GLAECONOMICS

Working Paper 8: The GLA's Submission to the Treasury Select Committee Inquiry into Regional Productivity

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Executive Summary

This submission considers the Government's Public Service Agreement (PSA) target relating to regional policy: **the aim to improve economic performance of all regions and reduce gaps in growth rates between regions.** These are measured in terms of output per head in the regions. This submission begins by reviewing this measure and alternatives that might be considered.

Output per head is not a measure of productivity. A productivity measure would need to reflect the inputs being made into production. The most commonly used measure is labour productivity, but many economists prefer to measure productivity by controlling for other inputs, such as capital and materials.

This approach, known as total factor productivity (TFP) has data difficulties even at the national level. At a regional level, it will not be possible to consider measuring TFP for some years. Even labour productivity poses challenges, given the way that data is collected.

In particular, productivity ought to relate to workplace activity. This is a particular issue for London, where 723,000 people commuted in from outside to work each day in 2001. Including the output of commuters into London raises output in the capital by 16 per cent. The Government's target does not specify whether residence based or workplace based data should be used, and indeed commuting issues are assumed to be unimportant outside London and its surrounding regions.

The data difficulties make it hard to be sure that rankings are reliable, where differences are 5 per cent or less, although it is clear that London has significantly higher productivity than the average.

Also, it is crucial that wider measures are used than just inter-regional comparisons. These obscure intra-regional distinctions. Moreover, London differs from all other regions in being entirely urban and this too is important for comparisons.

While the first and second parts of the target assess actual regional economic performance, the third part of the PSA target addresses the policy issue of how to improve regional economic policy. This submission reviews the drivers of productivity increases. A simple redistribution of activity may well have perverse consequences. For example, spillovers of knowledge are very important in driving research and development, and innovation. Dispersing institutions can undermine such spillovers and prevent innovation which would itself generate benefits for the country as a whole.

Investment in infrastructure is another example where spending in a leading region has benefits for the country as a whole, both in protecting an existing world class set of activities, allowing for projected growth to be possible and in generating substantial tax revenues which can be transmitted elsewhere in the country.

London makes a substantial net tax contribution to the rest of the country. This is not to argue that this is inappropriate – a region that is well-off, on average, would be expected to make such a contribution. Rather it is to show the scale of benefit which enhancing London's growth makes.

Analysis that suggests that each sector and industry has an impact multiplier should be resisted. While tracing through linkages – such as in input–output analysis – is useful and important, it is an error to think that these are set in stone. If particular activities move on, their suppliers and employees often find other activities and clients.

In conclusion, it is important to move away from too simplistic an approach to the issue of regional productivity. Understanding the drivers of productivity is key and this, together with the need to consider the social rationale for regional policy, suggests a small group of indicators should be identified to underpin government targets.

Introduction

The Treasury Select Committee has decided to undertake an inquiry into regional productivity, including the progress made towards achieving the Government's regional PSA target.

This submission to the Committee's inquiry reviews the PSA target and measures of regional productivity, especially the quality of the data that underlies these measures. It considers regional differences in output or GVA per head and productivity and discusses the drivers of regional productivity and the potential importance of regional spillovers. Finally, it assesses the regional distribution of public spending and taxation with particular reference to London.

The Government's Regional PSA Target

Government policies designed to address regional economic and social disparities date back to at least the inter war period. These concerns continue to the present day. The Government's 2002 Spending Review (SR2002) included a PSA target relating to regional economic performance.

The precise wording of the SR2002 regional PSA target is as follows:

> Make sustainable improvements in the economic performance of all English regions and over the long term reduce the persistent gap in growth rates between the regions, defining measures to improve performance and reporting progress against these measures by 2006.

The target thus has three strands:

- To improve economic performance in all English regions
- To reduce the gaps in growth rates between these regions
- To define measures to improve regional economic performance.

The third part of this PSA target is rather different from the first two parts. It implies both the provision of a better evidence base and the establishment of regional economic policies. This submission will cover all three parts of the target.

It is perhaps somewhat confusing that the first strand of the target is expressed in terms of 'economic performance' while the second strand is couched in terms of 'gaps in growth rates'. However, the technical note accompanying this target explains that both strands of the target will be measured in terms of the trend rate of growth in real Gross Value Added (GVA) (output) per head of population. Hence both of these parts of the target will be assessed in terms of growth in regional real output per head, so the Government's overall measure of regional disparities is output per head, rather than regional productivity.

Measurement Issues

Regional productivity measures

Economists traditionally calculate one of two measures of productivity – labour productivity and total factor productivity. Labour productivity is simply the amount of output divided by the amount of labour used to produce that output measured in terms of either the number of workers or preferably the number of hours worked as the same number of workers can work different hours and so supply different levels of labour input. However, this measure does not take into account increases in other non-labour inputs into production. Labour productivity may rise because of increases in capital or other factors used in production. For example, a clerk would be able to increase the speed at which they added up sales receipts from a company's retail outlets if they were given an electronic calculator compared to if they had to do these calculations simply by using pen and paper. For this reason economists have developed a measure of productivity that attempts to control for all increases in inputs into production – labour, capital, and other inputs such as materials. This measure is known as total factor productivity (TFP). TFP measures how efficiently all inputs are combined in order to a produce output.

Measuring regional productivity and output per head

Both output per head of population (the measure used to assess the Government's regional PSA target) and labour productivity are, in principle, simple measures to calculate as they are simply regional output divided by regional population and regional output divided by regional labour input (total regional hours worked or total regional employment). These measures thus require estimates of:

- regional output
- regional population
- regional employment or regional hours worked.

Measures of TFP are conceptually more complicated. Economists and statisticians use one of two approaches to estimate TFP. One approach involves dividing output by a weighted average of inputs used in production. The weights used are normally the share of total production costs attributable to that particular input. The alternative approach involves using advanced statistical techniques to estimate a production function, which sets out the relationship between output and the inputs used in production. Appendix A sets out this approach in more detail.

Regional measures of TFP would thus require estimates of the regional capital stock (and potentially estimates of other inputs on a regional basis such as energy and materials, if more complicated production functions than that outlined in Annex A are estimated) in addition to estimates of regional output and regional employment/regional hours worked as for labour productivity. Production function based estimates of TFP will also depend on how the production function is specified and this will in turn depend on the economic theory used to rationalise that particular formulation. Different economic theories can suggest different specifications for regional production functions. Given these additional data requirements to estimate regional TFP it is useful to first consider whether existing data is sufficient to

calculate meaningful estimates of regional TFP. In this regard, estimates of the capital stock are key.

Measuring the capital stock

Estimates of the capital stock are renowned for their weaknesses and this poses serious difficulties for the estimation of TFP even at the national level, let alone the regional level where data is generally much less robust. One significant reason why estimates of capital are difficult to produce is the assumptions that have to be made about depreciation.[1] The rate of depreciation varies between different sorts of capital assets and recent research has concluded that much of the difficulty in producing accurate measures of capital derives from the pattern of investment shifting towards assets with high depreciation rates, and so shorter asset lives, combined with changing relative prices of different types of capital assets.[2]

Another important problem is that not all capital goods are used at full capacity at all times during an economic cycle. At times of economic slack capital will not be fully employed. Unlike labour, which has a straightforward measure of the labour being used in production – employment or total hours worked – no similar measure exists for the proportion of the total capital stock being used in production at any given time.

The quality of the data on the UK capital stock has long been a cause of concern among economists. Recently the Office for National Statistics (ONS) has developed and published improved capital stock estimates for the UK economy as a whole. However, as of yet no regional measures have been developed of the capital stock. Thus it is not possible to currently estimate TFP on a regional basis and ongoing data constraints are likely to mean that it will not be possible or sensible to do so for a number of years to come.

Measuring regional output, employment and population

The discussion above has noted the importance of measures of regional output and employment. Currently ONS statistics on regional output have a number of limitations. Firstly, estimates of regional output or GVA are only available in current prices. This means that changes over time combine the effect of both regional inflation and real regional economic growth. This obviously seriously inhibits any analysis of developments over time in regional output and productivity. Secondly, regional GVA is produced using income data. At the national level, GDP is measured on three bases – income, expenditure and production and the income measure is generally considered the least reliable method of estimation.

The GLA Economics submission to the Allsopp Review of regional and other economic statistics emphasised that immediate priority should be given to the construction of annual real regional GVA figures, and that these should be produced on the production basis.[3] The first report of the Allsopp Review contained recommendations endorsing these proposals.[4]

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[1] Depreciation is the reduction in the productivity and value of an asset through wear and tear.
[2] N Oulton and S Srinivasan, Capital stocks, capital services and depreciation: an integrated framework, Bank of England Working paper 192, 2003
[3] GLA Economics, Working Paper 5: Submission to the Allsopp Review, Greater London Authority, 2003
[4] C Allsopp, Review of Statistics for Economic Policymaking, First Report to the Chancellor of the Exchequer, the Governor of the Bank of England and the National Statistician, 2003

This is welcome, but obviously does not invalidate concerns over the existing limitations of ONS regional GVA data, as it currently exists.

Estimates of regional employment are also not straightforward. There are two sources of regional employment data: the Annual Business Inquiry (ABI) and the Short-term Employment Survey (STES) surveys of employers on the one hand; and the Labour Force Survey (LFS) survey of individuals on the other. There are also two distinct concepts of employment at the regional level. Residence-based employment measures the number of residents of the region who have a job. Workplace-based employment measures the number of jobs at workplaces within the region. These measures will differ from each other where there is commuting of individuals to work across regional boundaries. London is the most obvious case of large inter-regional commuting. Data from the Census shows that in 2001 723,000 people commuted into London for work and 236,000 Londoners commuted out of London to work. For the purposes of calculating regional productivity it is clearly workplace-based employment that is required.

The usual sources used to estimate workplace employment are the two employer surveys – the ABI and the STES. The LFS is primarily used to estimate residential employment, but it is also possible to estimate workplace employment from the LFS. Research commissioned by GLA Economics from Dr Peter Urwin at the University of Westminster indicates that there are large differences between the LFS and ABI measures of workplace employment at the regional level especially for London.[5] These differences obviously lead to concerns about the overall 'quality' of these regional workplace employment figures. It should be noted here that the ONS are aware of this research and have reacted very positively to the concerns it has raised and are actively seeking to address any problems with their regional workplace employment series.

The results of the 2001 Census also led some to question the reliability of sub-national population statistics. In particular, concerns have been expressed about underreporting the population in metropolitan areas – most notably Westminster and Manchester. Despite this, population figures at the regional level are generally felt to be reasonably accurate and generate less concern than regional measures of output and employment.

Comparing regional labour productivity

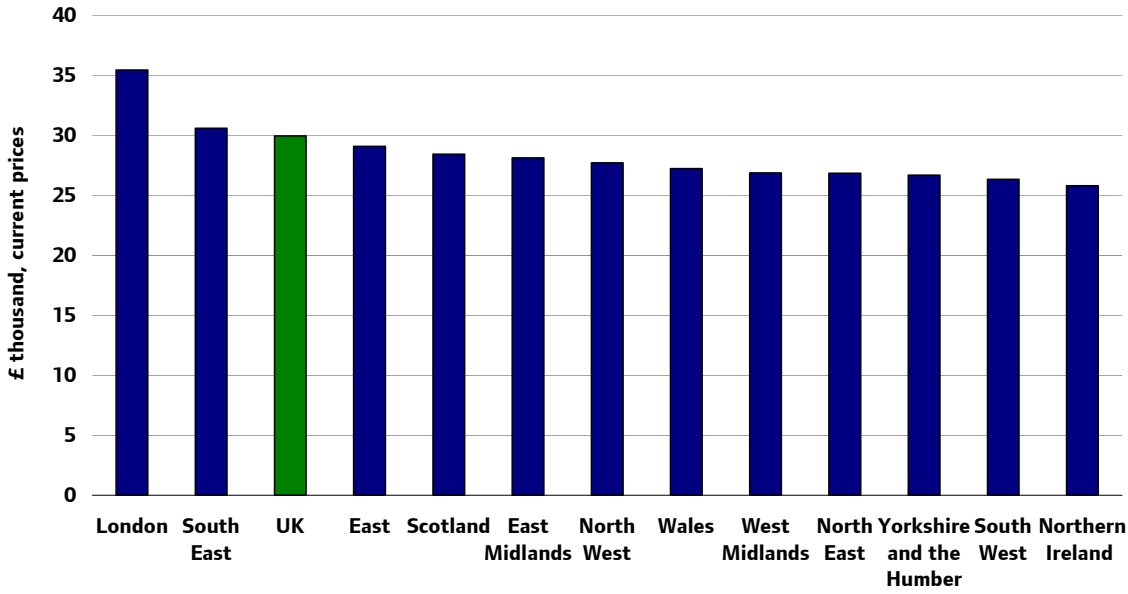
Given the data constraints outlined above it is useful to consider what conclusions can be drawn about labour productivity across the regions. We have noted that the lack of real regional output figures makes analysis of trends over time very difficult, if not impossible. The regional pattern of growth in productivity using output in current prices will be distorted by any regional differences in inflation.

Hence, the level of productivity can only be compared across regions at any one point in time. Figure 1 shows the level of productivity across the UK regions and countries in 2001. It is clear that the level of productivity in London is the highest of any UK region. In fact, the measured level of productivity in London is 16 per cent higher than the next highest region,

[5] GLA Economics, The GLA's London Workforce Employment Series, Greater London Authority, 2003. See in particular Table 4 on page 13.

the South East. The conclusion that London has the highest level of productivity of all the UK regions is probably a robust finding. However, some of the other rankings of the regions shown above are probably less well founded. For example, the measured level of productivity in the South East is just 5 per cent higher than that in the East of England so given the uncertainties in the data it is difficult to be sure that productivity in the South East is in reality higher than that in the East of England. Similarly, the measured difference between productivity in Scotland and Wales is just 4 per cent – too small a difference to be sure that in reality Scotland has a higher level of productivity than Wales. In general, with the exception of London being the most productive region, it is difficult to be at all confident about the precise rankings of any of the regions.

Figure 1. Regional productivity – GVA per worker



Source: GLA Economics calculations based on ONS data.
Note: GVA here is on a workplace basis.

An additional complication is the differing industrial structures between regions. As measures of labour productivity do not control for inputs other than labour then industries that are more capital intensive (such as manufacturing relative to services) will have higher levels of labour productivity. Hence, regions with an industrial mix more skewed towards capital intensive industries will tend to have higher levels of labour productivity than other regions, even if the level of productivity in individual sectors does not vary across the regions.

PSA target: Regional GVA per head

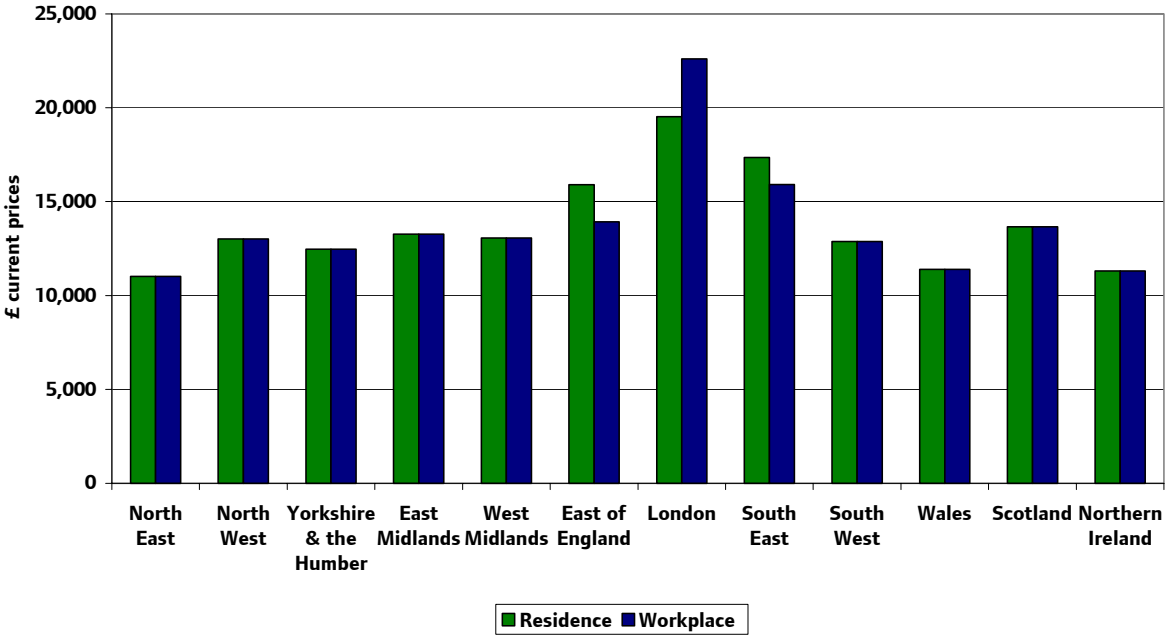
The ONS calculates regional GVA on both a residence and a workplace basis. Residence-based regional GVA allocates the output of commuters to where they live rather than their place of work, while workplace based regional GVA allocates the output of commuters to where they work rather than where they live. This difference has very significant implications for the measurement of GVA in London and the two surrounding regions of the South East and the East of England given the very considerable degrees of commuting between London and these two regions already noted.

Since the number of residents of the South East and the East of England who work in London greatly exceeds the number of Londoners who work in these two regions, it follows that London's GVA measured on a workplace basis exceeds that measured on a residence basis. In fact in 2001 in current prices London's GVA on a workplace basis was £22.1 billion, or 16 per cent higher, than its GVA on a residence basis. Mirroring this, in 2001 workplace-based GVA was lower than residence-based GVA by £10.6 billion and by £11.5 billion in the East of England and the South East respectively.

Outside London, the South East and the East of England, estimates of regional GVA on a residence and a workplace basis do not vary. This is because information on commuting patterns are used by the ONS to derive workplace based estimates of regional GVA from initially residence based GVA estimates. As past evidence suggests that net commuting between regions is only significant between London, the South East and the East of England, this adjustment is only attempted for these three regions. As for employment, workplace-based regional GVA is clearly the appropriate measure of the economic activity that occurs within a region, and GVA on a residence basis is a rather odd concept.

However, the technical note that accompanies the regional PSA target does not specify whether residence or workplace-based GVA per capita is to be used as the basis for assessing progress against this target. Hence Figure 2 shows levels of regional GVA per head on both a residence and a workplace basis. It is clear from Figure 2 that the level of GVA per head in London, the South East and the East of England is materially affected by whether it is measured on a workplace or residence basis due to the impact of commuting between these regions. Figure 2 also suggests there are three groupings of regions: those with relatively high GVA per head – London, the South East and the East of England on a residence basis; a middle grouping with GVA per head of around £12,000 to £14,000 on a workplace basis – North West, Yorkshire and Humberside, East Midlands, West Midlands, South West, Scotland and the East of England on a workplace basis; and a grouping with relatively low GVA per head below £11,500 – the North East, Wales and Northern Ireland.

Figure 2. Regional GVA per head – residence and workplace employment basis



Source: ONS

Choosing correct comparators

London is the only UK region which is entirely a large urban conurbation. This raises the questions whether the best comparator for London is other regions which have very different socio-economic characteristics, other leading cities such as Birmingham and Glasgow, or wider built up urban areas such as Greater Manchester or the West Midlands Metropolitan County.

Looking only at regional differences is insufficient for judging the needs of the regional economy. Regional comparisons can obscure very considerable intra-regional differences and patterns. For example, in spite of having a successful and vibrant economy London has significant problems of worklessness and poverty. London is a city which exhibits great disparities. The incomes of the wealthiest one-fifth of the population are more than seven times higher than the bottom fifth – in the rest of the country the difference is less than five times.[6] This is especially true of Inner London where 48 per cent of children live in poverty, compared with 30 nationally, and Inner London is 'by far the most deeply divided part of the country, with the highest proportions of both rich and poor people anywhere'.[7]

[6] G Thom and P Convery, Employer Engagement and the London Labour Market, Research Report No. 185, Department of Work and Pensions, 2003

[7] From G Palmer, J North, J Carr and P Kenway, Monitoring Poverty and Social Exclusion 2003, New Policy Institute/Joseph Rowntree Foundation, 2003

Implications for Policy

Sources of regional productivity

The Government's regional economic policy is focused on the long-term supply side task of building regional economic capability, rather than assisting areas that are in difficulty. The joint HM Treasury and Department of Trade and Industry report published in 2001 states that 'regional economic policy must be focussed on raising the performance of the weakest regions rather than simply re-distributing existing economic activity' and that 'a successful regional and sub-regional economic policy must be based on building on the indigenous strengths in each locality, region and country'.[8] In this context, the Government has identified five key drivers of productivity:

- skills
- investment
- innovation
- enterprise
- competition.

Modern economic theories of economic growth stress the importance of ideas or knowledge as the underlying driver of growth. However, they differ in what is posited as the primary conduit through which knowledge impacts on growth. Different theories respectively emphasise human capital or skills; innovation or research and development; or the embodiment of new knowledge in investment in new capital goods. These modern growth theories emphasise the importance of incentives for individuals and, or firms to invest in human capital, capital goods, and research and development. Incentives in turn depend on the extent of competition[9] and enterprise/entrepreneurship which can be seen as the ability of individuals and firms to respond to incentives. Hence the Government's five drivers of productivity have a solid base in economic theory.

However, in a regional context the relationship between these five drivers and productivity growth becomes more complicated because of potential regional spillovers. For example, innovation may be undertaken at a company's research and development centre in the South East region but the new product that results may be produced at the company's factories in Scotland. In this example, the productivity benefits of innovation in the South East spills over to Scotland. Similarly infrastructure investment in the road network in the East Midlands could potentially improve market access for companies in adjacent regions. So for example a company located in Liverpool in the North West region may be better able to serve customers in Derby. Very little is known about the extent of any regional spillovers although logic suggests that they could be considerable.

[8] HM Treasury and DTI, Productivity in the UK: 3 – The Regional Dimension, 2001

[9] The precise relationship between competition and productivity is much debated by economists. However empirical studies such as S Nickell, Competition and Corporate Performance, Journal of Political Economy, 1996, have found that increases in competitive pressures in an industry have positive impacts on productivity growth rates.

Spillovers

The possibility of regional spillovers has potentially significant and at times counter-intuitive implications for regional policy. A common call in the debate around regional policy is for measures such as 'regionalising innovation' by relocating research centres and redistributing government spending on research and development to regions that are seen to be 'lagging'. However, it is likely that the research centre targeted for regionalising is part of a local concentration of research activity and that spillovers of knowledge between the research centre and neighbouring institutions are very considerable and lead to the research centre being highly productive in the creation of knowledge. This knowledge is then widely diffused and much of the actual economic benefit of exploiting it accrues to 'lagging' regions.

In these circumstances actually moving the research centre to a lagging region, and away from the area where it can enjoy spillovers of knowledge from its neighbours, would reduce its overall production of knowledge and this could actually reduce the amount of economic benefit from it which accrues to 'lagging' regions as well as the growth rate of the economy as a whole. More generally the possibility of significant inter-regional spillovers means that policies to build up the regional economic capability of lagging regions and so reduce regional economic disparities need to resist the simple calls to redistribute economic activity, or government spending on areas such as innovation or skills to the lagging regions of the UK.

Infrastructure

London offers a specific example of where investment in a region is in the wider UK national interest. Transport investment is vital for the positive agglomeration effects of London to be maximised. Agglomeration and the tendency of businesses to cluster is a relatively well-accepted phenomenon.[10] According to research commissioned by the Department for Trade and Industry, the central London finance and business services (FBS) cluster is one of the most competitive in the world.[11] Access to deep skilled labour pools is one of the main advantages offered by clusters, and is frequently cited by companies as one of the top two factors in location decisions by firms, along with access to markets.[12] Service sectors, including the central London FBS sector, are particularly dependent on deep high-skill labour pools. The London FBS sector has a very high concentration of jobs in central London. However, unlike cities such as Paris, in London housing is highly dispersed over a large area. The combined economic geography of dispersed residential areas, but highly concentrated jobs density in central London makes good transport links crucial for London's economy.

The transport system in London is in such a poor state, after decades of underinvestment, that capacity constraints and associated costs are beginning to exert a serious deterrence effect on people and firms.[13] One in eight companies in the City and the central London

[10] See for example M Porter, The Competitive Advantage of Nations', 1990 or M Fujita, P Krugman and A Venables, The Spatial Economy, 1999

[11] M Porter and C Ketels, UK Competitiveness: Moving to the Next Stage, DTI Economics Paper No.3, 2003. See also Corporation of London, Financial Services Clustering and its Significance for London, 2003.

[12] See Cushman and Wakefield, Healey and Baker, European Cities Monitor 2003

[13] Oxford Economic Forecasting estimates that transport delays costs firms and individuals just in the City of London in excess of £230 million a year. See The Economic Effects of Transport Delays' on the City of London, Corporation of London, 2003

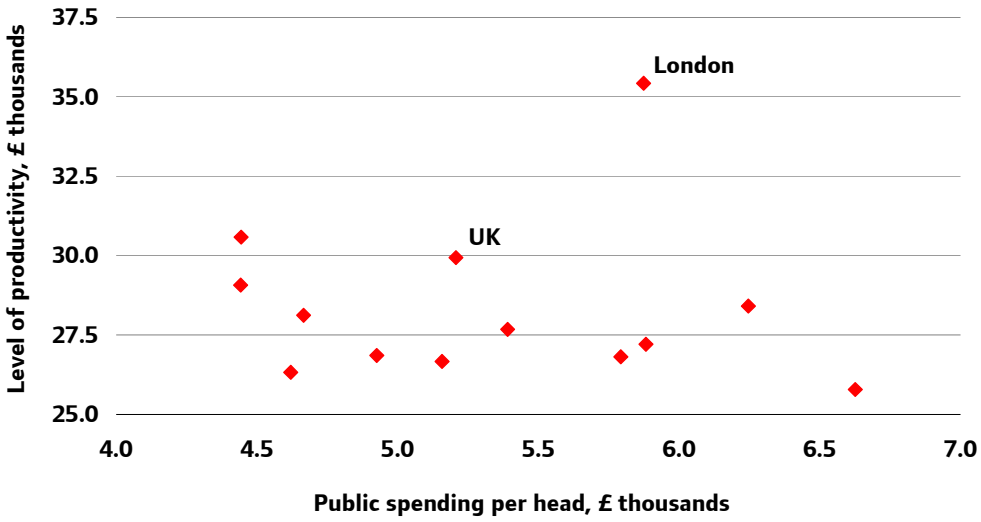
business district have reported that problems with transport have been a major factor causing them to move operations to another location.[14] These points matter because the financial and business cluster competes on an international stage. If firms from the financial and business cluster in London choose to relocate, they are unlikely to go anywhere else within the UK. They are likely instead move to other world cities, such as Paris or New York. Therefore London's loss is very unlikely to be a gain for another region of the UK. Instead, it will be a net loss for the whole of the UK. Further, since the government's aggregate tax take is around 40 per cent of GDP, the government will derive a substantial direct financial loss from any reduction in growth caused by firms in London locating to other countries in reaction to ongoing transport difficulties in London.

Regional distribution of tax and public spending

One issue that the Committee has raised in its call for evidence is the relationship between public expenditure in the regions and the effects of such flows on regional productivity. One obvious point is that causation runs both ways. Relatively poorly performing regions are likely to have more of their residents in receipt of social welfare benefits and this will boost the amount of regional spending in the region. But also some forms of public spending in a region can be expected to raise regional productivity. For example, spending on infrastructure in a region should raise regional (productivity) growth. (Note also that regional spillovers, as discussed above, mean that spending in one region may have positive productivity effects in other regions.)

Figure 3 shows the level of productivity across the regions in 2001 against the level of public spending per capita across the regions. No clear relationship between the level of public spending and the level of productivity is apparent, perhaps because as noted above there are likely to be both positive and negative relationships between the level of public spending in a region and its economic performance.

Figure 3. Productivity and public spending



Source: Public Expenditure Statistical Analyses (PESA) 2003, Corrigendum, Corrected tables for Chapter 8, June 2003, and GLA Economics calculations based on ONS data
Note: The figures for public expenditure are for identifiable expenditure on services only as set out in PESA.

[14] Oxford Economic Forecasting, The Economic Effects of Transport Delays on the City of London, Corporation of London, 2003

London appears as an outlier in Figure 3. This is at least in part a product of the great disparity that exists in London. London has many successful and productive sectors but along side this it has very significant social needs which lead to considerable social expenditures in London, such as low rates of employment among its resident population and very high rates of child poverty.

Despite London having a relatively high level of public spending per head, at least compared to other English regions, it contributes far more to the national coffers than it receives in public spending. Estimates by the Corporation of London suggest that the difference between taxes and expenditure in London in 2001/02 was in the range of £7 billion to £17 billion.[15] GLA Economics has also calculated the level and difference between public expenditure and taxation in London. These calculations are summarised below.

When estimating the difference between tax receipts and public spending in London there are two main difficulties to overcome. First, part of public expenditure is not identifiable or allocated to regions, so assumptions have to be made about the regional allocation of this expenditure. Second, there is no official data for many taxes at the regional level, so again tax revenues in London have to be estimated, using UK tax receipts and various mechanisms to allocate part of each of them to London.

Public expenditure in London

Public expenditure is divided into identifiable and non-identifiable expenditure. Identifiable expenditure is spending which is recognised as incurred on behalf of a particular population and allocated to regions/countries in the UK. Non-identifiable expenditure is that part which is incurred on behalf of the United Kingdom as a whole such as defence or overseas aid.

Total public expenditure in London is calculated by adding together:

(a) Identifiable expenditure on services in London taken from the publication Public Expenditure Statistical Analysis (PESA), produced by HM Treasury.
(b) An estimated proportion of the spending which has not been allocated to regions in PESA which is allocated to London.

[15] Corporation of London, London's Place in the UK Economy 2003, 2003

The second component (b) can be estimated in a number of ways. Table 1 sets out two estimates that allocate this component using alternatively: the share of spending on identifiable services in London, or the share of population in London. GLA Economics estimates for public expenditure in London are very similar to those produced by the Corporation of London.

Table 1. Public expenditure in London in 2001/02, £ billion

Estimate using:	Share of identifiable expenditure	Population share
Identifiable expenditure in services in London	42.2	42.2
Plus estimated proportion of other spending allocated to London	11.5	10.2
Total public expenditure in London	53.7	52.4

Source: PESA 2003, GLA Economics calculations

Tax receipts in London

The Treasury provides information on tax receipts for the UK as whole. However, at the regional level there is data only for income tax, vehicle taxes, council taxes and social contributions for just 1999 from an ONS study.[16] Various mechanisms are used to allocate UK tax receipts to London. For example, corporation tax is allocated on the basis of London's share of national output and value added tax is allocated on the basis of London's share of household consumption. One conceptual issue relates to where one should count the tax revenues generated by commuters who work in London but reside outside. In principle, these revenues should be divided between London and their place of residence according to how much public services they consumer in each location. However, this is impossible to do in practice. Thus, the residence and workplace estimates in Table 2 provide lower and upper bounds for the true estimate of tax receipts accruing to London. Again these estimates for tax receipts are similar to those of produced by the Corporation of London.

Table 2. Tax receipts in London in 2001, £ billion

	2001
Residence-based	62.3
Workplace-based	66.9

Source: GLA Economics calculations

[16] A Linacre, Regional, Sub-regional and Local Area Household Income, Economic Trends, No. 582, May, 2002

The difference between tax revenues and public expenditure in London

Table 3 displays the estimated difference between taxation and public expenditure in London for 2001.

Table 3. The difference between taxes and public expenditure in London in 2001/02, £ billion

	Public spending estimate derived using share of identifiable expenditure		Public spending estimate derived using population share	
	Residence level	Workplace	Residence level	Workplace
Tax receipts	62.3	67.8	62.3	67.8
Public expenditure	53.7	53.7	52.4	52.4
Difference between tax receipts and public expenditure	8.6	14.2	9.9	15.5

Source: GLA Economics calculations

GLA Economics calculations suggest that in 2001/02 London's net contribution to the UK public purse was between £9 and £15 billion. This is equivalent to between 14 and 23 per cent of all tax revenues generated in London. Some form of net contribution by London to the nation's finances is entirely right. London is after all a relatively prosperous region on average, and one of the hallmarks of a civilised and responsible society is that the wealthy help to support the poor and disadvantaged. It is at least arguable whether a contribution of this magnitude can be justified, given the social needs generated by London's high rates of worklessness and poverty and the need for further investment to ensure its continued economic growth such as the Crossrail transport project. But these figures do indicate the returns to the nation as a whole that flow from investing in London.

Estimating the impact of regional productivity: impact analysis

A very common way of estimating the impact of regional policy or the regional economic contribution of a particular industry is use an approach known as impact analysis. This approach however has a number of conceptual weaknesses.

This approach measures the impact of a sector, for example, by first determining its direct impact in terms of the amount of output or employment in that sector. It then adds in multiplier effects that the sector is estimated to have on output and employment in other sectors of the regional economy. These multiplier effects consist of indirect and induced effects. Indirect effects refer to the purchases by the sector in question of goods and services used in the production of the sector's output. Sometimes further purchases by the sectors supplying the sector in question are further taken into account. Induced effects result from the spending by the sector's employees that in turn is estimated to support output and employment in other sectors.

One problem with this approach is that if one carried out these impact studies for all sectors in the economy and then added them up then the resulting measure of the total impact of the economy would be well in excess of the actual size of the economy itself. This clearly does not make much sense. Secondly, multiplier effects only measure the additional economic impact of the sector in question in the short run. In the medium to longer term, suppliers to the sector would adjust to any decrease in activity from that sector by finding markets for their products elsewhere, and this would compensate for at least some and possibly all of the output lost through reduced activity in the sector in question. Similarly, workers displaced because of reduced demand would find other employment as the labour market adjusted.

Conclusion

The main focus of the Government's regional policy is economic, but its rationale is also expressed in social terms. For example, the joint HM Treasury–Department of Trade and Industry report published in 2001 states, 'as a matter of fairness the Government believes that no country or region [of the UK] can be allowed to fall permanently behind'. However, the social rationale for regional policy is not reflected in the regional PSA target.[17] The text of the target is strictly economic in tone. Hence we agree with the views expressed recently by the Office of the Deputy Prime Minister Select Committee that 'GVA per head is not an adequate indicator' for this PSA target.[18] A *small* basket of indicators of indicators is required.

The geographical coverage of the PSA target is just England, not the UK as a whole. This presumably reflects the fact that one of the three government departments jointly accountable for this PSA target, the Office of the Deputy Prime Minister, covers just England while the other two, HM Treasury and the Department of Trade and Industry, have UK-wide responsibilities. However, this restricted geographical coverage is odd, because if there is concern about regional disparities then it is presumably throughout the whole of the UK, not just in England.

The Government's regional policy stresses the importance of raising economic growth in all the regions through a focus on the five drivers of productivity rather than redistribution of economic activity across the regions. We support this approach. Tackling the barriers preventing improvements in regional economic performance is more likely to succeed in the longer term than approaches which fail to address these causal factors. However, such a general approach is not enough to ensure success. The details of regional economic policies need to be based on evaluation of which policies actually produce positive results, and the possibility of significant spillovers between regions complicates policy prescriptions.

London offers a specific example where failure to invest in transport infrastructure risks negative results for not just London but the UK economy generally. The relationship between public spending in a region and regional economic performance is complex. London makes a net contribution to the national public purse of between £9 billion and £15 billion. Investing further in London to address its need for improved transport infrastructure is required to ensure its continued economic growth and the consequent net fiscal benefits to the rest of the nation.

[17] HM Treasury and DTI, Productivity in the UK: 3 – The Regional Dimension, 2001
[18] ODPM Select Committee, Reducing Regional Disparities in Prosperity, Volume 1: Report, HC 492-1, 2003

Appendix A: Estimating Total Factor Productivity

One common way of estimating total factor productivity (TFP) is via estimating a production function. This approach is set out below.

A production function is a mathematical relationship between output produced and the inputs used to produce that output. A simple and commonly used approach is to estimate a simple Cobb–Douglas production function,[19] as follows:

$$Y_t = A_t K_t^{ß} L_t^{1-ß} \quad \textbf{(1)}$$

where:

Y_t = output at time t

A_t = the level of technology at time t

K_t = capital stock at time t

L_t = employment at time t

ß = a parameter, $0 < ß < 1$.

The amount of output produced depends on the amount of inputs into production, in this simple example labour and capital, plus the level of technology.

Taking logs of equation (1) gives:

$$y_t = a_t + ßk_t + (1-ß)l_t \quad \textbf{(2)}$$

where lower case letters denote logarithms.

Taking differences in equation (2) gives:

$$\Delta y_t = \Delta a_t + ß\Delta k_t + (1-ß)\Delta l_t \quad \textbf{(3)}$$

This says that growth in output is equal to growth in technology plus a weighted sum of the growth in capital and labour. Now TFP is defined as the measure of productivity that controls for all increases in inputs into production, but that is simply:

TFP = $\Delta y_t - ß\Delta k_t - (1-ß)\Delta l_t$ which from equation (3) is:

$$\text{TFP} = \Delta a_t = \Delta y_t - ß\Delta k_t - (1-ß)\Delta l_t \quad \textbf{(4)}$$

[19] This approach is named after the two authors who developed it originally.

Since TFP is equal to Δa_t the change in technology TFP is often described as resulting from technological progress. However the implicit definition of technology in this simple example is very broad. The changes in capital and labour include only changes in the quantity of these inputs. So TFP encompasses improvements in the quality of labour (perhaps as a result of workers undertaking education and training) and the quality of capital (for example, from the introduction of new more advanced machines).

Given data on output, the capital stock and the labour force and the value of the parameter ß, Δa_t or TFP can be computed from equation (4). The value of ß is commonly assumed to be equal to the share of capital income in total income as this is an implication of economic theory if markets are competitive.

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Chinese
中文
如果需要此文檔的您的母語拷貝，
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Hindi
यदि आप इस दस्तावेज़ की प्रति अपनी भाषा में चाहते हैं, तो कृपया निम्नलिखित नम्बर पर फोन करें अथवा दिये गये पता पर सम्पर्क करें।

Vietnamese
Tiếng Việt
Nếu bạn muốn bản sao của tài liệu này bằng ngôn ngữ của bạn, hãy gọi điện theo số hoặc liên lạc với địa chỉ dưới đây.

Bengali
আপনি যদি আপনার ভাষায় এই দলিলের প্রতিলিপি (কপি) চান, তা হলে নীচের ফোন্ নম্বরে বা ঠিকানায় অনুগ্রহ করে যোগাযোগ করুন।

Greek
Αν θα θέλατε ένα αντίγραφο του παρόντος εγγράφου στη γλώσσα σας, παρακαλώ να τηλεφωνήσετε στον αριθμό ή να επικοινωνήσετε στην παρακάτω διεύθυνση.

Urdu
اگر آپ اِس دستاویز کی نقل اپنی زبان میں چاہتے ہیں، تو براہِ کرم نیچے دیئے گئے نمبر پر فون کریں یا دیئے گئے پتہ پر رابطہ قائم کریں۔

Turkish
Bize telefon ederek ya da yukarıdaki adrese başvurarak bu belgenin Türkçe'sini isteyebilirsiniz.

Arabic
إذا أردت نسخة من هذه الوثيقة بلغتك، الرجاء الاتصال برقم الهاتف او الكتابة الى العنوان

Punjabi
ਜੇ ਤੁਹਾਨੂੰ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਕਾਪੀ ਤੁਹਾਡੀ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਚਾਹੀਦੀ ਹੈ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ ਹੇਠ ਲਿਖੇ ਪਤੇ 'ਤੇ ਰਾਬਤਾ ਕਰੋ:

Gujarati
જો તમને આ દસ્તાવેજની નકલ તમારી ભાષામાં જોઈતી હોય તો, કૃપા કરી આપેલ નંબર ઉપર ફોન કરો અથવા નીચેના સરનામે સંપર્ક સાધો.

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