Nation', written slightly under 50 years ago, and I think it was incredibly influential in thinking about an approach to industrial or infrastructure policies. Peter, in writing the book, was describing the first industrial nation, which was Britain, and thinking about how it industrialised first, and, to an extent, what Government policies were adopted at this time. His point of view, which is worth repeating, is that industrialisation in Britain, from at least the mid-18th Century onwards, is taken as the classical case of spontaneous growth, so not something that is directed or planned in the sense in which we now understand it to be, and we may see, in other parts of the world, as a planned process. That was not what was going on, and to be fair, in context, clearly, Government in the 18th Century was a much smaller beast than we have today, and the idea of planning would be almost anachronistic to expect Governments to be planning at this time – it is not something that was typically done.

Nevertheless, the insight that this was spontaneous and responsive primarily to market influences, so that means the price mechanism and the expectation of profit, but this was very much the view about where industrialisation came from, primarily through market influences and underlying social institutional forms, not organised consciously by Government design in the interests of promoting industrial growth. So, in no sense was it a strategy, but I think, more importantly, this point, I think, in the sense of Keynes' point about academic scribblers, has been sitting at the back of lots of policymakers' minds in the intervening 50 years, as the British way of doing it – no need to plan, it will happen spontaneously – and I think it has been influential as a piece of insight I do not take issue with, but its influence may have gone far beyond just a simple description of the 18th Century. He went on, in the book, to say, industrialisation being the "it", "…was not the result of deliberate Government policy sponsoring industrial progress". The state did very little to promote industrial innovation as an active policy, to stimulate productive investment, to mobilise capital for productive investment, whether directly or by way of tax revenues or indirectly, by guaranteeing the rate of return on capital raised by the

market, or offsetting risks faced by the market – think of the PFI, for example, as something that might be all about that kind of problem. It did not conduct enterprise, did not set out to attract foreign capital or skills, it was reluctant to accept responsibility for social investment, and also was reluctant to establish the usual infrastructure. The state was almost entirely independent of the issues of industrial and infrastructure policy that occupy so much of our time today as we think about what we might do to address the problems that we perceive in the UK economy.

Let me go on, in at least economic history time, if not the time at which these things were written… This is a book which I have referenced before in my lectures, 'The Management of the British Economy', written by J. C. R. Dow, who was Deputy Director of the Institute when he wrote this, and he makes a different kind of point, describing the immediate post-War British economy, and he says, outright: "The major fluctuations in the rate of growth of demand and output in the years after 1952 were chiefly due to Government policy". So, it was Government policy itself that was leading to fluctuation in the economy, very much about Government stabilisation policy, trying to stop the economy from having excessive stop-go cycles, but in fact, these policies were implemented in such a way as they tended to exacerbate the economic cycles, he argues, and he goes on to write: "It must be supposed policy went further than intended, as in turn did the correction of those effects." So, as soon as you go a little bit further, think of the shower in the morning when you are trying to get the temperature just right, you turn it to the right and it seems cold, so you continue to turn it to the right and it gets too hot, and then you turn it too far to the left and it gets too cold – maybe that does not happen to you, but it still happens to me. Maybe you have better utilities where you are. "As far as internal conditions are concerned then, budgetary and monetary policy failed to be stabilising, and must, on the contrary, be regarded as having been positively destabilising." This was a damning indictment of stabilisation policies in the 1950s and 1960s. But I think there is another, deeper point to be made: if the main focus of the smart people in the Treasury and in Government was on short-run policy, who was thinking about the long-run? Who was thinking about the supply side? Who was creating the conditions for a re-industrialisation of the economy and the re-building of infrastructure after the War? Now, clearly, people were thinking about it, but were they thinking about it enough? Was this a case of diverting scarce policy resources to a more interesting area, which is monetary and stabilisation in fiscal policy, rather than deeper, more complex issues to do with infrastructure and industry? I suggest that may be one possibility for us to pursue.

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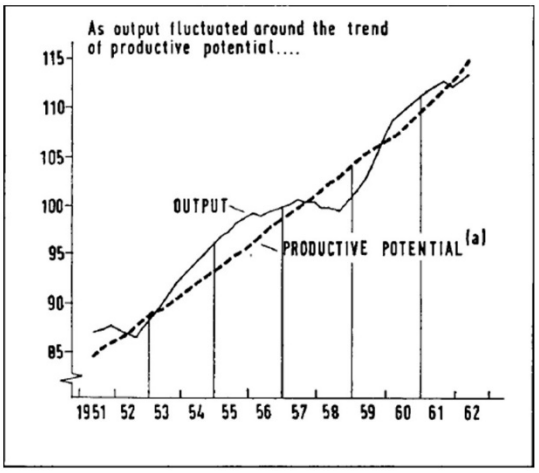
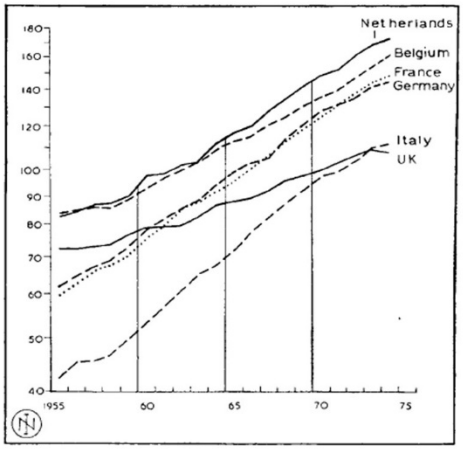


Godley and Shepherd, 1964

Chart 1. Gross value added per person employed, in GDP, 1955–74(a)

UK 1970=100; Semi-log scale



D. T. Jones, 1976

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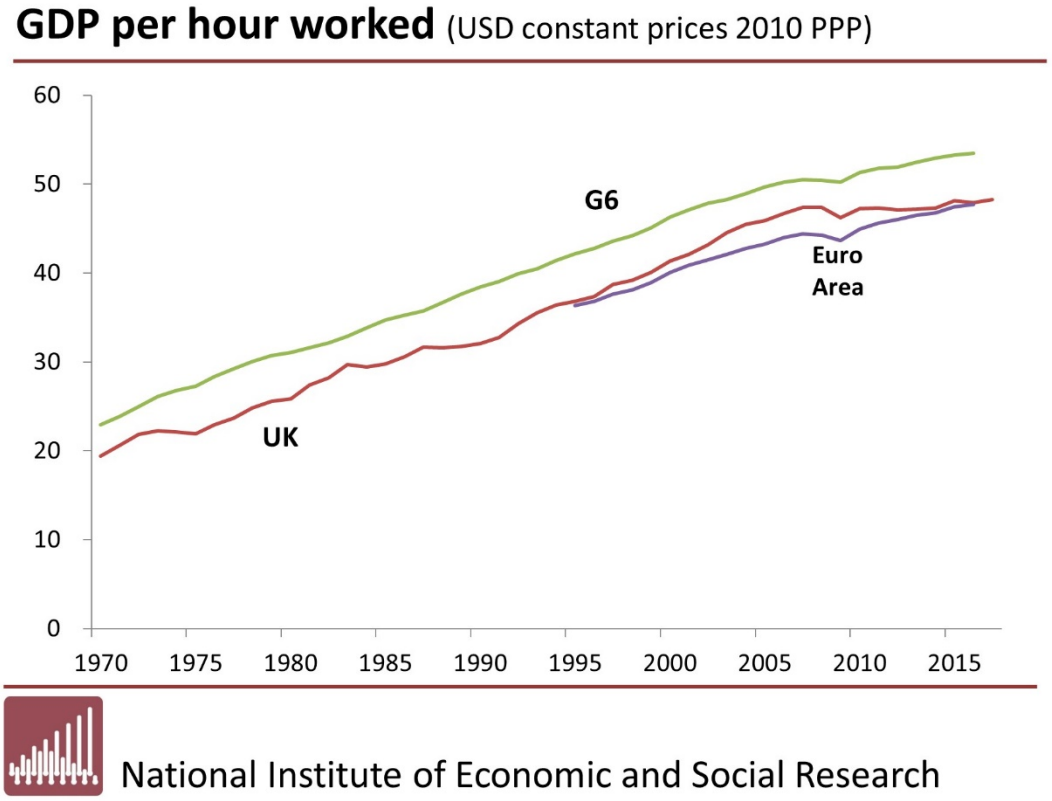
When we start to think about capacity – and this is some work the Institute did in the 1960s and 1970s, one of the early attempts to understand what happens in an economy if the supply side, that is what we are really talking about today, the ability of the economy to produce capacity and produce goods and services. Of course, those goods and services will lead to income and lead to expenditure, but we will not talk so much about the expenditure or demand side today, we are only interested in the supply side of the economy. The undotted line shows you the actual level of output in the British economy from 1951 to 1962, and the dotted line is an attempt to measure capacity. If you look at it hard enough, you can see it is not a straight line, there is some movement in it over the business cycle, and this is an attempt by Wynne Godley and his co-author, Shepherd, to think about how the productive capacity may move, over time, and with the economic cycle. It is one of the early attempts to get at that. In fact, people went further in the 1980s and 1990s to almost suggest that the whole of the fluctuation in output was all to do with changes in the supply side of the economy – that is probably going a little bit too far. But the point I want to make is that the long-run increase and augmentation of income, and income per head, is nearly entirely determined by the evolution of the supply side of the economy. The demand side essentially follows it. The demand side can perturbate around it, but it is the supply side that matters. So, the critical question is how we build the supply side of the economy. You will remember, if you came to earlier lectures, the supply side, in the most simple terms possible, comprises three elements: the quantity of labour in the economy, the capital stock, and if we add to that, the notion of total factor productivity, that is, if we combine these two items and we add in how productive we are, overall, we get some measure of output in the economy at its productive, full-price capacity.

Later on, we can see this measure of productivity, this is one particular measure, and that is the amount of value-added in the economy we are producing per person employed, and I am just showing you this because the Institute has been looking at these things for a very long time, and the pictures are, unfortunately, very similar over time.

This is a comparison of the UK with some of our European neighbours. You see, in 1955, this index, with the UK at 100 in 1970, was at around 70 15 years earlier, and, another five years later, was around 110, but what you

can also see, in the nature of this scale, is that other countries tended to be growing their productivity at a faster rate. This is an aggregate number across the whole economy. The aggregate number, of course, is adding up all the regions and giving us an aggregate picture. I will come to the regional decomposition or the spatial dimension of this a little bit later on in this talk. But the key thing for an economist here, or any of us really, are the slopes, because this slope is telling us the rate of growth over time, and it is this rate of growth that determines the value added per person, and probably the amount of income per person in the economy at any moment in time. By far and away the flattest, so the worst performance in terms of growth, is the UK, and this is going back '55 to '75 – it's not a new phenomenon. This pre-dates joining the EEC. It is a very, very old phenomenon in the UK. This has not been addressed.



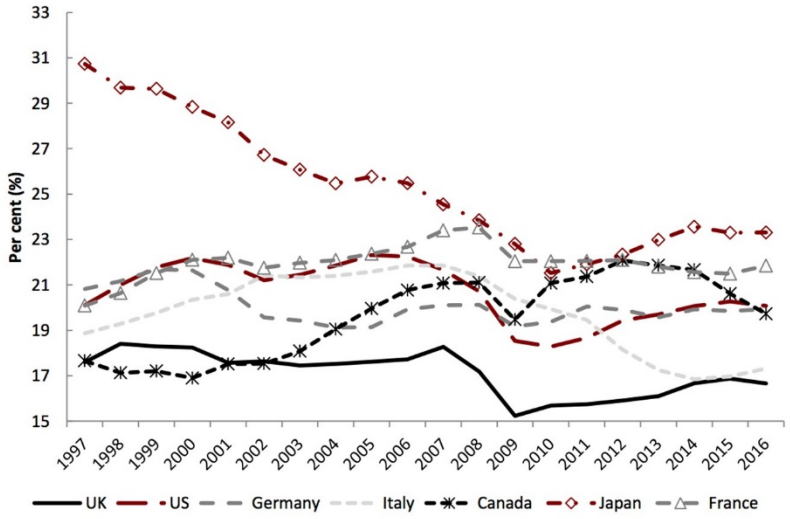
But let me not be accused of selecting time periods to make my point. I can look at GDP per hour worked. This is data from the OECD, and we are looking here at – USD is US dollars constant prices 2010 – and this is the amount of GDP we are producing per hour that we work. So, the average in the G6 in 2010 is around $50 per hour worked, and that is a lot of data to get to that number, but we will take the OECD's estimates as something we believe rather than saying these are ones that we are going to cast some doubt on. At that same point, you can see the UK is in about the 40s, and if we look at the Euro area at 2010, it is a little bit below that. But the clear pattern is there. If we look at the average in this fairly long 45-year period, the UK has, almost in constant terms, been below the level of productivity of the other G6 nations, which means that those that were ahead of us in income terms 45 years ago have gone even further ahead, and those that were behind us have tended to catch up and go beyond us. If we look from the mid-1990s onwards, in a period I have called in my own work "the long expansion", from 1992 to 2007, you can see the UK pulled away from the average that we see in the Euro area, and in fact, seemed to be approaching the G6 average by about the time of the financial crisis, so it was a relatively good period of performance compared to our trading partners. But, sadly, in some sense, following the financial crisis, we have seen that our performance has, in relative terms, deteriorated, and we are now back to about the average of the Euro area alone – that is 16 or 17 countries rather than just the main Western European ones. Again, that tells us our average or aggregate level of productivity, the amount of

output we produce per head, across the whole country, is, on average, less than our G6 trading partners, and not much better than the whole of the Euro area.

Let us try and go a little bit further than that. I talked about the things that determine supply as being the level of labour in the economy, the level of capital, and total factor productivity. Let me look now at investment, which is essentially the derivative of capital. As we invest, and investment stays in the economy, that adds to the capital stock.

Investment to GDP in G7

Figure 3: Gross fixed capital formation to GDP ratio



Source: Source: NiGEM database

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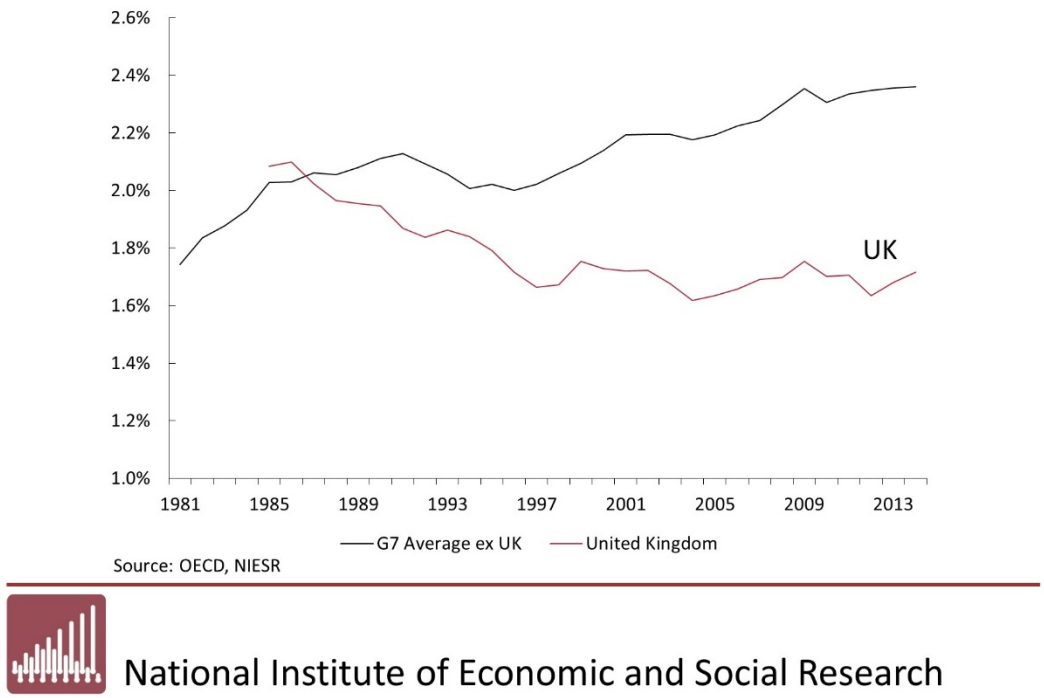
You can see, the UK, in terms of investment relative to GDP, is, sadly, at the bottom of the G6. Now, that may be fine, if we had a very efficient form of investment. If every unit that we invested was more efficient than that in our trading partners, we would have a higher capital stock over time, but we do not. There is no reason to suppose the unit that we invest in the UK is any more efficient than it is in the other economies, and certainly, the levels of income per head, or indeed productivity, would also back up that conjecture. So, yes, Japan started, 20-odd years ago, with very high levels of investment, possibly even over-investment, and the contraction of the economy over that period has been a movement down from too high a level of capital to a lower level of capital. So, the Japanese experience is, to some extent, distorting your view of that chart. What we can see is the UK level of investment has been low, and continued to be low, over this very long period.

Let me go further. Investment is public and private, and let us just have a look at the public sector alone. Again, these are average numbers – I am not looking at the region at this stage, and we will get there shortly with a story of what all of this means at the regional level. Public investment, that is the stuff the Government does that the rest of the country cannot do – defence, health, bridges, roads etc – in the 25 or 26-year period since 1990, has hovered around 3%. Remember I talked about that period of catch-up in productivity from about 1995 to 2005? Without doing any heavyweight econometric statistical analysis here, you can see that that period of catch-up, at least no less than it is coincidental with this increase in public investment from 1995 to about 2005, so public investment may have powerful what economists call spill-overs or multiplier effects for the rest of the economy, particularly if it is doing things that the private sector cannot do – I go back to questions of roads and bridges and hospitals and other areas. So, it could very well be the case, and a lot of literature suggests, that public investment, if appropriately thought through, so we avoid the white elephant problem, may have an important role in building up the capital stock and, to some degree, the level of productivity in the economy. So, even though the level of public investment we now see is about the medium-term average, it has been declining since the start of the financial crisis, and that is a cause, I think, for concern.



We will have a look at another aspect of the economy, and that is research and development expenditure relative to GDP. Now, given the story I am telling you so far, you are probably not surprised by this either, so I am building up a rather damning picture of where we are, and we have talked about the intellectual antecedents and we have talked about the focus on short-run policy, and we are looking at the consequences of that as a result of productivity, investment, the level of capital stock, and you will know, from previous lectures, I have pointed at least a partial finger to the operation of the financial sector as well, but I will leave you to look at the lecture on that in your own time. Research and development expenditure has been shown – and this is both public and private, it is not only public research and development expenditure – has also been shown, by much research, to have important consequences for the level of income over time. You can see, the UK, in the 30-year period since the mid-1980s, is not achieving, on average, the levels of expenditure in research and development that we are seeing in G6 economies, and I think that is another cause for concern.

So, what is the summary so far? It is rather depressing, on this glorious day. Total factor of productivity is low, our capital stock seems to be low as a result of low levels of investment, our public investment may well be low, and our R&D may well be low. I am not actually telling you anything particularly about a model, I am not telling you what economists may call K-star or I-star, what the appropriate levels are. I am just making some simple observations based upon the data that is in front of us. I could do something more, but I think these kinds of results will come out from all kinds of analyses as well.

Let us go a little bit further now into what we might call the number of post-War errors that undermined the industrial infrastructure policy that we see. In the next few slides, I draw heavily on work by Nick Crafts, so I want to thank him for all his insights.

I think it is clear that supply side policies can matter, but there need to be appropriate incentives to invest and innovate, and that is very much about tax, very much about a financial sector that is prepared to support innovation in a particular form, but I am using these words because I am summarising a large amount of literature that seems to suggest that these kinds of results are appropriate. So, we could make the statement that

supply side policies do not matter, if we did not find a role for investment or coordination or policies that – I will come to a phrase later on – policies that allow firms to plan over the longer-run. But, consistently, we find that these things do matter.

What we had instead, as I have already said, is the concentration on short-run stabilisation policies, and these were pursued, for those of you who remember, in a form of consensus, where there were income policies designed to promote full employment, in cooperation with trade unions. Now, this may not have been a bad outcome in the post-War period. In earlier lectures, I have talked about the Beveridge Report and the need to provide full employment and opportunities for people, and those kinds of issues are tremendously important and things that we shouldn't forget as we forge a new economy. But to the extent to which public resources or public minds, public thought was concentrated on those questions, we may have avoided the longer-run structural questions that I want to talk about today or have been talking about today.

As a result, we can point to contributory negligence in taxation, particularly taxation of capital returns, and perhaps, at times, inappropriately high levels of income taxation as well, which worked against incentives to innovate and invest. Despite trade union cooperation, industrial relations in this immediate post-War period were not ideally what we would have wanted them to be. Let me not go any further, but many, many days were lost to strikes throughout this very long period, despite trade union cooperation over a full employment regime. Industrial policy, I think, was largely let down over this period. Forms of nationalisation were essentially backward-looking to protect declining industries rather than forward-looking in terms of providing new industries with time to grow. There was the spectre of some form of protectionism itself, which itself was not something that was helping innovation in the way that we would want.

So, I think, overall, we can talk about an adverse impact, either because of errors of commission or interaction with an institutional legacy, which was this consensus about labour and capital and trying to minimise disruption, and perhaps what the economy needed after the War was some disruption to bring about new practices and new methods of doing business.

What are the problems of industrial policy that I've alluded to? Well, I think, historically, producers, those people that are out there producing manufacturing goods or whatever they are doing, are long-lived institutes, with large amounts of resources, and they are in a position to lobby Government in a particular way that consumers generally cannot, and so what you will have is, other things being equal, this policy, if we are not careful, may be designed to support producers who are long-lived, rather than new producers or new firms or consumers, and there is certainly an element of that industrial policy in the post-War period.

If there is going to be more lobbying by producers, which kind of firms will be lobbying? Well, it is going to be the older ones, often the ones that have suddenly started to become unprofitable. They are going to say, "Conditions have changed, we can no longer be profitable, please, Mr and Mrs Government, can you help us please, if you don't mind, thank you very much, Sir?" That is what I think we tended to see. And those who are still winning are not going to look for subsidies or industrial support, they are going to say, "We're fine, we don't need to spend our resources doing this, we will carry on with what we're doing". In fact, when we consider the financial sector, that might be exactly what we saw there as well. When it was making lots of money in the period up to 2007, it did not want any interference by the Government at all, but as soon as the music stopped, there was a tremendous amount of support from the Government, so we might think about the financial sector as also an aspect of industrial policy that reflected the paradigm that I am talking about.

So, what do subsidies do? Well, to put it in very stark terms, it stops declining industries from dying. It sustains them, keeps them in operation, keeps their capital employed, keeps labour employed in firms that have low levels of productivity, and may lead to what has now been called a "zombie firm problem", but certainly was not called that in the immediate post-War period.

Once politicians have got involved with a firm, they are going to be quite slow to admit their failures. I would not like to comment on the quality of politicians. They are very high in my esteem of course. But, when they have invested their own political capital in a firm, they may wish to continue to show it is been a great success,

rather than saying, "Actually, this has not worked – I am going to move away from it", and that is something we tend to see once the political system gets involved in a firm: that support may remain far beyond its actual requirements in terms of the economy itself.

So, what happened in the 1970s? Well, we saw exactly this, a bias towards providing subsidies to industries that were in decline, some moves towards tariff protection, for exactly those same types of industries. The subsidisation of new high-tech companies in civil aircraft, computers and nuclear power didn't work terribly well in this period. The subsidies that were made available for investment, as I think I have just shown, did not actually help increase the level of investment or, as a result, increase the capital stock, so it did not actually bring about its objective, it just led to a dead-weight loss in Government expenditures that were financed by future taxes, that all of us in this room have to pay. But that said, amongst all the losers, perhaps helping Rolls-Royce was a success because, in the end, it managed to correct itself. So, the difficulty here is choosing and deciding which interventions are going to work and which ones are going to fail. That there was one success does not mean that the whole policy was necessarily a success; but that there was one success would also imply that it is not always right to say no – there may be circumstances in which you want to provide some support. I suppose that is what makes political decision-making so hard.

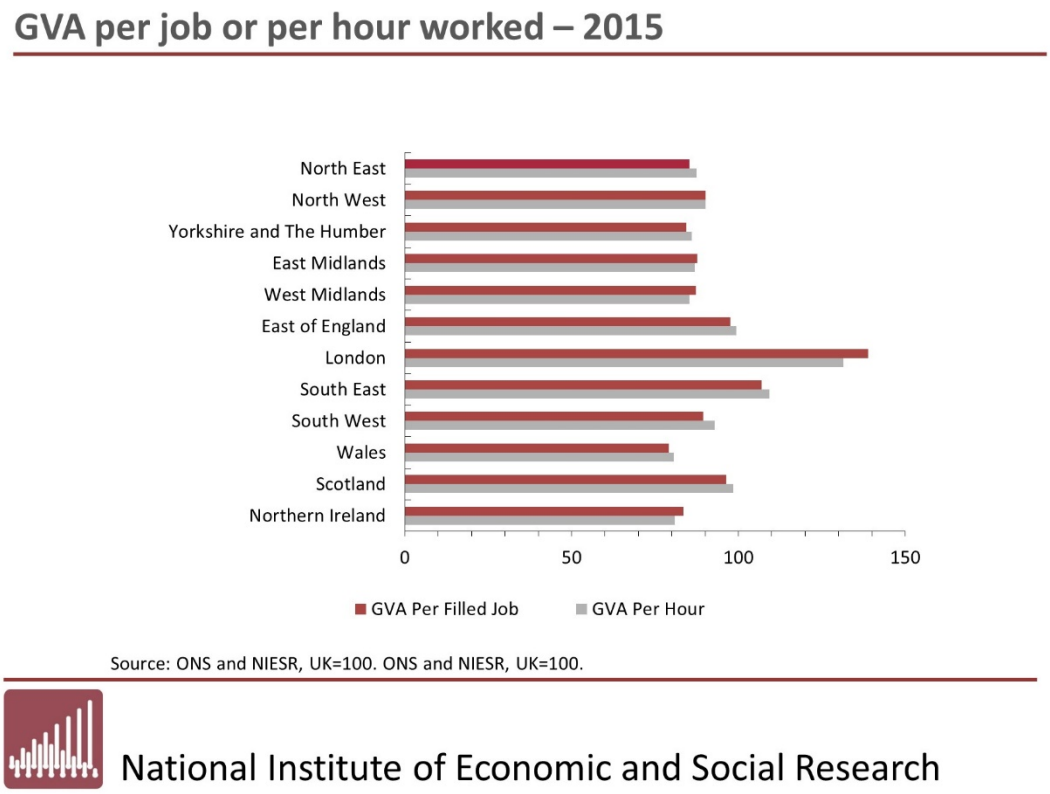
So, what happened in Mrs T's decade? We went from selective and individual firm type industrial policies to something more horizontal to try and reform the whole industrial sector, so it would be easier for industries to help themselves. But the concentration was very much on the strengthening of competition, where possible - development of all kinds of Monopolies & Mergers Commission, competition policy - that would improve the lot for consumers, by reducing monopoly power where possible, that was the idea. There were of course a number of industrial relations reforms, an extensive programme of privatisation, movement away from state-ownership of firms towards their ownership by the private sector, some restructuring of taxation, with more emphasis on indirect taxation, and simplification of income tax, fewer income tax bands, and the benefit to wage ratios were reduced, in principle making it more attractive to enter the labour market. And so, we can see, the policies that were implemented in that decade were very much about moving away from support for producers to more opportunities for consumers and to encourage the participation of workers in the workforce, a very different form of supply side policies than just supporting firms that were already in existence.

But the programme was not complete. Tax reform was incomplete. We did not properly consider wealth, property and local taxes. Indeed, our attempt at property and local taxes, the Poll Tax, did not end very well at all. There was a fundamental underspend on infrastructure. The quality of state, further and university education was not particularly well addressed in this period. The increase in tertiary education happened much later on, and, arguably, might have been concentrated on the wrong form of tertiary education. I think we are still suffering from a lack of reform in land-use planning in the UK. But all of these reforms did not address an endemic problem of short-termism, short-term planning, either by industry or by financial markets. That rails against the development of industry and infrastructure. Short-termism seems to continue to be a problem.

What happened in the next period, the early 1990s through the period prior to the crisis? It was a reasonable performance, as I have already outlined, in part as a result of those reforms I have just outlined for supply side, but the performance in that period was reasonable rather than outstanding. The expansion that we did have in 1992 to 2007 did not seem to be sustaining, insofar as what has happened subsequently is that we have gone sideways as an economy, so, clearly, the reforms that we had were not sufficient to bring about robust growth in the economy. We have some supply-side reform, with flexible labour markets, and the flexible labour markets were very helpful in the period after the recession because it meant that people showed real wage flexibility, and the participation in the labour meant, alongside low interest rates, we did not see very large-scale defaults on housing mortgages, that people would continue to be able to pay their loans, which – it may have seemed like a very large shock to the economy in 2007/8, but had we had much higher levels of unemployment, without the real wage flexibilities that we saw, I am pretty sure that the size of the shock would have been larger and even more persistent. It is very difficult to prove, but I am just suggesting it to you as a clear possibility.

So, what was good? Competition regulation has been good. Education and taxation still need reform. Innovation policy continues to be disappointing, and infrastructure policy and land-use planning has continued

to be poor. In the period prior to the financial crisis, as I have already said, our large and, may I just say, under-regulated financial sector seemed to contribute a lot to that period. A lot of what it might have been doing was simply recycling savings from abroad, in a fairly simple manner, back to people who had collateral in their housing, and, subsequently, we've discovered that that sector was not sufficiently well-regulated. That is a question for another time.



What has this all meant for the state of the economy? Well, on average, as I have said, productivity and income per head has not performed very well in the UK over the long-run, and over the most recent period, compared to other advanced economies and our G6 neighbours, and, also, significant regional heterogeneity in outcomes. If we look at the average gross value added, GVA, gross value, so that is the amount of extra output you produce compared to the costs of your inputs in your economy, if we normalise that to 100, if we look at the regional level, only London and the South-East outperform the average, and we can see that areas such as Wales are as low as 70% of the national average. So, whatever performance we have had either has been poorly distributed across the economy or – and I think this is another important part of the prospect of the underlying causes – because we have not thought hard enough about creating opportunities across the country, that has tended to drag the average down, and I think that is a critical part of the case that we would want to make here, is to think about how we can get these places being more productive.

Gross Value Added (Selected regions)

Region	GVA per head [UK = 100]	Region	GVA per head	Region	GVA per head
Edinburgh, City of	146	Cambridgeshire CC	115	Peterborough	109
Aberdeen City and Aberdeenshire	145	Hertfordshire	115	Nottingham	109
Belfast	138	Greater Manchester South West	110	Leeds	108
Cheshire East	128			Derby	108
Glasgow City	127			Warwickshire	108
Manchester	127			Shetland Islands	107
Solihull	125			Cheshire West and Chester	106
Warrington	124			Bath, N Somerset and S Gloucestershire	106
Bristol, City of	122			Mid Lancashire	105
Swindon	121			Gloucestershire	102

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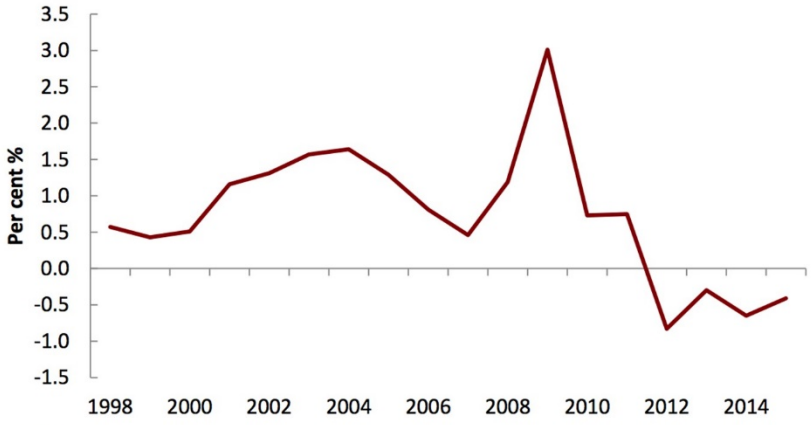
But the story even here, at the regional level, is more complicated. We can look at cities. We can look at city areas or we can look at regions within the areas that I have just described, and in every part of the UK where the average region is below the UK average, we can still find pockets that are above the UK average – so, Peterborough or in Cheshire or Bristol or Manchester. As a region, their average productivity is below the average of the whole economy, but within there, there are pockets of very high productivity nevertheless. And so, it is as much about thinking about how we can raise the regional productivity through developing the influence of these particular pockets of urban productivity that could raise the productivity of those areas as well. So, at the national level, we are very much concentrated on London, and many people would argue London is an engine of productivity growth for the rest of the country, but there are clearly areas, such or Edinburgh or Aberdeen, we know the reasons why, or Belfast, that could act as conduits for raising productivity in those regions as well. That requires some thought as to how that can be the case. You need to direct activity towards those particular cities or urban areas within low-productivity areas themselves.

Growth in Net Capital per Employee

Figure 4: Growth in net capital stock per employee, 1998 to 2015



Source: ONS.
Note: Reference year: 2013

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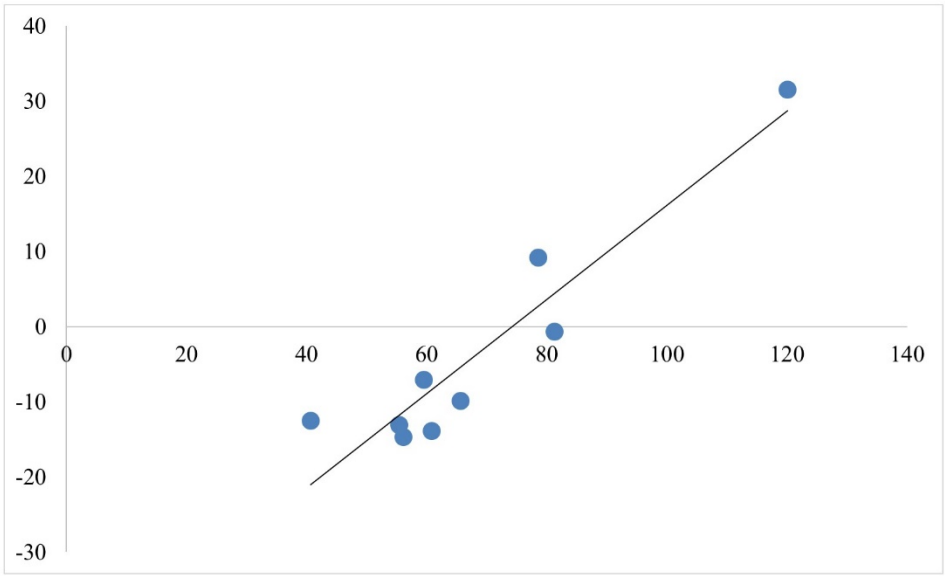
If we go further and try to understand what this all means in terms of the capital we have per employee, we see that that has actually been contracting since 2011. So, think, again, I am an employee, I want to produce a widget, how many widgets I can produce may depend upon the amount of capital I have available to me. If that is growing over time, I can be produce more widgets for every hour that I work. But, actually, I am seeing that it is contracting in this period, and that is also an important part of the problem facing the economy. How can we get more capital into employees' hands? Now, there is a lacuna to this point in the extent to which large amounts of capital may now be intangible – think of the internet, think of how that works, and it could be that we can be very productive without capital alone. But I think the stark reduction in capital available per employee, I think, is part of the story. The capital, again – I cannot do this regionally at the moment, but if the capital, again, is concentrated in the South-East and in London, rather than being distributed throughout the country, you see something else that is driving regional heterogeneity in performance, and it it is driving regional heterogeneity in performance, it may well be acting to drag down the average performance of the whole country.

Regions: English House Price Rises versus Relative Productivity



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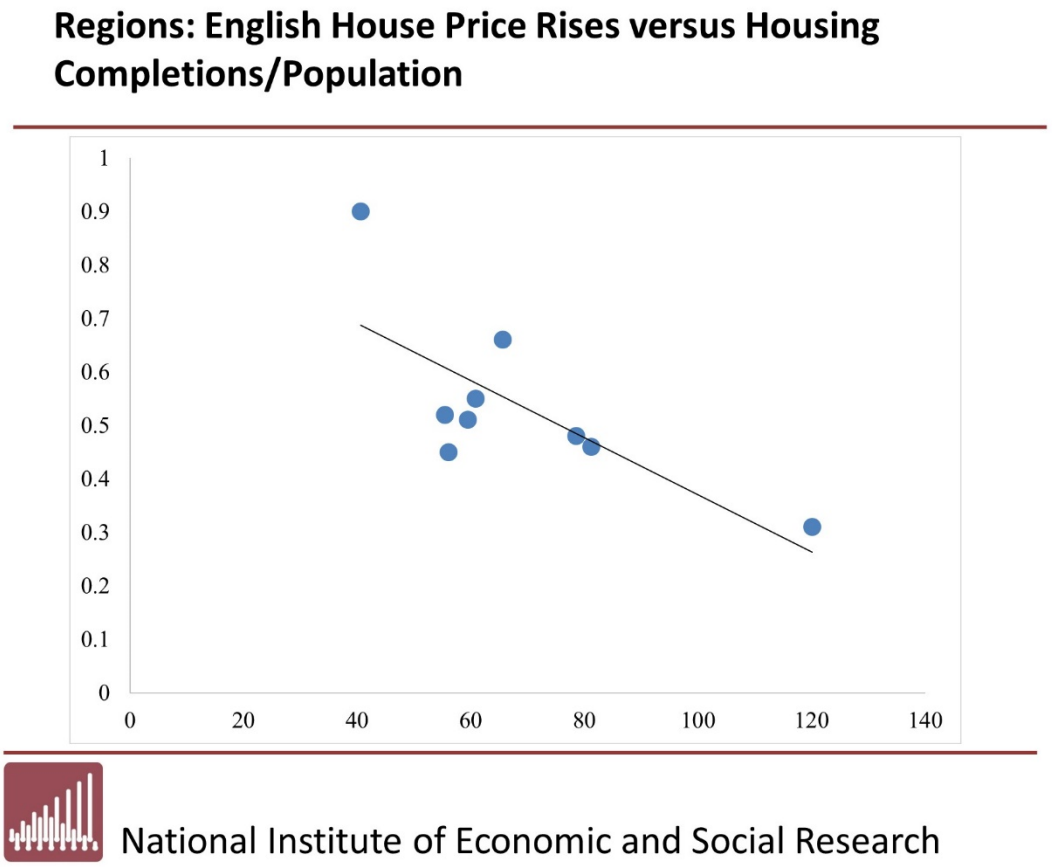
And so, how can I convince you further that regional outcomes matter for things that matter to us? Well, here, on the x-axis, I am plotting the nine UK regions, the increase in house prices in the nine UK regions over a 20-year period, from 1996 to 2016. So, you can see, in one region, house prices in that period have gone up by 120%.

The x-axis is the cumulative increase in house prices from 1996 to 2016, for the nine English planning regions, and the 120 corresponds to one region that I have mentioned a number of times – Can you guess which region it is? It is London.

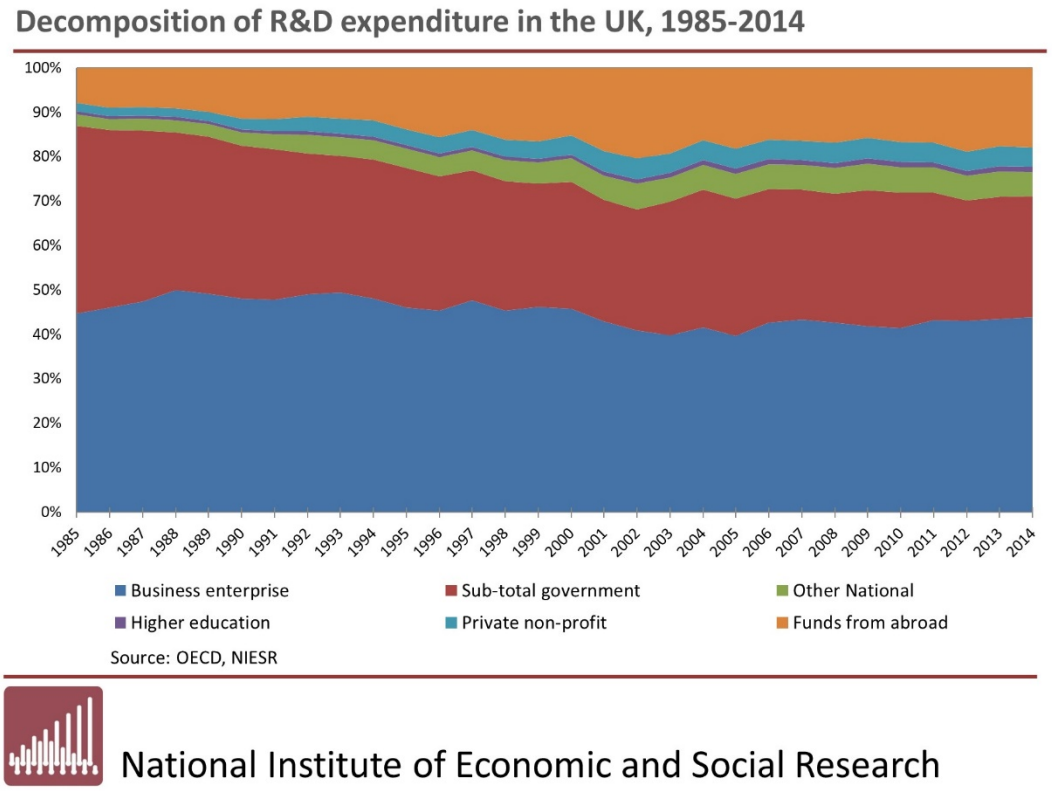
On the y-axis, I have simply taken that chart I showed earlier on on productivity and taken away 100 from all those numbers, so that the number that's between 30 and 40 is London because it's 30% or 40% above the UK's average, and that is a snapshot of 2015. So, what we are able to see is, statistically at least, it is a pretty tight relationship, in that the areas for which we seem to see high levels of productivity are also areas in which house prices have risen the most. Now, productivity may be very closely linked to wages, may be very closely linked to income, and therefore, it is kind of saying that the supply of housing may be fixed, the extent to which we're feeling better-off in those regions has driven up prices.

But here is the rub. Let us suppose every region had had the same level of productivity, that there had not been this very large difference in productivity because of the allocation of capital, the allocation of labour and the accrual of total factor productivity, that we had had policies to even these things out, and I am just transferring all the things in the economy to the impact on house prices. As I have said many times in these lectures, as I go around the place, that is all anyone ever wants to talk to me about anyway, so I might as well just put everything into the filter of house prices. And you would have this interesting result, that if there had been no difference in regional productivity, the zero line, and just to help you here, I mean, if everyone had the same level of productivity, this simple regression would be telling us that house prices across the country, on average, over that 20-year period, would have only gone up by 70%, and we wouldn't have the much larger differences that are creating barriers to mobility and creating intergenerational barriers to people establishing their lives. So, the

point about regional heterogeneity matters, and the inability of infrastructure to even out these consequences matter for prices, which matters for wealth and matters for life chances.



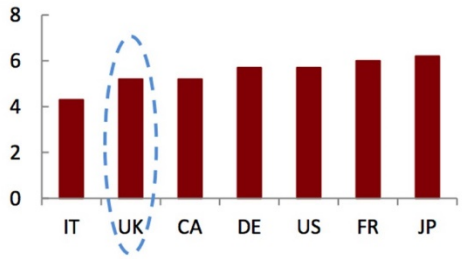
Let me go further. Here, we have, on this axis, exactly the same numbers, so that is the increase in house prices over a 20-year period in the nine English regions, and here we have an index of housing completions relative to the population in that region. So, just to help you out, what is going on here is that, in this particular region, where the number of house completions was almost the same as the change in population, it was almost one, house prices rose by the least amount, and in the areas where the completions were low relative to the increase in population, the increase in house prices was highest. So, what does that tell us? It tells us that policy, apropos completions - land-use, construction, building of roads that helps those things to be completed – again, would have mitigated against the increase in house prices, if it was done across the country. In fact, one could almost say if we had built as many houses as the increase in population, actually, there would not have been any increase in house prices. But I am simply making another point that infrastructure matters. The infrastructure would have changed the composition of house prices and reduced some of the rigidities in the way that the economy can move, both at a moment in time, that is regional movement to the where the jobs are, the location of firms becomes a lot easier in that world, and intergenerationally, how the next generation has to cope with the problems that it faces, if these prices had not moved by that much.



I do not want to make the case today, and I never would, that the whole of the problems that we face are all about the public sector. When we look at – this is a simple decomposition of research and development expenditure into private and public, essentially, and what I just want to say is that there is as much private as there is public, in the sense of which if we look at – this is Government, and some of it is private, non-profit, but they both matter. So, we think of worlds in which we are not – I'm not arguing today that all R&D should be done by the private sector or all R&D should be done by the public sector, but R&D in total seems to matter. What we need to think about are worlds in which both of them can work together, and of course, to some extent, the university sector may well be an area for that to be thought through fully.

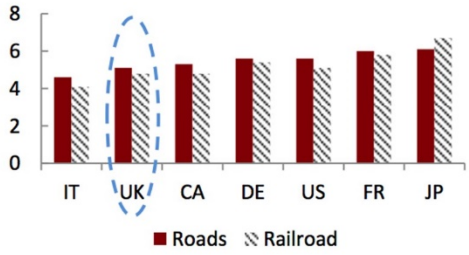
Quality of Infrastructure

Figure 1: Perceived quality of infrastructure spending



Source: The Global Competitiveness Report, 2016-2017
Notes: The scale ranges from 1 to 7, with 1 denoting the worst outcome and 7 the best.

Figure 2: Perceived quality of roads and railroad infrastructure



Source: The Global Competitiveness Report, 2016-2017
Notes: The scale ranges from 1 to 7, with 1 denoting the worst outcome and 7 the best.

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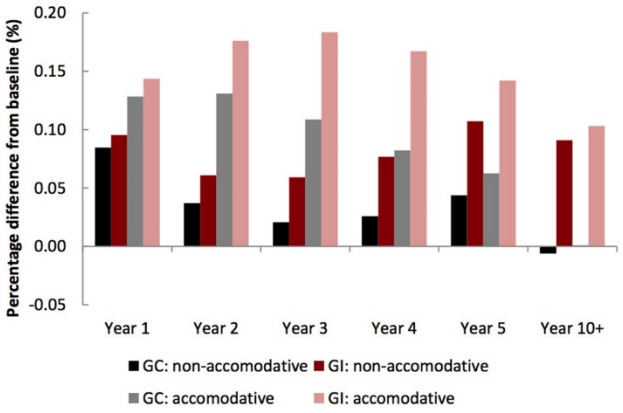
What is the overall, as a result of that, the quality of the infrastructure in the UK? Well, this is just a report from something called 'The Global Competitiveness Report', and it looked at the G7 counties and said, "What's the quality, looking across all our infrastructure in the UK, compared to other G7 countries?", and, sadly, we are in the bottom couple of countries. The index here – I am not convinced completely that these numbers are significantly different from each other, but the perspective here is that the quality of infrastructure is poor, and in line with the previous results, I think I am trying to show that it has tangible important problems for the economy as a result and improving the quality of our infrastructure would help economic outcomes.

Government Investment Impact

Figure 5: Response of UK output to a fiscal expansionary shock



Source: NiGEM simulations.
Note: GC denotes government consumption; GI denotes government investment. Accommodative denotes that the central bank does not change interest rates for the first five years of the simulation, while non-accommodative denotes that the central bank reacts immediately to developments in the economy.

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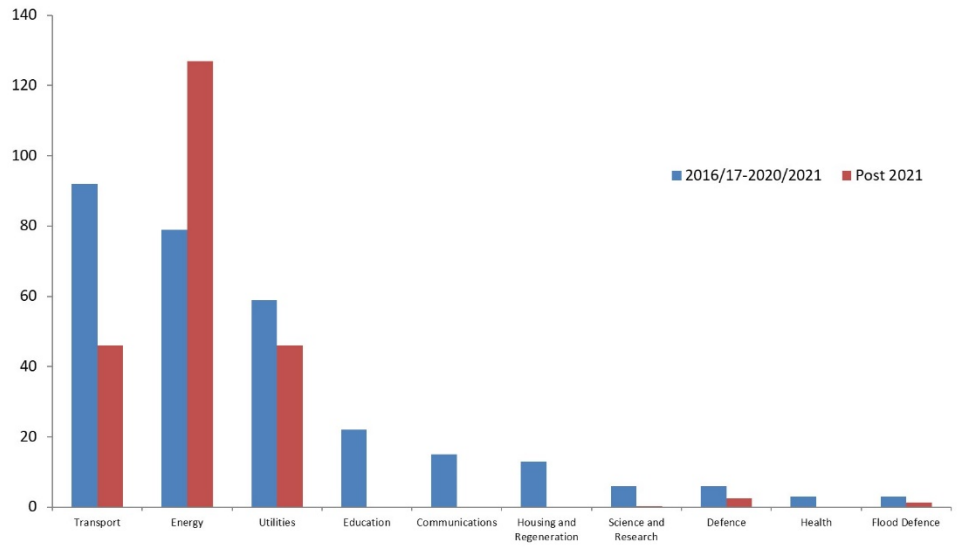
What happens in an economy if we use Government investment to increase infrastructure? Well, we are running some simple simulations here, which is a 1% shock to Government expenditure for a five-year period and trying to understand the impact on output as a result. These are different responses, depending upon whether the Monetary Authority interest rates rise or do not rise in a particular way, but what I want to say is that what you see is that, in general, the responses are not terribly large. For a 1% increase, you are seeing something smaller in every year than 1%. This is what we find time and time again in aggregate data. You may remember a debate four or five years ago on the impact of extra Government spending at the time of recession and whether every pound spent by the Government would have more than one pound impact on the economy, the so-called, and famous, multiplier. But when you run these kinds of simulations, you do not see those kinds of reactions, and I think there are two reasons for that. One is, typically, models such as this are already working at close to full capacity, so the extra investment doesn't lead to any form of supply-side response. We have to ask ourselves: can we understand what would happen to the supply side if the economy had sufficient slack in it. That is one question. The other question is that most of these models and most of this work is constructed on aggregate data, and the aggregate data often washes out, does not allow us to see what happens in particular regions when they themselves may have sufficient capacity available to them. To the extent to which it washes itself out, we are underestimating the possible impact on supply. So, what we need, and we do not particularly have at the moment, are ways of understanding regional multipliers, and understanding how overall capacity may respond to such Government shocks when there is a lot of spare capacity in the economy. So, these are two things that I think, even though the simulations do suggest significant impacts, particularly if interest rates don't change – these are the largest impacts here, this pink line here, and this, overall, shows some significant effects, but they are not large enough to make the case compared to the actual cost of the investment. So, I think there are some limits to the modelling that we currently have available to us - more regional modelling and more ability to understand slack in the economy.

Infrastructure and Construction Pipeline 2016, planned investment by sector

£ billions, real terms (15/16 prices)



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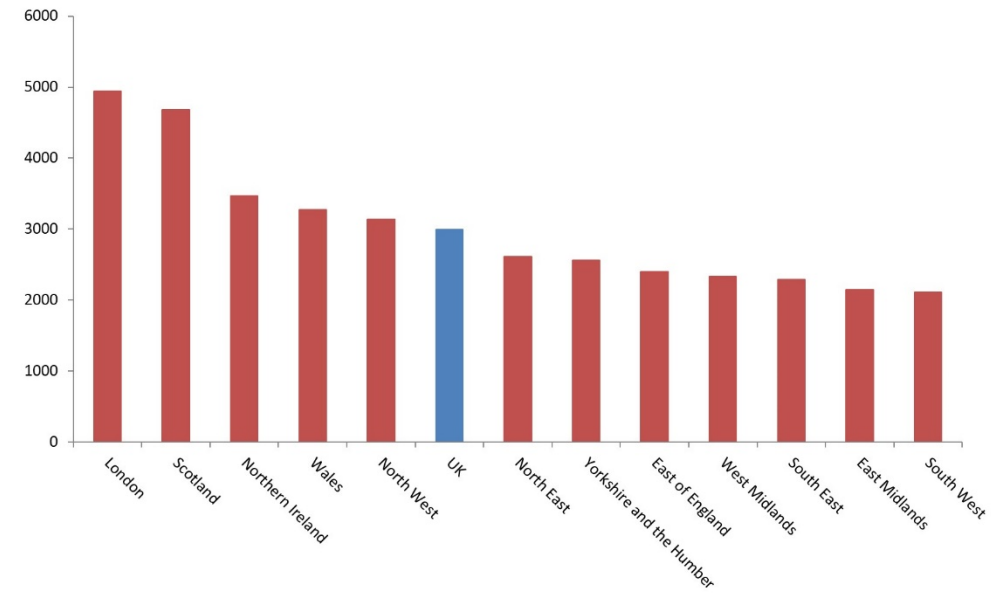
When we look at the infrastructure pipeline that is out there, a pipeline of planned investment from the National Infrastructure Commission, it looks high in terms of transport and energy, and also, post-'21, there seem to be a lot of plans for infrastructure expenditure, and our question is whether these will take us back to the levels we should be at. It looks like it is very much skewed towards transport, energy and utilities, and very few commitments, in the medium-term, to science and research, housing and regeneration, health and education – seem to be pretty profound gaps in the plans in the immediate period. So, there seems to be some lack of attention to those areas when we look at the plans published by the National Infrastructure Commission.

Public Spending on Infrastructure by Country and Region

£ per head, 2011-12 to 2015-16, excludes spending incurred for UK as a whole



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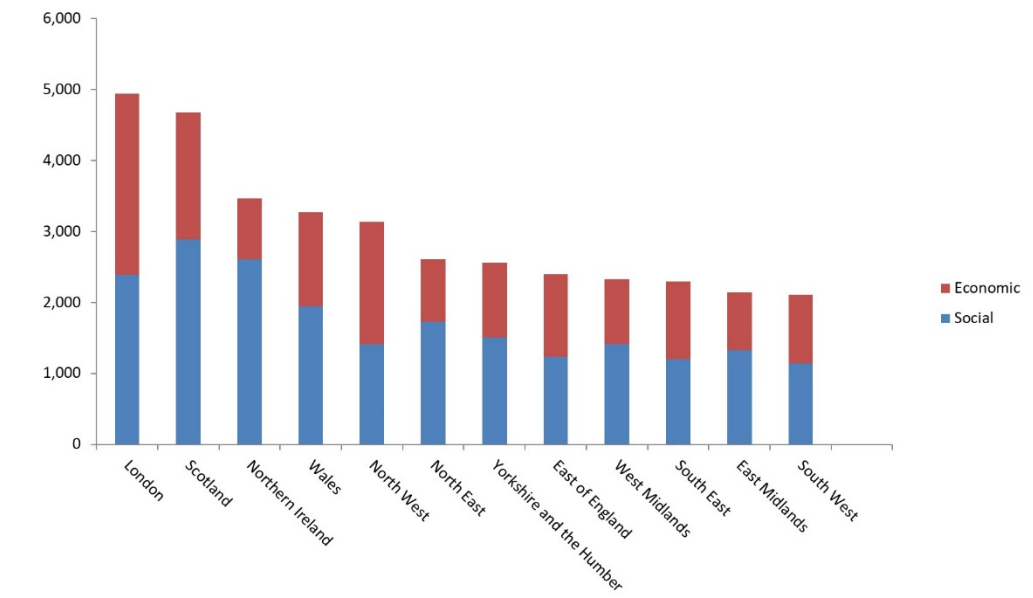
Furthermore, if we look at public spending on infrastructure by country and region, in the four or five years in the first part of this decade, at about £3,000 over that period, it is not far above what we get from the NHS per person per year. It looks relatively low. I am not going to give you any metrics here and I am not going to make a case for how much needs to be done. I am simply making the case that it looks low. What I also see is that…to what extent is this reinforcing or off-setting the regional differences that I have talked about earlier on? The largest slug per head is going to London, which is already ahead of everywhere else. But we are seeing more perhaps being sent to Scotland, Northern Ireland and Wales, which were behind the average, so the extent to which this policy may be off-setting or amplifying differences is not clear to me at the moment.

Public Spending on Infrastructure by Country and Region

£ per head, 2011-12 to 2015-16, excludes spending incurred for UK as a whole



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We can split that same number by economic and social expenditure, and you see that a large amount of what is going to the regions, Scotland, or the Celtic regions, Scotland, Northern Ireland and Wales, is very much more social than economic, so it may not be helping their economies over the very long-run, more concentrated on social issues. So, I think there are some clear questions there as to the way to which public expenditure or public spending on infrastructure is going to be allocated across our regions as we move ahead.

To conclude, the case I am trying to make for Britain, there has been persistent and chronic productivity failures that I think are both national and regional. In theory, in the kind of spontaneous theory that many of us have at the back of our mind, we may think that recessions create spare capacity and a chance to re-allocate factors to new industries and new innovations that will provide dynamism into the future, but the regional performance suggests that that is not what has gone on since the start of the financial crisis or necessarily in the post-War period. It may well have been reinforcing differences in productivity, so there may be some need to coordinate some of the action to allow resources to catch up in those areas. As a consequence, we see substantial differences across firms, regions and sectors, which are manifest in things such as the allocation of FDI and house prices, and it's something that needs to be addressed. Indeed, times may even be worse. Our high-growth industries in the long expansion – financial services, telecoms and some manufacturing industries – are no longer supporting aggregate productivity growth since the start of the financial crisis. So, the things that helped us catch up from the mid-'90s to the mid-'00s are no longer helping us anymore. They seem to have possibly hit their own capacity constraints or are suffering from a chronic lack of infrastructure expenditure, so the issues that ned to be addressed. Overall, subdued demand in the economy, lack of confidence in the economy, a banking system that is in a period of retrenchment and reform itself, may be adding to these constraints and making firms less dynamic than we'd otherwise or prefer them to be. So, there seems to me to be a first-order case for the Government to pick up this problem by the scruff of its neck and try and attack it. I am not convinced that we have done so yet.

So, I am concerned, and I am sorry to cause you to be concerned about the future, but at the bottom of a pint of beer, things never seem quite so bad. It is tempting to remember Yeats, and that things can fall apart if we are

not very careful: "Turning and turning in the widening gear, the falcon cannot hear the falconer, things fall apart, the centre cannot hold, mere anarchy is loosed upon the world". Let us hope that does not happen. But I am concerned that, time and time again, we have not addressed these structural deep issues, that the regional economy needs thought, careful thought and design, and if we do not act upon these things, we may find the economy continuing its relative decline at a rate that would alarm us.