

# Centre Piece

The Magazine of The Centre for Economic Performance

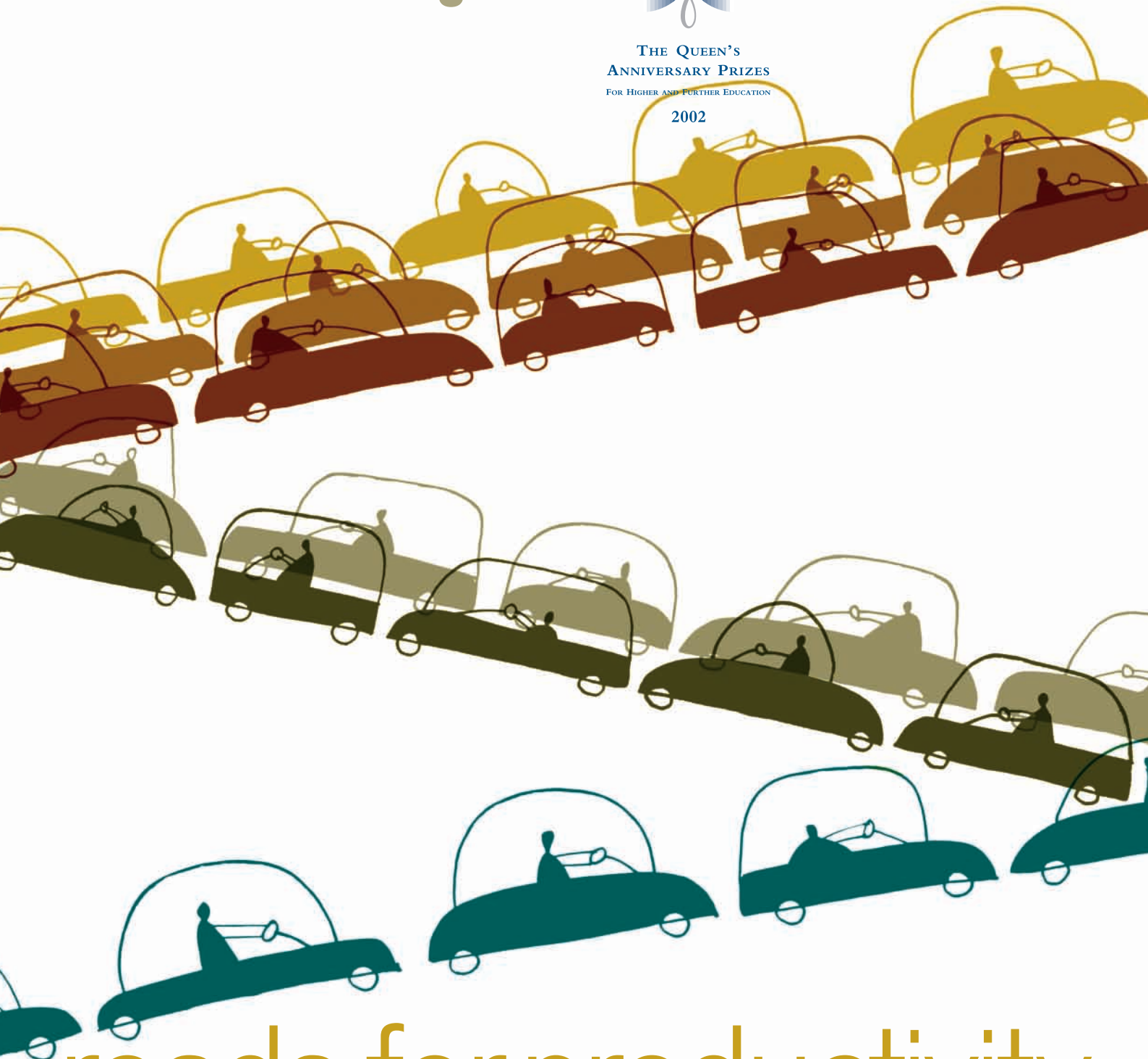


Volume 9 Issue 3 Autumn 2004

## teacher shortage



THE QUEEN'S  
ANNIVERSARY PRIZES  
FOR HIGHER AND FURTHER EDUCATION  
2002



## roads for productivity

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# Productivity: understanding regional differences

**What drives variations in economic performance across Britain?**

**Patricia Rice and Tony Venables find that access to cities has a big influence on regional productivity.**

**H**ow can we explain the large and growing disparities in economic performance across the regions of Britain as documented in publications like the Treasury's report on the regional dimension of productivity (HM Treasury, 2001)?

Our research indicates that a key influence on variations in productivity across Britain's 'NUTS3' sub-regions is how close they are to 'economic mass' – the size of population of working age within driving time of 80 minutes or shorter. Indeed, according to our calculations, doubling the economic mass to which an area has access – for example, by reducing journey times to the nearest big cities – can raise its productivity by 3.5%.

## **Explaining Britain's regional inequalities**

The latest data (ONS, 2003) indicate that GDP per head in London is 54% above the national average and even higher in inner London. In contrast, GDP per head in the North East, the poorest of the 11 broad (NUTS1) regions of Britain, is just 73% of the national average, falling to as low as 60% of the average in some of its NUTS3 sub-regions. Moreover, these disparities have increased since 1995 with

GDP per head in London and the South East growing relative to that in regions on the periphery – Scotland, the North East, the North West, Wales and the South West.

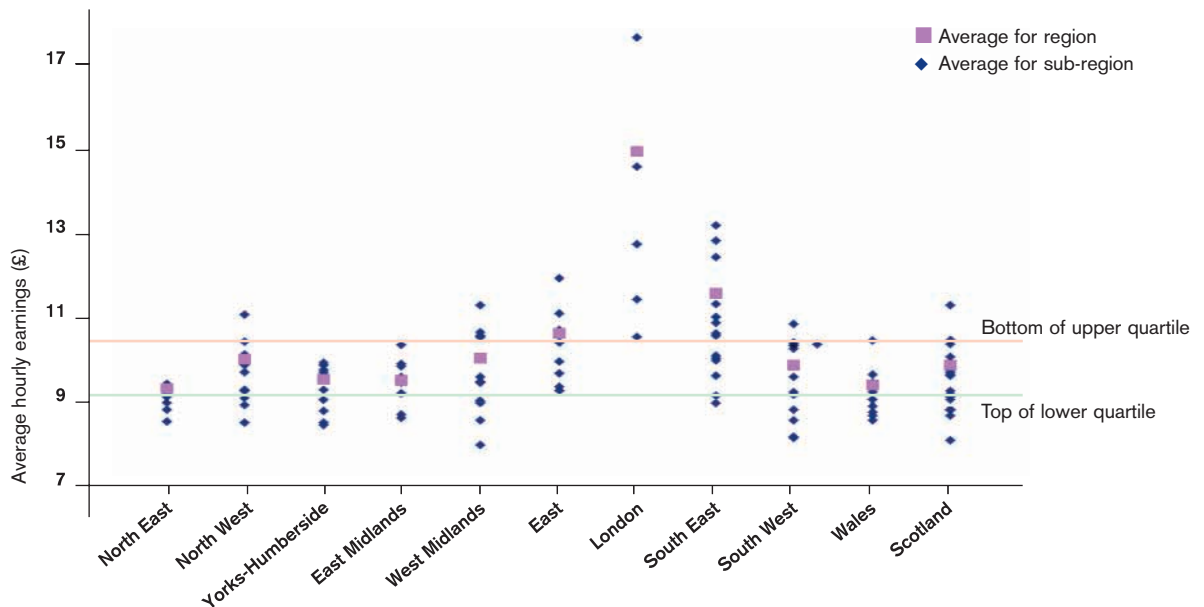
Regional inequalities in income per head arise from many different sources – differences in labour force participation, differences in employment rates, differences in the composition of skills and occupations and differences in productivity. All of these are correlated with one another but they may have distinct and separate causes.

In this research, we focus on disparities in income per worker and do not attempt to explain rates of labour force participation or employment. We examine regional variations in earnings and the role of three key variables: occupational composition; skill levels; and productivity benefits associated with 'agglomeration' or proximity to a large mass of economic activity.

Our analysis uses data on Britain's 126 NUTS3 administrative sub-regions. In order to compile a consistent dataset, a number of these are combined to give a sample of 119 spatial units that we call 'areas'. The data cover the period

# Doubling the economic mass to which an area has access will raise its productivity by 3.5%

Figure 1: Regional and sub-regional disparities in average hourly earnings for full-time employees



1998-2001 and the four years of data are averaged in order to remove some of the year-to-year volatility.

Several alternative measures of income are available at the NUTS3 level, including earnings and estimates of gross value added per worker. We focus on earnings, which means that we fail to account for income from non-employment sources but avoid problems arising from allocating

profits and other non-wage income across relatively small spatial units.

Figure 1 shows the regional distribution of earnings. On the horizontal axis are the 11 NUTS1 regions, with the squares indicating average hourly earnings for full-time employees in each of these broad regions. The diamonds represent the comparable figures for the NUTS3 sub-regions that make up each NUTS1 region.

The national average for full-time hourly earnings is £10.83 an hour. At £14.88, average hourly earnings in London exceed that average by 37% and are approximately 60% higher than in the North East, the lowest ranking region.

What is readily apparent from Figure 1 is that the degree of dispersion *within* regions is comparable with the degree of dispersion *across* regions. All regions, apart from the North East and Yorkshire and Humberside, include at least one sub-region in the upper quartile of the distribution (at or above the upper horizontal line) while only London and the East do not have one in the lower quartile (at or below the lower horizontal line).

## If people are 30 minutes closer to a city in terms of driving times, their impact on productivity increases fourfold

### Earnings variation: the effects of occupational composition and productivity

Regional variation in average earnings can be 'decomposed' into two parts: differences in productivity and hence in the wage rates paid to workers in a given occupation; and differences in the occupational composition of employment.

The issue of occupational composition can be summarised as follows: does a region have low average earnings because it has a high proportion of workers in low skilled occupations or because the workers in any given occupation have low productivity and hence low earnings? We compare actual average earnings in a region with what average earnings would be if the region had its own occupational composition but the same occupational wage rates as the UK as a whole. The evidence shows that around a third of the regional variation in earnings can be explained by occupational composition.

To identify the contribution of productivity differences we construct a measure of average earnings for each area, which is conditional on the occupational composition being the same as that for Britain as a whole – what we call a productivity index. We also construct an index of occupational composition by computing average earnings in each area based on its actual occupational composition but assuming that wage rates are equal to the national average.

These indices are calculated for each of the NUTS3 areas, and Figure 2 illustrates their averages at the broader NUTS1 level. The height of the bar for each region

indicates the percentage by which earnings are above or below the national average. The bars show that only London, the South East and the East have earnings above the national average – in the case of London, 37% above the average.

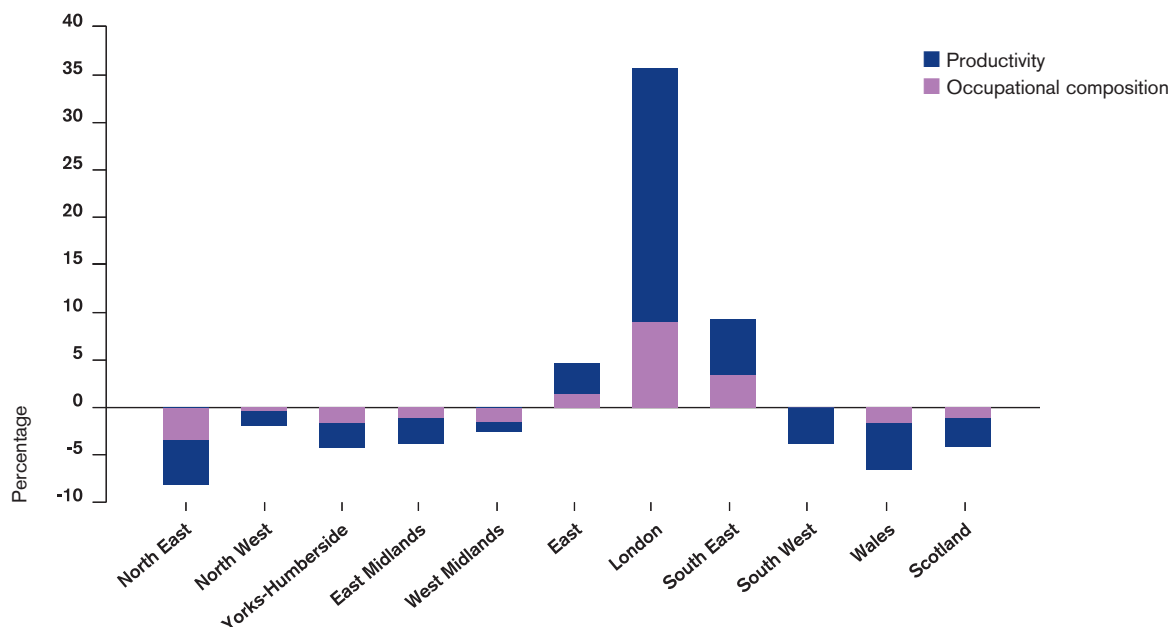
The purple part of each bar in Figure 2 indicates the proportion of the earnings variation that is due to the region's occupational composition while the blue part indicates the proportion due to productivity differences. It is clear that occupational composition matters a great deal, supporting a near 15% earnings gap between London and the North East. Yet most of the regional variation in earnings across the NUTS3 areas comes from variation in our productivity index rather than the index of occupational composition.

### Productivity differences: skill levels and economic mass

We now turn to the question of how much of the regional variation in our productivity index can be explained by economic geography – proximity to economic mass – and how much is due to other factors including regional skill differences.

On the impact of economic mass, our hypothesis is that 'increasing returns' cause productivity to be high in regions that have proximity to cities. US evidence offers some empirical support for such effects – see, for example, Ciccone and Hall (1996), who find that density of activity has a positive effect on productivity. Three main sorts of mechanisms have been put forward to explain the relationship between city size and productivity (see Fujita and Thisse, 2002, for a survey):

Figure 2: Occupational composition and productivity



## **Below average access to cities contributes to the poor performance of the North East, the South West, Wales and Scotland**

■ One is technological 'externalities' – firms learn from being located near other firms involved in related activities, so that they innovate and implement new technologies more efficiently.

■ A second is that wide, deep labour markets work more efficiently, by having lower costs of search for both workers and employers and making it much easier to match workers with jobs.

■ The third main mechanism is simply that firms benefit from lower costs of trade and transport if they have good access to both their customers and their suppliers of intermediate goods and services.

It is worth noting that while the first of these mechanisms raises the productivity of a worker of a given type in a given job, the other two do not. Market access effects mean simply that firms seek to locate where they can save on trade and transport costs.

In this research, unlike earlier studies, we assess not only the effects of population size on productivity, but also the distance over which these effects extend. In order to capture the effects of agglomeration, we compute an index of economic mass based on a weighted sum of the population within a given proximity. More specifically, for each of the NUTS3 areas, we estimate the population of working age within each of a series of driving time bands – that is, within 30 minutes, 30-40 minutes, 40-50 minutes, etc. Economic mass is measured as the weighted sum of the population in each time band, where the weights decline with travel time. In other words, population within 30-40 minutes driving time has a larger weight than population within 40-50 minutes.

We then estimate two key parameters: the first is the extent to which productivity increases as economic mass increases – the 'elasticity of productivity' – and the second is the rate at which the contribution of population to economic mass declines with travel time – the rate of 'spatial decay'.

Our estimates point to a fairly steep rate of spatial decay so that moving a given population 30 minutes closer in terms of driving time increases its impact on productivity fourfold. In other words, an extra person within 30-40 minutes driving time has four times the impact on productivity of an extra person within 60-70 minutes driving time.

The estimates of the elasticity of productivity with respect to economic mass centre around 0.05, which implies that doubling the economic mass that an area has access to increases its productivity by 3.5%. This estimate is at the lower end of the range of estimates found by previous research: Rosenthal and Strange (2004) report a consensus view that 'doubling city size seems to increase productivity by an amount that ranges from roughly 3-8%'.

### **Is this just a London effect?**

To what extent are these findings due simply to the coincidence of a large population and high productivity in London and the South East? We take a number of steps to establish the robustness of the findings. These include computing separate estimates for two sub-groups of the sample: a South East 'core' of 60 NUTS3 areas within 180 minutes driving time of central London; and a 'periphery' of 59 NUTS3 areas more than 180 minutes from London.

For both the South East core and the periphery, we find strong evidence that productivity increases with population and that the impact of population declines sharply with proximity as measured by driving times. That said, the responsiveness of productivity to increases in economic mass is somewhat greater in the South East core than in the periphery.

### **Productivity differences: the impact of education**

The second factor driving regional variation in the productivity index is the educational qualifications of the local workforce. In theory, an index of productivity can be constructed at a sufficiently disaggregated level in terms of occupation that each occupational group is homogenous in terms of its educational qualifications. If this were the case, then the impact of education levels on earnings would come only through the occupational composition index and not at all through the productivity index.

In practice, it is not possible to obtain reliable data at such a disaggregated level and jobs within the same occupational group can vary significantly in terms of the associated level of educational qualification. To allow for this, we include the proportion of the economically active population qualified with a specified level of education as explanatory variables.

As might be expected, increasing the proportion of the workforce qualified to at least first degree level while reducing the proportion with sub-degree (GCSE, A-levels, etc.) qualifications raises the productivity index. A 10% increase in the proportion with degree level qualifications or higher increases productivity by nearly 1%.

Equally, increasing the proportion of the workforce with no formal educational qualifications relative to the proportion qualified to sub-degree level reduces productivity. A 10% increase in the proportion with no formal qualifications reduces productivity by around 0.7%.

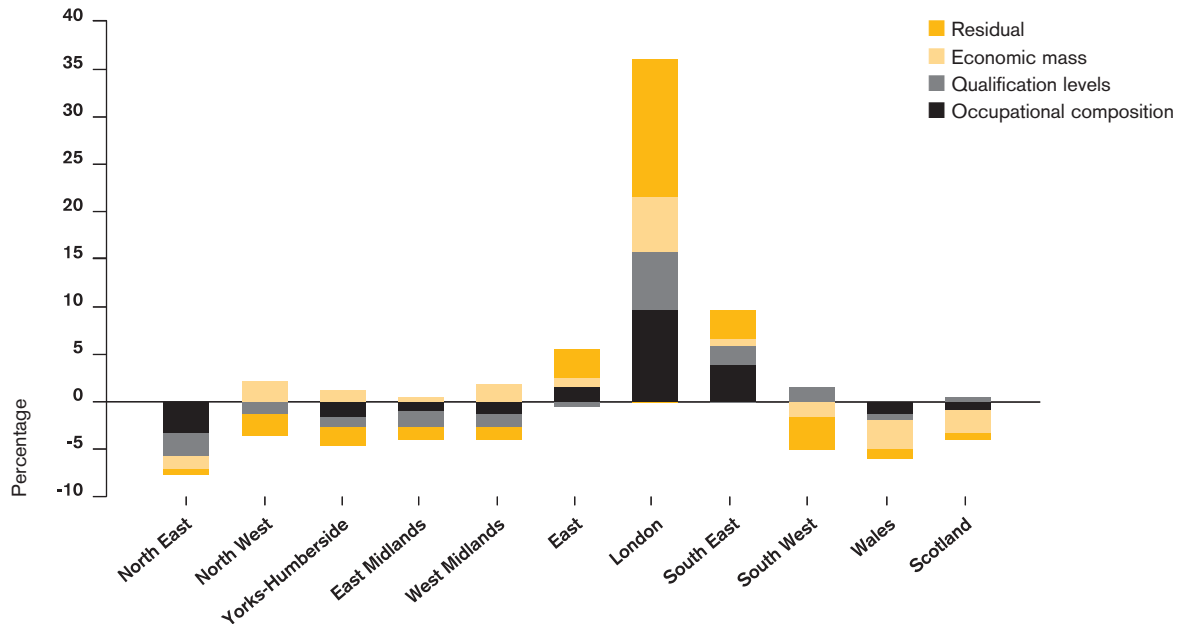
### **Accounting for regional differences in earnings**

We have investigated three causes of regional variations in earnings: occupational composition; productivity differences due to agglomeration; and productivity differences due to education. The relative importance of each of these factors – and the residual that is unexplained by these factors – is illustrated in Figure 3. As with previous figures, we just illus-



## Wales' overall 3% productivity loss from below average access ranges from plus 0.5% in Cardiff to minus 9% in Powys

**Figure 3: Decomposition of earnings differentials (percentage deviation from GB average)**



trate the averages for each of the NUTS1 regions, although the measures are calculated for each NUTS3 area.

As in Figure 2, the overall height of the bar shows the percentage by which average earnings differ from the national average, and the black part of each bar shows the contribution of occupational composition to this difference. In Figure 3, the contribution of productivity differences is further decomposed into the contribution of differences in qualification levels; differences in economic mass; and the unexplained residual.

What can we conclude from this analysis? First, it is clear that a robust and quantitatively important determinant of variations in productivity between NUTS3 areas is the proximity of each area to economic mass – the presence of a large population of working age within 80 minutes or less driving time.

Below average access to economic mass contributes to the poor performance of the North East, South West, Wales and Scotland, and reinforces the strong performance of the East Midlands, London and the South East. The effects are quite large – around 9% of the difference in earnings between London and Wales as a whole is attributable to differences in these scale effects.

At first sight, the magnitude of the productivity effects of greater proximity to cities may appear modest. But there are large variations in access to economic mass across the NUTS3 areas and the effects are much larger for some

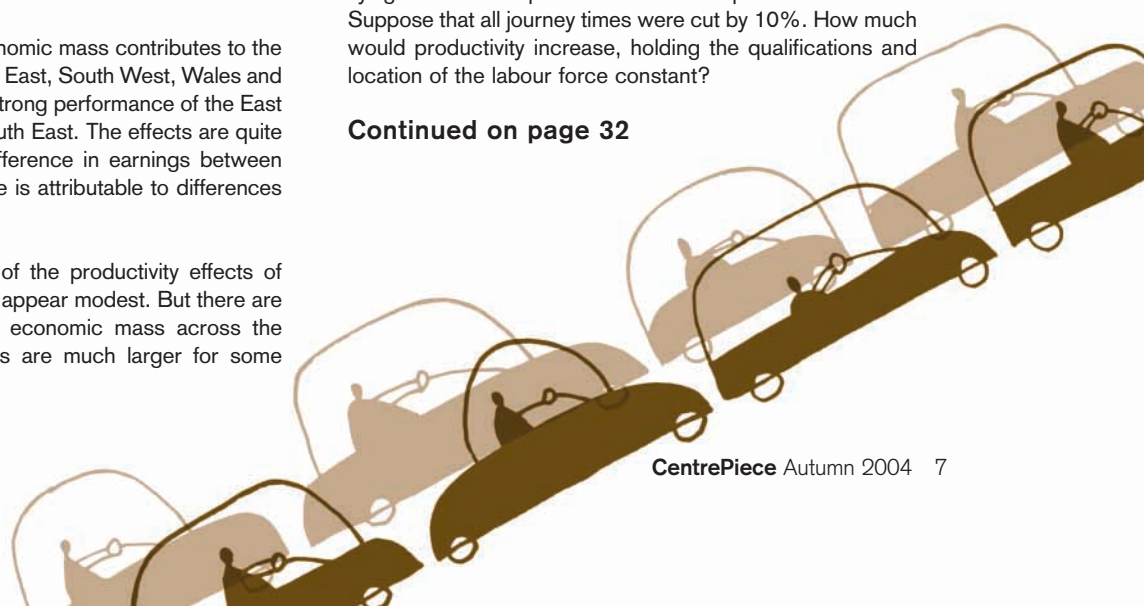
NUTS3 areas than between entire NUTS1 regions. Thus, while London as a whole has a 6% gain from its access to economic mass and Wales a 3% loss, this ranges from plus 0.5% in Cardiff to minus 9% in Powys.

Moreover, closer examination of the contribution of economic mass to explaining regional variations in productivity suggests that it is particularly important in areas in the lower half of the productivity distribution. More than two-thirds of the productivity variation between these areas is due to variation in their access to cities.

### The productivity gains from cutting journey times

A final indicator of the quantitative importance of the effects of economic mass comes from considering the following thought experiment designed to assess the likely productivity gains from improvements in transport infrastructure. Suppose that all journey times were cut by 10%. How much would productivity increase, holding the qualifications and location of the labour force constant?

**Continued on page 32**





# North and South

Joining the European Union had a big impact on the geography of UK trade and manufacturing. Henry Overman and Alan Winters trace the continuing effects of that decision on the North-South divide.

Concerns about the North-South divide in the UK are back on the political agenda. To many observers, the existence of such a divide is self-evident. For a whole range of indicators, people in the South score better than people in the North. People in the South are more likely to be employed. When they are employed, they earn more. They are healthier. They are probably happier. Worryingly, these observers argue, the gap between North and South may well be growing.

Dig a little deeper, however, and things become less clear. House prices in the South are booming. So people earn more but their real income (net of housing costs) may actually be lower. Also, people in the South are more educated. Shouldn't we expect more educated people to earn more and be more likely to have a job?

The problem is that these observers tend to list symptoms of the North-South divide rather than causes. But deciding whether a policy response is needed and what form that policy response should take requires information on causes not symptoms. Unfortunately, little is known about the

factors that actually drive differences in regional economic performance in the UK.

A good place to start looking for some of the causes may be the geography of the UK economy itself – this is the North-South divide after all. Firms based in northern regions are located far away from large markets in the south of the country and on the continent. Since distance still matters, surely being far from these large markets must explain part of the reason why firms in the North do less well than firms in the South?

But once again, things get slippery when trying to assess whether these kinds of factors matter. The basic problem is that this is a chicken and egg situation: firms in the South may do better because they are near to a bigger market, but the market is big because firms in the South do better. To assess the real significance of geography in explaining differing regional performances, something is needed to break this circular link.

Ideally, we want some 'shock' to the UK economy that might affect North-South geography but that is independent

# Joining the EEC shifted UK trade away from former trading partners and towards the six original members

of that geography. A very good candidate for such a 'natural experiment' is the UK's 1973 accession to the European Economic Community (EEC) as the European Union (EU) was then called. EEC accession had a large effect on trade patterns and would appear to advantage markets in the South over those in the North.

## The impact of EEC accession on the geography of UK trade

What happened to the geography of the UK economy in response to this trade shock? In other words, how did EEC accession affect the location of economic activity in the UK? The data that can help us answer this question are for the manufacturing sector from the early 1970s to the early 1990s. But despite this limited sectoral and time coverage, lessons from studying this period of UK history can help us understand what drives UK regional differences more generally. Not only that, but it may also allow better predictions of the potential implications for the UK economy of the deepening integration implied by joining the euro.

Figure 1 shows five-year averages of the percentage of UK trade (the total of imports and exports) accounted for by the original six founders of the EEC (the EC6). The figure tells what is, by now, a familiar story: EEC accession shifted the direction of UK trade away from former trading partners and towards the countries in the EC6.

In the two decades leading up to EEC accession, the importance of UK trade with the EC6 was growing, but fairly slowly. In the 20-odd years before 1973, the percentage of UK trade with one of these six countries had grown from about 13% to 21%. In contrast, in the 20 years after accession, the percentage of trade with the EC6 more than doubled from 21% to 44%.

This post-accession reorientation of UK trade by source or destination is well known; the fact that it was associated

with a geographical reorientation is not so well known. Figures 2a and 2b show this geographical reorientation for imports and exports, respectively. To understand the figure, note that the underlying data give the share of UK imports and exports that enter or leave through particular UK ports (including airports). The figure then plots these shares for nine regional groups:

- Thames and Kent (THAKE);
- Haven and East Anglia (HAVEA);
- Sussex and Hampshire (SUHAM);
- South, South West and Cornwall (SSWCO);
- North East-Humber (NEHUM);
- East Scotland (ESCOT);
- Rest of sea ports (RESTP);
- London airports (AIRLO);
- and other airports (AIROT).

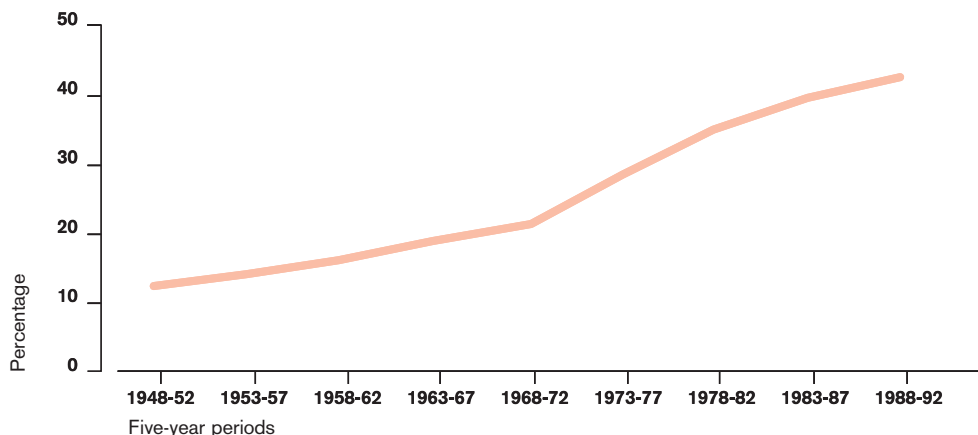
The figures illustrate two key characteristics of the changing geography of UK trade:

■ First, the growing share for the top two segments (AIROT and AIRLO), which clearly captures the growing importance of air transportation in the value of UK trade.

■ Second, the gradual reorientation of trade towards the South East port groups – roughly speaking, the lower the segment, the closer the port groups are to the South East corner of the UK. Between 1970 and 1992, the ports in the south of the country – THAKE, HAVEA, SUHAM and SSWCO – saw their share of manufactured imports increase by 20 percentage points – from 42% in 1970 to 62% in 1992. The reorientation of manufactured exports is in a similar direction but not as marked: the ports in the South saw their share of manufactured exports rise from 47% to 58%.

In summary, the general picture for both exports and imports is of a reorientation to ports in the southern part of the country.

Figure 1: Percentage of UK trade with the EC6



# Since 1973, there has been a reorientation of UK manufacturing trade to ports in the South

Figure 2a: Manufactured imports by port region

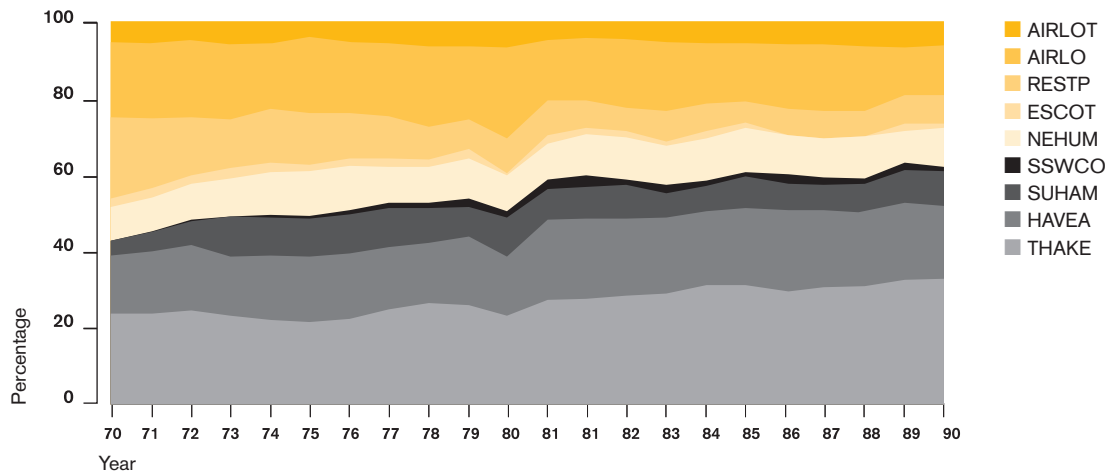
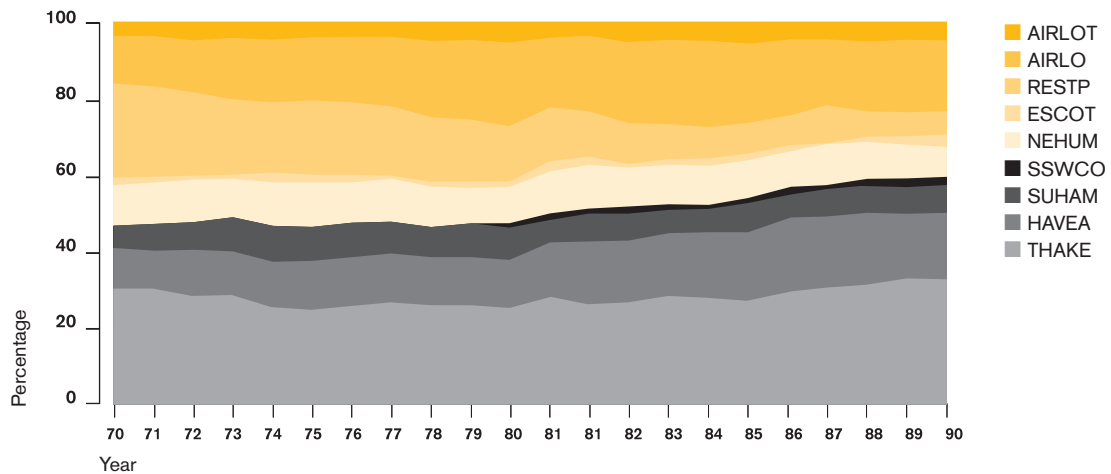


Figure 2b: Manufactured exports by port region



## Which UK ports have benefited most?

The reorientation is associated with very significant changes for particular ports. Table 1 shows the top five UK ports in terms of manufactured exports for both the early 1970s and the early 1990s. The table highlights some important changes over the period. Most notably, there has been the rise of Dover as a major trading port and the corresponding decline of Liverpool. The former saw its share of both imports and exports increase more than threefold over the 20-year period, while Liverpool saw a decline of similar magnitude.

The southward reorientation shows up in the fact that all five of the UK's major ports in the early 1990s are based in the south of the country compared to only three in the early 1970s. Yet the contrast between the relative performance of London and Felixstowe urges caution in attributing the changes in port performance to port location alone. Felixstowe and London are both located in the South and both function as major specialist deep-sea ports. But while

Felixstowe saw its share of UK trade increase, London saw a marked decline.

Such contrasts suggest the importance of factors other than location in determining port outcomes. Among those explaining the different experiences of Felixstowe and London is that the former was outside the National Dock

Table 1: Top five ports for exports (percentage share of manufactured exports)

1970-2		1990-2	
Port	%	Port	%
Heathrow Airport	18.9	Dover	19.4
London	16.9	Heathrow Airport	14.6
Harwich	7.9	Felixstowe	12.4
Liverpool	6.9	Southampton	5.7
Dover	5.6	London	5.1

## Dover has become a major trading port and Liverpool has seen a corresponding decline

Labour Scheme. This was a highly restrictive labour agreement, which, until its abolition, reduced productivity and stifled innovation in member ports. The figures suggest that restrictive practices and a failure to innovate can spell problems for ports wherever they are located.

The evidence presented so far has been based on the shares of particular ports or groups of ports. Figure 3a attempts to capture the geographical pattern of trade more directly. It summarises the distance from Dover of an average £1 of exports over time. This figure eloquently captures the gravitation of UK manufacturing trade towards the ports of the South East. The average distance from Dover of an average £1 of exports fell by around 35% over the 20-year period. Figures for imports show a similar decline although the magnitude is slightly smaller than for exports.

So EEC accession resulted in a reorientation of the UK's trade towards the south of the country. What about the

impact on manufacturing activity itself? Figure 3b is the counterpart to Figure 3a, but plotted to show the distance from Dover of the centre of gravity of UK manufacturing. Clearly, the southward movement for total manufacturing is much less pronounced than for exports.

Does this mean that EEC accession had no impact on the location of UK manufacturing industry and that market access plays no role in understanding regional economic performance? It turns out that the answer is no, but isolating the impact requires looking at individual manufacturing sectors and using economic theory to help structure the investigation.

### Lessons from the new economic geography

What does economic theory predict about the likely impact of EEC accession on the location of particular manufacturing sectors? Obviously, traditional theories of comparative advantage, which emphasise the fact that differ-

Figure 3a: Distance from Dover, manufactured exports

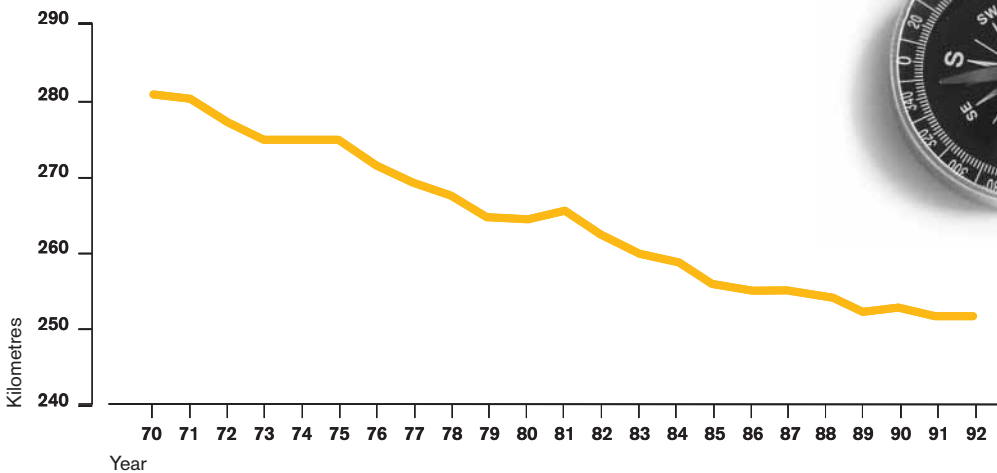
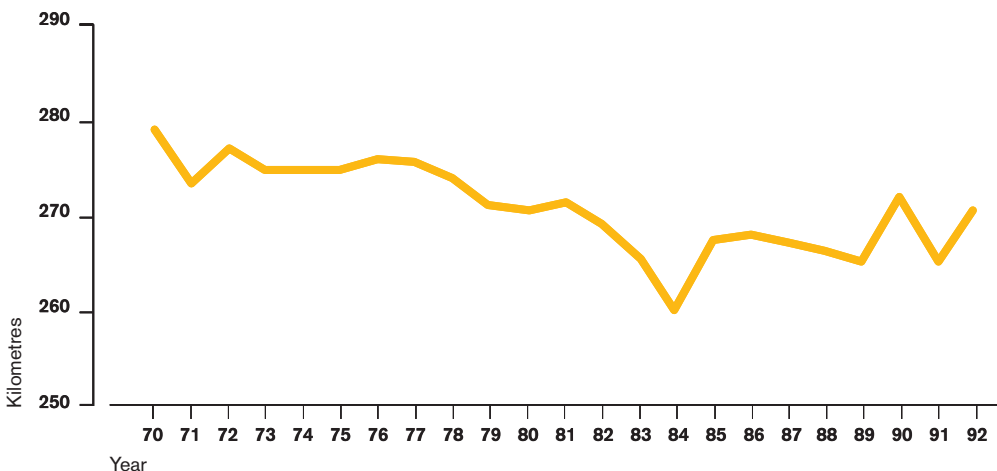


Figure 3b: Distance from Dover, UK manufacturing



## Improved export market access has pulled employment in some manufacturing sectors towards the South



ent EU countries have different endowments of labour and capital, help us understand the changing composition of manufacturing across sectors. This must play a part in understanding the overall decline in UK manufacturing during this period as production shifted to EU partners. It could also clearly help in understanding the shifts in the location of aggregate economic activity if particular regions specialise in sectors that do relatively better as the UK adjusts to its new trading conditions.

But the main focus here is on how trade shocks affected the location of particular sectors, a question on which traditional theories of comparative advantage are essentially silent. Studying this requires theoretical foundations that focus directly on the impact of opening up to trade on economic geography. These effects have been the focus of the recent boom in research on the 'new economic geography', predominantly associated with urban and international economists, many of whom are working in CEP's globalisation programme.

This research programme starts from the principle that the location of economic activity depends on a balance between forces of 'agglomeration' and 'dispersion' – in other words, a balance between forces that attract firms to large markets and those forces that repel them from those markets.

Firms that locate in big markets benefit from being close to both their customers and their suppliers. Offsetting these advantages is the fact that they operate in a more crowded

market, which increases competition in product and factor markets and puts downward pressure on prices and upward pressure on wages.

The balance of these forces depends on the level of trade integration between different locations. When trade between regions or countries is difficult, the cost of serving distant customers is so large that it dominates the desire to be near customers in the large market and economic activity is dispersed. As trade becomes easier, the opposite is true and agglomeration can occur. If locations become very integrated and the cost of trade becomes very low, then congestion costs can emerge and industry can once again disperse.

### **The impact of EEC accession on the geography of UK manufacturing**

What does such analysis imply for the economic geography of the UK as it opened up to trade with Europe? One possibility is that border regions, in this case the South, benefited disproportionately from the improved market access that came with EEC accession – that is, firms located in regions closest to the continent benefited most. But this is not the only possibility when a country opens up to trade: allowing for increased product market competition felt via imports, it is possible that border regions may suffer if firms relocate to regions in other parts of the country

Thinking about the specific case of the UK, this means that in some manufacturing sectors, increased import competition in the South may have outweighed

## Greater import competition has pushed employment in some manufacturing sectors away from the South

better market access and the South might have lost out relative to the North. In other words, theory no longer predicts that EEC accession should necessarily have led to better economic performance of southern regions in *all* manufacturing sectors. Instead, we need to look at different manufacturing sectors in different regions and think about the balance between product market competition (which should be associated with lower employment) and increased market access (which implies the opposite).

To assess the strength of these two forces, our research has so far focused on how EEC accession explains changes in regional employment in particular sectors. Overall, the results seem to support the hypothesis that the reorientation of trade associated with EEC accession did have some significant effects on the economic geography of UK manufacturing. More than 40 manufacturing sectors out of 80 show a positive impact on employment of better export market access with most other sectors showing no effect. In these sectors, everything else equal, manufacturing employment shifted towards the South in response to better market access in those regions.

The results for import competition suggest that this too has a role in explaining changes in the location of UK manufacturing. 17 sectors out of 80 show negative employment effects associated with increased import competition. In these sectors, everything else equal, manufacturing employment shifted towards the North. Working out the overall impact of EEC accession means balancing out these two effects for different sectors. Doing that, we see, for example, that the centre of gravity of the pharmaceutical industry moved southwards while that of textile production moved northwards.

Clearly, these results are not the end of the story, but they are a start. For now, the evidence presented here suggests that cumulative causation and better access to EU markets may explain some of the difference between northern and southern regions. Of course, much more work needs to be done to understand how important these effects are relative to other theories in explaining the differing economic performance of the UK's regions. But it is only through careful examination of the underlying causes that we will truly be able to analyse the need for – and possible role of – regional policy.

This article summarises 'Trade Shocks and Industrial Location: The Impact of EEC Accession on the UK', CEP Discussion Paper No. 588 and 'The Geography of UK International Trade', CEP Discussion Paper No. 606, both by Henry G Overman and L Alan Winters.

**Henry G Overman** is a lecturer in economic geography at the London School of Economics and an active member of CEP's research programme on globalisation. **L Alan Winters** is Director of the Development Research Group at the World Bank and an associate in CEP's globalisation programme.

### Further reading

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# Teacher shortage: another impending crisis?

How can the UK education system recruit and retain the high-quality teachers it needs, especially for the places and subjects where there are severe shortages? **Arnaud Chevalier** and **Peter Dolton** examine the role of pay and other incentives in getting people into the profession and keeping them.



# Teachers' relative pay is a perennial issue: when it's low, graduates are less likely to enter the profession

Over the past 50 years, the UK has lurched from one crisis to another in the recruitment and retention of teachers, particularly for secondary schools. Now the shortage of teachers looks set to become even more of a problem as large numbers of people currently in the profession near retirement. Shortages are especially acute in subjects like maths, science and modern languages and in specific geographical areas like inner London, where there are many alternative careers. A growing body of economic research on the labour market for teachers (much of it carried out at CEP) is seeking to understand these shortages and provide insights into potential policy measures.

To some extent, the labour market for teachers functions like any other labour market, with schools acting as employers. But there are two notable characteristics shared with some other public service occupations like health care professionals. These are that the state has both monopoly power in the provision of credentials – the state determines who is qualified to teach – and near 'monopsony' (monopoly buyer) power in the recruitment of teachers – since most teachers are employed in state schools. What's more, teaching is highly unionised and the government generally determines pay.

### The demand for teachers

The first key element in the demand for teachers is the demographic pattern of pupil numbers. The total number of primary and secondary pupils in state schools since 1946 has fluctuated considerably, from a low of three and a half

million pupils in 1947 and 1985 to a high of nearly five million in the mid-1970s.

The second demographic trend affecting the demand for teachers is the age distribution of the stock of existing teachers. Figure 1 shows the age distributions of primary and secondary teachers in England in 2000. Currently, the official retirement age is 65 but teachers can retire as early as 55. There is a substantial fall in the number of teachers at the early retirement age of 55 and only a minimal number of teachers remain in the profession after the age of 60.

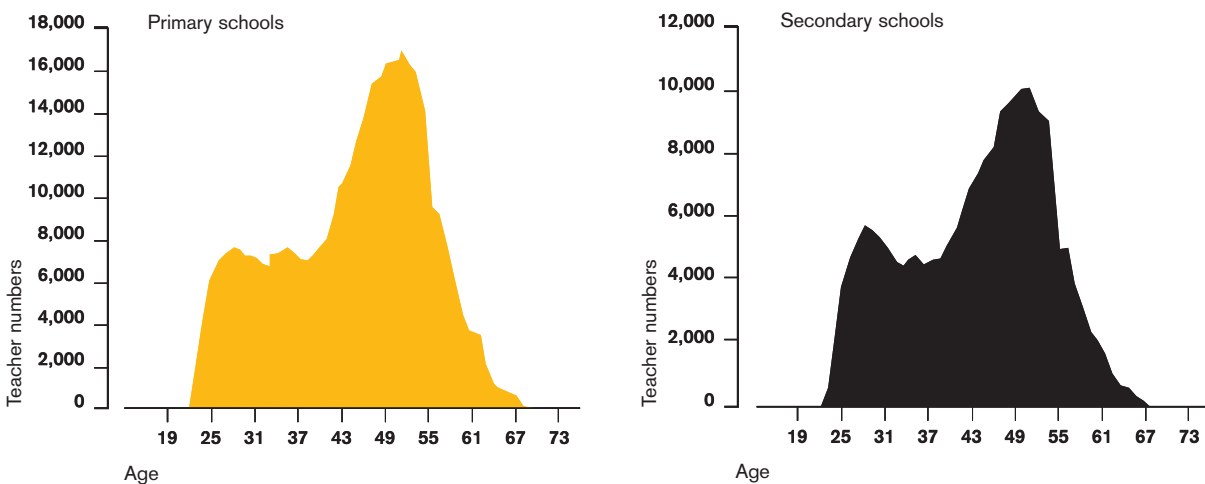
England has an ageing teaching profession, especially in primary schools. 40% of all teachers are aged 45-55, and those aged over 55 account for another 6% of the workforce. Within the next ten years, nearly 50% of the current workforce is likely to have retired. Since the number of pupils is not forecast to decrease significantly, at the current level of recruitment, there is likely to be a large shortage of teachers.

To some extent, the government can influence the retirement plans of existing teachers. For example, a change in the pension scheme in 1997 made it less financially advantageous for teachers to claim early retirement and led to a fourfold reduction in the proportion of teachers retiring before 60.

Several other features complicate the demand for teachers:

- First, the financial administration of education at local level is performed by local education authorities (LEAs).

Figure 1: The age distribution of teachers in England in 2000



Source: Database of Teacher Records (England)

## Nearly 50% of primary teachers may have retired within the next ten years

This means that although central government sets overall spending limits and determines teachers' pay, it does not have day-to-day control over how many teachers an LEA employs.

■ Second, since the 1988 Education Reform Act, schools have become financially autonomous with devolved budgets. Hence it is at the level of the individual school where decisions about teacher recruitment are taken, using calculations of predicted income based on expected student numbers.

■ Finally, desired pupil-teacher ratios are influenced by educational criteria and pay negotiated with trade unions. So it is not surprising that the setting of pay scales and attempts to meet target pupil-teacher ratios could be incompatible with the constraints of government spending limits. In these circumstances, a school's capital budget for buildings and equipment may have to be cut to 'balance the books'. This also gives rise to relatively large variation in pupil-teacher ratios and per pupil funding across different



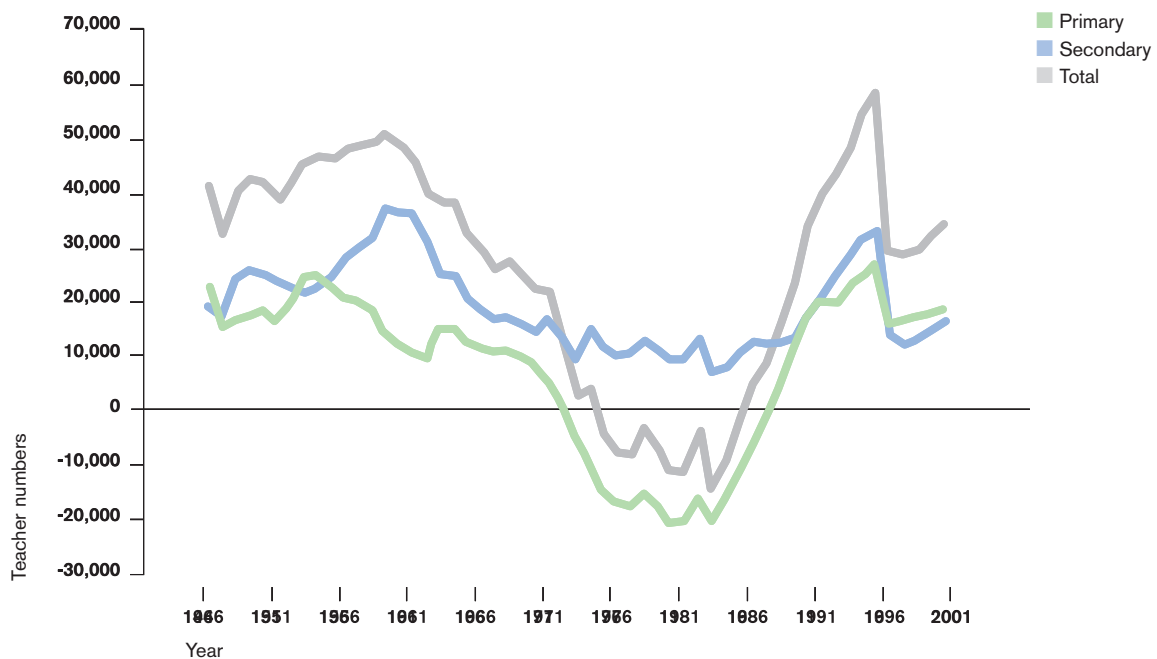
regions of the country and compounds the difficulties of assessing the aggregate demand for teachers.

Calculating the exact size of the shortage of teachers is difficult. For example, government estimates are sometimes based on the number of existing vacancies. These are often inconsistent with figures for the shortfall of demand over supply based on using desired pupil-teacher ratios and pupil numbers.

Figure 2 shows the demand for teachers calculated by taking desired pupil-teacher ratios as published by the government and multiplying them by actual pupil numbers. Teacher supply is taken from government data on the number of teachers in service, and the 'excess demand' – or teacher shortage – is the gap between demand and supply. This calculation suggests that in 2000, there was a national aggregate shortage of 34,000 teachers.

Figure 2 shows that there has been excess demand for teachers almost continuously throughout the post-war period. The main problem has been a shortage of second-

Figure 2: Excess demand for teachers 1946-2001



Source: Database of Teacher Records (England)

## Today's teachers may be drawn from a lower part of the ability distribution than in the past

ary teachers, although the difference in excess demand between primary and secondary teachers disappeared towards the end of the 1990s. The 1970s were the only time in the post-war period when there was a (small) excess supply of teachers.

In some cases, the demand for teachers appears to change sharply from one year to the next. This is not due to demographic change but to modification of the official desired pupil-teacher ratio. Since a shortage of teachers seems to be a permanent feature, the remaining discussion focuses on what determines the supply of teachers.

### The supply of teachers: quantity

All teachers in the UK must be qualified. In England, a qualification can be obtained after a four-year university degree in education or a one-year post-graduate certificate of education (PGCE). Newly qualified teachers must register with the General Teaching Council and gain 'qualified teacher status' to work in the state sector. Ultimately, the government has some control over the stock of teachers since it can determine how many places there are on teacher training courses.

Many factors influence the choice of whether or not to become a teacher. Teacher training courses are not always filled and attendance varies by subject. In the mid-1990s, there were 20% fewer students training to be secondary teachers than the government had targeted, although this shortage has decreased to approximately 6% more recently. By subject, the shortage is biggest in maths, modern languages and geography with shortfalls ranging between 20% and 30% in 2000/1, for example.

Measures to increase the retention of trainees and new teachers have been at the forefront of the political agenda on education. The most prominent measures are repayment of student loans for up to ten years and a hardship allowance for students in shortage subjects committing to become teachers, bursaries for completing the PGCE and 'golden hellos' of £4,000 for new teachers in shortage subjects.

The flow of newly qualified teachers does not necessarily indicate the level of overall supply. Focusing on those currently working as a teacher ignores individuals who are available to teach but not currently employed as teachers. Supply can be calculated as consisting of those entering the profession and those remaining in teaching from the previous

year. For example, Dolton, Tremayne and Chung (2003) report that in 2000, 18,000 new entrants and 6,000 re-entrants joined the teacher workforce.

But the difficulty is not just recruiting teachers but keeping them in the classroom. Some trainees drop out and others decide not to become teachers. Smithers and Robinson (2003) find that of 100 registered trainees, 88 passed the final examination, but only 59 were teaching a year later. After three years, only 53 of the original trainees were still in the classroom.

This wastage not only adds to the costs of providing teacher training but also has negative effects on children's performance. Dolton and Newson (2003) find that inexperienced teachers are less effective in helping pupils achieve good educational outcomes.

### The supply of teachers: quality

One of the most important debates in education is whether the quality of teachers is high enough. While teacher quality is notoriously difficult to measure, research suggests that some teachers do consistently perform better than others over time and that teacher effectiveness is an important determinant of pupil attainment.

But even if it is unclear whether teachers with better academic records or qualifications are necessarily better teachers, we need to be concerned about recruiting teachers from the lower end of the ability distribution. There is some evidence from work carried out at CEP (Chevalier et al, 2002; and Nickell and Quintini, 2002) that today's teachers are being drawn from a lower part of the educational achievement or ability distribution than they were in the past.

The issue of how to recruit better teachers and provide them with appropriate incentives is thus an important one. It is this we turn to next, beginning with a discussion of what has happened to teachers' relative pay over time.

### Teachers' pay

The main element of the UK's strategy to increase teacher recruitment and retention has been to offer financial incentives. Since teaching competes with all other professional occupations open to graduates, policy-makers clearly need to take account of changes in the graduate labour market when determining teachers' pay. It is not pay in teaching alone that matters but teachers' pay relative to potential 'forgone' earnings associated with an alternative career.



# Teachers in maths, languages and English are disproportionately more likely to resign

Figure 3: Teachers' pay relative to average non-manual earnings 1955-2000

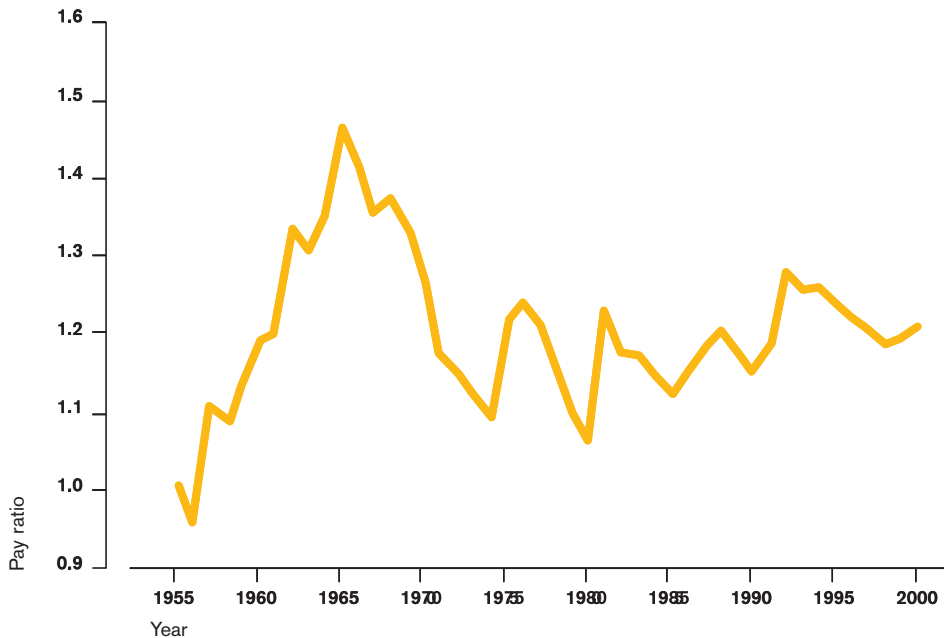


Figure 3 shows the decline in teachers' relative pay compared with average non-manual earnings between 1955 and 2000. Since 1992, teachers' pay has fallen by 6% relative to average non-manual earnings (although the decline 'bottomed out' in the late 1990s). Over the longer run, teachers' pay follows a repetitive cyclical pattern: a period of sustained decline followed by a dramatic increase, usually as a result of a major government report on the crisis in teacher supply.

lower teachers' relative pay (or the growth of their pay), the less likely it is a graduate will choose teaching as a career. Relative pay affects both initial career choices and choices made later in an individual's career. Dolton (1990) finds considerable inertia in the profession and suggests that this may be partially due to different individuals' subjective evaluation of the relative pecuniary and non-pecuniary rewards to teaching.

Figure 3 shows the process of 'catch-up' following a decline in relative pay, the most notable example being the average pay rise of 29% following the Houghton report in 1974. This was followed by four or five years of decline in real pay before the Clegg Commission award of 1980 restored 1974 'relativities'. Compared with the earnings of other public service professions, teachers' pay has also declined: by 11% relative to police earnings since 1981 and by 25% relative to nurses since 1973.

Chevalier et al (2002) explain the market position for teachers between 1966 and the mid-1990s using data from five separate cohorts of graduates. This makes it possible to simulate the effects of possible teachers' pay rises over time. They find that relative pay in teaching compared with alternative professions has a significant impact on the likelihood of graduates choosing to teach, although the impact depends on the market situation at the time.

### Who becomes a teacher?

It is clear that relative pay in teaching has a marked effect on graduates' choice of occupation. In particular, the



The effect of pay on teacher supply is strongest when it is relatively low or following a period of decline. It is also strongest for individuals who have graduated more recently. For example, increasing teachers' pay by 10% would have led

## Graduates are considerably less likely to be teachers if they live in London

to an increase of nearly 10% in teacher supply in the mid-1980s but only 2% in the mid-1960s or early 1990s.

Labour market conditions at the time that occupational choices are made are also important. Dolton, Tremayne and Chung look at time series data over the whole post-war period and find that aggregate labour market conditions, particularly levels of unemployment, are important determinants of teacher supply. In particular, the supply of graduates to teaching is counter-cyclical with most graduates' perception of teaching (and willingness to enter the profession), improving when graduate prospects are poor in alternative occupations and when graduate unemployment is high.

Relative pay affects both the decision to become a teacher and the decision to remain a teacher. Dolton and Van der Klaauw (1995) find that the higher is teachers' relative pay, the less likely they are to leave teaching. They examine the importance of relative pay in teacher turnover decisions by simulating a uniform 10% increase in relative monthly earnings. This leads to a 9% reduction in the probability of teachers leaving within five years of being in the profession, or a total retention rate of 69%. A 25% increase in pay raises the percentage of teachers still in teaching after five years to 73%.

Work using US data suggests that raising teachers' pay could improve teacher quality (Ballou and Podgursky, 1997). But attracting more able students to teaching is not the only difficulty for policy-makers. Since individuals with higher ability generally command higher pay, high ability teachers are at more risk of leaving the profession than less talented teachers. To negate the lure of improved outside opportunities on 'able' teacher retention, fast track programmes have been introduced in the UK with the aim of recruiting and retaining the most able graduates by shortening pay scales while providing them with additional training, support and supervision and/or performance-related pay schemes.

### The supply of women teachers

Another key aspect of teacher supply is the relative popularity of the profession with women graduates. A crucial aspect of the distinction between the occupational choices of men and women is that the latter are often making simultaneous decisions about starting a family and whether to participate in the labour market. This is particularly true in teaching, where a common view is that the profession has 'complementarities' with family formation, notably the ease of returning to teaching after a career interruption.



Dolton and Makepeace (1993) find that the choice of teaching as a career is intimately related to women's decision to participate in the labour market. This is true in the sense that unobserved factors, which make a woman more likely to select a career outside teaching, make them less likely to participate in the labour market and vice versa. This generates a positive correlation between the decision to work and the choice of teaching as a career.

Feminisation of the teaching profession does add some difficulties to planning teacher supply as many women will at some point interrupt their career for family reasons. Smithers and Robinson find that 12% of primary teachers who resign do so for maternity or family reasons. Women are also more likely to leave teaching than men so policies to facilitate work and child-rearing, such as subsidised child-care or reduced workload, may increase teacher supply. Analysis of non-pecuniary factors in occupational choice by Dolton, Makepeace and Van der Klaauw (1989) finds that such factors are generally very important in the choice of teaching, and they are more important for women graduates.

### Performance-related pay

While the evidence is that raising pay has a positive effect on teacher supply, it remains very difficult to design a pay package that would guarantee a supply of high quality teachers. Numerous authors criticise across-the-board pay increases for existing teachers as inefficient since they are unlikely to improve performance radically. Instead, over the years, there have been various attempts at introducing differential pay for teachers. Since 2000, this mainly focuses on performance-related pay (PRP), which is intended to boost teachers' pay while making increases dependent on teachers demonstrating effective performance in their jobs.

The system of performance management in the UK has two main elements. First, each teacher is appraised annually by his or her senior line manager on the basis of previously agreed objectives. At the second performance review stage, the assessment is used by the head teacher as a basis for decisions on pay in the coming year.

PRP currently applies only to the most experienced teachers, those who have reached the 'threshold' at the top of the pay scale for classroom teachers (usually six or seven years into their careers). The idea is that individuals who can prove themselves effective teachers, assessed against a set of nationally agreed criteria, will 'cross the threshold', receiving an immediate £2,000 pay rise and access to a

## Pay is not the only cause of teachers' dissatisfaction with their work

new higher pay scale for classroom teachers. Around 80% of teachers who were eligible for the threshold payment when PRP was introduced in 2000 applied and around 97% actually received it.

It is unclear whether PRP is the appropriate vehicle to solve problems in recruitment and retention of teachers. For example, PRP may not be the best vehicle to improve teacher performance, since the outcome of interest – pupil achievements – is multi-dimensional and depends on the efforts of a group of teachers rather than individuals.

Of course, it is by and large an empirical question as to whether PRP actually improves teacher performance. Evaluation for the UK is not possible since the scheme was introduced nationally but evidence from elsewhere in the world tends not to support PRP schemes. In fact, over time, most schemes for teachers have collapsed and there is evidence that the ability of PRP to motivate staff is limited.

### Teacher shortages in specific subjects and geographical areas

The fact that teachers' pay and conditions are determined for the whole market presents problems with teacher supply in particular subjects and geographical areas. For example, training places for teachers of subjects like physical education are always over-subscribed. But there are always unfilled places for teachers specialising in maths and modern languages despite the wealth of financial incentives to induce people to enrol. And because outside options for teachers with high ability in maths or languages tend to be higher, they are also more likely to leave the profession.

Smithers and Robinson find that teachers in maths, information technology, languages and English are disproportionately more likely to resign. What's more, among all graduates, there is evidence that the average return to a maths degree is higher than for many other subjects (Walker and Zhu, 2001). This means that the opportunity cost of teaching may be a lot higher for a maths graduate than a history graduate in terms of the forgone earnings in alternative jobs.

As with other public service professions, there have also been shortages of teachers in certain areas of the country, most markedly in inner London and the South East. Official vacancy rates are two to three times higher than the national average in London despite it being the



area that relies most on temporarily filled positions.

Chevalier et al (2002) estimate that an average graduate is 15 percentage points less likely to be a teacher if he or she lives in London. Smithers and Robinson find that teachers in London are also more likely to leave or transfer to other schools than teachers in other geographical areas. Official turnover and wastage rates in 2002 were respectively 20% and 11% in London compared with 15% and 9% for England.

Recruiting difficulties in London are thought to stem from the better alternative careers for potential teachers and the upward pressure on living costs associated with a more competitive labour market. But it is possible that recruiting difficulties in London have more to do with the job conditions in inner city schools than outside job opportunities and living costs.

Nevertheless, from April 2003, a specific pay scale has been defined for the capital to replace the previous London allowance: on the lower pay scale, teachers in London are paid £3,500 more than in the rest of the country; and the pay differential for teachers on the PRP scale is up to £6,000. And budgets permitting, schools have greater flexibility with teachers' pay. A range of recruitment and retention allowances – £1,000-5,400 – can be offered to assist towards relocation, travel to work or provision of care for dependents. Schools will be able to offer this allowance to a new or established maths teacher but not to other teachers in the same school.

### Non-financial incentives for teachers

Most government policies to retain teachers concentrate on financial incentives. But surveys of teachers reveal that pay is not the only determinant of their dissatisfaction. Chevalier et al (2003) find that teachers are less satisfied in their jobs than many comparable graduates working in other fields and are particularly dissatisfied with hours of work. Compared with other graduates, teachers are 12 percentage points more likely to claim to be dissatisfied with their hours. Compared with other employees, teachers' hours are concentrated during term time with an average working week of 52 hours.

It has long been asserted that many people become teachers because of the non-pecuniary benefits, long summer holidays being the classic example. But more recently, with the advent of the 'quasi-market' and increased accountability, these non-pecuniary benefits may have become less attractive. For example, the national curriculum and the

# Performance-related pay is unlikely to solve the problem of teacher recruitment

rigours of inspection procedures may have given teachers an excessive administrative burden.

Interviews with teachers leaving the profession confirm that heavy workloads and other characteristics of schools rank higher than pay as a reason for quitting. For over 40% of the leavers surveyed by Smithers and Robinson, nothing could have made them stay. For the others, changes in workload or pupil behaviour were more likely to be cited than pay as an inducing factor to stay. To get a high quality teaching profession in place, all of these difficult issues need to be addressed.

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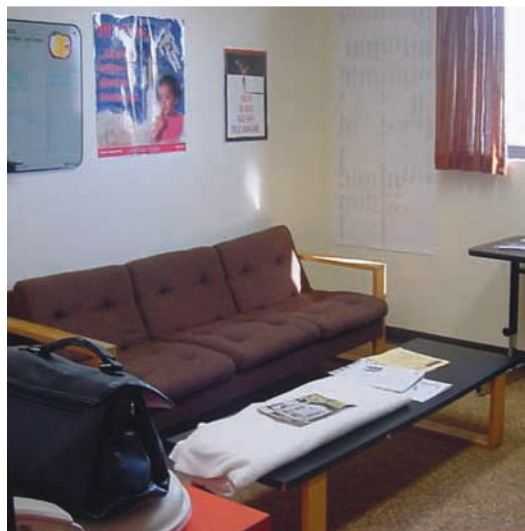
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# Jobless recovery:

whatever happened to the great American jobs machine?

**In terms of employment creation, the US economic expansion since 2001 has been the worst in over half a century. Richard Freeman and William Rodgers explore what's been going on in the labour market during this 'jobless recovery'.**

**D**uring the 1990s, the US labour market drew plaudits around the world for the large number of jobs it created. The rate of unemployment fell to levels below those of most other advanced economies and the percentage of the population in employment rose to its highest level in history, as even the less skilled and former 'welfare mothers' found jobs. At the same time, productivity grew smartly, real wages rose after decades of stagnation or decline, the seemingly inexorable rise of inequality ended and poverty fell. Europe marvelled at the 'great American jobs machine' and sought solutions to European problems in US policies and practices.

What a difference a few years make. In the 2004 election, the question in the United States was not how the great American jobs machine functions but why the economy has produced a 'jobless recovery'. Three years after the Business Cycle Dating Committee of the National Bureau of Economic Research (NBER) declared that the country

was in economic recovery and nearly four years after the Bush administration claimed that the trough had been reached, fewer people were working than at the outset of the recovery. Although by historical standards, the percentage of the population in employment remains quite high, it is now two percentage points lower than three years ago.

## **Economic and political fallout from the jobless recovery**

The jobless recovery since 2001 has created greater economic problems for Americans than the sluggish job performance of Europe in the 1990s created for Europeans. The United States has only a limited safety net for workers. Those who lose their jobs risk losing health care or seeing their family drop from the middle class into poverty. American welfare policy means having full employment not a social welfare state.

The jobless recovery has also created political problems for the Bush administration since it suggests to many that 'trickle-down' economic policies are more trick than treat



## For jobs, the current recovery has been the worst since World War II

for Americans on middle incomes and below. The weakest area of support for the administration in opinion polls was in economic issues. For example, in the spring 2004 *Work Trends* survey by the Heldrich Center for Workforce Development, only 7% of workers said that the President was doing an excellent job in handling issues related to jobs. This compared with 32% who said he was doing a poor job. Among employers, only 18% said he was doing an excellent job while just over a fifth rated his job as poor.

Since GDP and productivity have grown smartly since 2001, the underlying reason for this low rating must have been the jobless recovery. In the long run, the massive balance of trade deficit and fiscal deficit may exact a greater toll on the US economy, but jobs are what seem to matter most to voters. Of the 1,100 likely voters surveyed by the *Los Angeles Times* in September 2004, 46% said Kerry would do a better job at creating jobs; 39% picked Bush. And the CNN/USA Today/Gallop poll of 9/10 October found that 28% of likely voters put the economy on par with terrorism as the most important issue. Gallop reported that since July, the economy has been the first or second most frequently chosen issue among likely voters.

These concerns cut across the income scale. As an example of how the jobs issue affects an upper income suburban

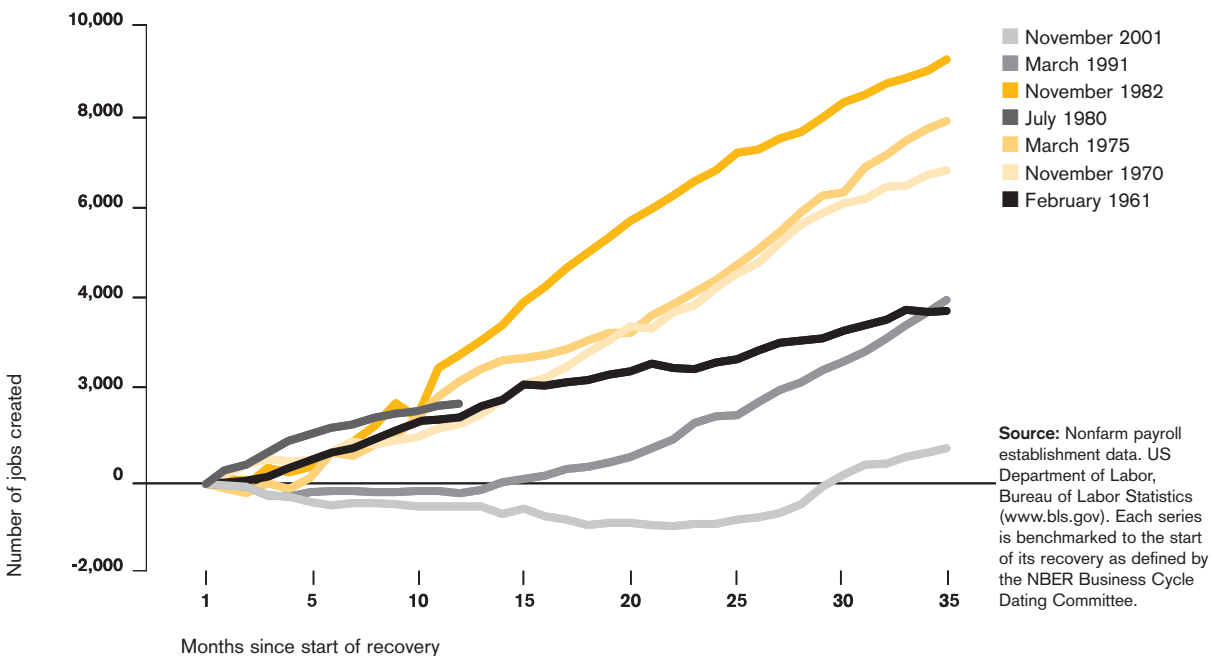
community, more parents have requested scholarship support for the extended day care programme in Brookline, Massachusetts in recent months than in the past decade or so. This programme enables an unemployed parent to look for work and accept a job immediately if they get an offer.

### US employment patterns across different groups, states and sectors

Our research is examining the operation of the US labour market in the jobless recovery. Because the country is in the middle of this phenomenon, ours is a real-time analysis, some of whose conclusions could change if the recovery stalled or employment grew suddenly. But even rapid change in the labour market will not gainsay the surprising US failure to generate jobs for so long in this recovery.

Our first finding is that the current recovery has been the worst in recent US economic history for employment creation (see Figure 1). The failure of the great American jobs machine is not a matter of election year hype. Employment growth looks bad in comparison to all previous post-World War II recoveries, including the 1990s recovery, when employment also took what appeared to be an extraordinarily long period to recover. Typically, employment growth lags business cycle recoveries by three to four months. In the 1990s recovery, the lag was a little over two

Figure 1: Cumulative employment growth during the seven most recent recoveries



## White-collar workers have had more trouble finding jobs than in virtually any other recovery

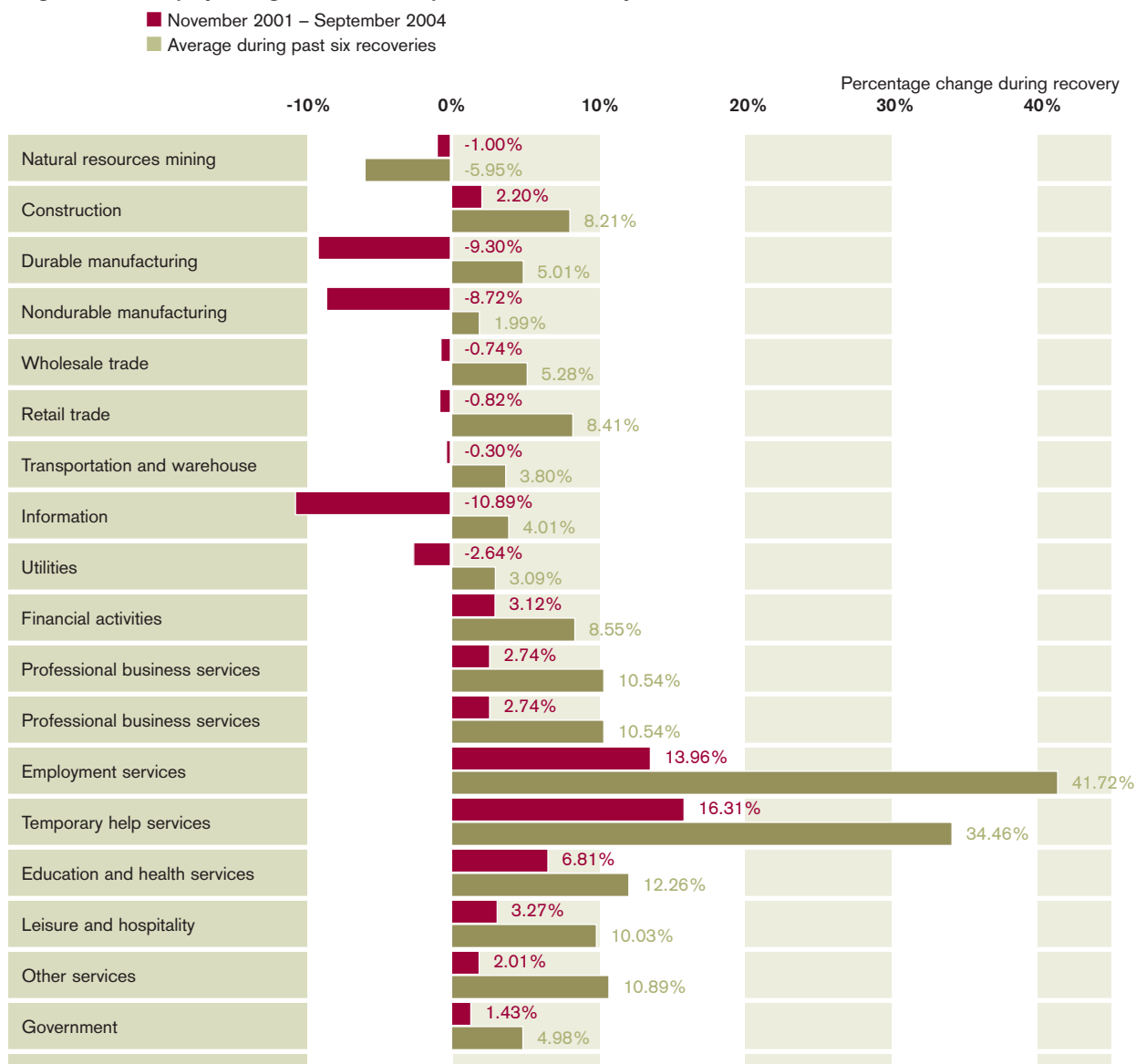
years. In the current recovery, the lag is three to four years and, at the time of writing, the labour market has shown only twitches of recovery.

We have examined the growth of employment sector by sector, anticipating that we would find some sectors with employment growth that looks normal for a recovery and others with abnormal employment experience. This would have provided valuable clues to the cause of the jobless recovery.

We have been surprised to find that in many private sector industries, employment as of late 2004 is markedly below

employment at the start of the recovery. For example, in August 2004, employment was 9.1% lower in durable manufacturing and 8.5% lower in non-durable manufacturing than when the recovery began. Employment was also down in retail, wholesale and transportation. It had grown modestly in education and hospitals, government, finance and insurance, and some other services. But it had fallen in many other service sectors, including the broad 'information' industries (telecoms, newspapers, movies, cable TV, etc.), a major part of the new economy that is supposed to be producing good jobs to replace declining employment in traditional manufacturing. Figure 2 compares these growth numbers with previous recoveries.

**Figure 2 Employment growth at similar points in the recovery**



## Disadvantaged groups have had worse employment experiences relative to other workers than in previous recoveries



We have examined employment growth among groups especially sensitive to the swings of the business cycle: African-Americans, new labour market entrants and the less skilled. Historically, recessions take their first toll on these groups but in recoveries, they benefit from larger increases in employment than more advantaged groups. The evidence is that African-Americans and new labour market entrants have had worse employment experiences relative to other workers than in the previous two recessions and recoveries.

We have also examined the labour market for the highly skilled. One of the most stunning facts about the post-2001 labour market is that the rate of unemployment among electrical engineers has exceeded the national unemployment rate. White-collar workers have had more trouble finding jobs than in virtually any other recovery.

Analysing employment growth by state, we find that compared with the current recovery, the typical state's employment grew 2.6-4.8% faster in the 1990s recovery and 4.5-6.3% faster in the 1980s recovery. Current employment growth is substantially weaker across the board, with two distinct patterns emerging.

Employment growth in states that have experienced any increase in jobs during the current recovery has been slower than in past recoveries. Arizona and Florida are good examples of this pattern: employment growth in these states was just over 1% between 2001 and 2003, but during comparable periods in earlier recoveries, it was two to four times higher. Elsewhere, in contrast with the 1980s and 1990s recoveries, there has been a contraction in employment. Michigan and Ohio fit this pattern: during the current recovery, employment in these states fell by 1-4% compared with modest increases in the earlier recoveries.

We have also studied employment growth in the so-called battleground states of the election, which comprise about

one-third of total non-farm employment. We found that there is little difference in the employment paths that these and other states have taken during the current recovery. This suggests that either compositional shifts in industry employment – for example, the decline of manufacturing jobs – or other non-economic factors must explain why the election was so competitive in these states.

### Wages, inequality and poverty

It is more difficult to pin down what has happened to wages and inequality in the jobless recovery. Some data show gains in real wages after three years of recovery; others don't. Some measures of inequality show modest improvements; others show little change. But as the recovery has proceeded, wages of workers at the bottom of the distribution have not improved, at least up to mid-2004. Between the second quarter of 2003 and the second quarter of 2004, earnings for the bottom 10% of the wage distribution fell by 1.9%. Over the same 12-month period, earnings for the bottom 10% of the African-American wage distribution fell by 3.2%.

Of course, changes in real wages are not the fundamental problem of the jobless recovery: rather, it is sluggish employment growth. But what is clear is that the combination of stagnant employment and sluggish real wage growth has meant that poverty has risen in this recovery, albeit modestly. This contrasts with the usual pattern of poverty falling as GDP grows.

In political discourse, the Bush administration has sought to treat the rise in poverty as old news, likely to be reversed as employment rose in late 2004. But several key labour market statistics that are correlated with poverty show no improvement at the time of writing. The employment of Americans who have no more than a high school degree or who are single parents or African-American have not improved since the Census Bureau collected the poverty

## The trade deficit, falling inward investment and offshoring have all contributed to the jobless recovery

data. Specifically, in the year to September 2004, the percentage of high school dropouts and African-Americans in employment remained at 41% and 57%. The equivalent numbers for single mothers did not improve either.

### Explaining the jobless recovery

Is it possible that the jobless recovery is simply a matter of the NBER incorrectly dating the end of the recession? While there is a range of uncertainty around the dating of a recovery, aside from jobs, the current recovery looks reasonably normal. Profits have risen, GDP has grown and productivity has increased at the rapid rates of the 1990s. Industrial production has grown less rapidly than in previous recoveries but this reflects the continuing shift towards a service economy.

Is it possible that the jobless recovery reflects greater rigidity in the US labour market, consistent with the orthodox explanation of weak employment growth in Europe in the 1990s? Clearly not. Neither the Bush administration nor the Clinton administration enacted new regulations on unemployment insurance or welfare benefits that might affect adversely the level of employment.

Could the jobless recovery reflect conservative central bank policy of the type that the European Central Bank adopted during the 1990s? Again, clearly not. The Federal Reserve has kept interest rates low during the recovery. As far as we can tell, Alan Greenspan has not lost his nerve or realistic view about the US economy.

So how come the great American jobs machine has stalled? While we cannot claim to have any definitive answer, our research has uncovered a set of factors that seem to have had some effect in creating the jobless recovery.

### US performance in the international economy

The first is the poor performance of the United States in the international economy. In the current recovery, the trade deficit has risen to levels that are unprecedented in recent US experience. Between the fourth quarter of 2001 and the second quarter of 2004, the ratio of exports minus imports relative to GDP increased from -4.2% to -5.4%. This is larger than the normal increase in trade deficits in a recovery, but it is not the largest on record. In the 1980s recovery, the trade deficit rose from -0.5% to -2.4%.

What is unprecedented is the huge drop in foreign direct investment in the United States as a share of GDP: from 1.6% in 2001 to 0.3% in 2003. In the two previous recoveries, foreign direct investment rose as a share of GDP, presumably directly creating jobs in the United States.

The Bush administration's Council of Economic Advisors was recently criticised for downplaying the significance of jobs being 'offshored' in the jobless recovery. But government statistics do not provide even crude measures of the

number of jobs being offshored in the service industries. For example, while Indian exporters report several billion dollars of exports in computer related and telecoms services and many major US companies proudly proclaim offshoring of service sector work as a way to improve profits, government statistics record less than a billion dollars of service sector imports declining over time and only a minuscule number of job losses attributable to offshoring.

The Government Accounting Office recently examined the quality of official statistics and found them virtually useless in measuring job losses. We have greater faith in the Indian statistics and in business announcements that offshoring has cost the United States a significant number of jobs.

But simply ascribing some of the jobless growth to international factors like trade, foreign direct investment and offshoring does not give a complete explanation. That the value of the dollar fell relative to the euro and pound despite rapid increases in productivity demands some deeper explanations as to why the United States did not do better in international markets.

### The impact of health care costs

The second factor behind the jobless recovery is the US mode of funding medical insurance. Health insurance spending per employee has risen sharply in the United States, albeit over a longer period than in the current recovery. It adds a substantial marginal cost to employing workers, and many firms have sought ways to operate without committing themselves to permanent workers who obtain such benefits.

The Kaiser Family Foundation finds that between 2000 and 2003, employment of people with employer-sponsored health care coverage fell by 2.8%, which is considerably greater than the overall fall in employment in that period. This is at least consistent with the notion that some of the

**Table 1: The fiscal stimulus as a percentage of potential GDP was larger in the jobless recovery than in two preceding recoveries**

Recovery	Surplus or Deficit (-)
1982	-1.1
1984	-3.6
<b>Change</b>	<b>-2.5</b>
1991	-2.4
1993	-2.8
<b>Change</b>	<b>-0.4</b>
2001	1.1
2003	-2.8
<b>Change</b>	<b>-3.9</b>

**Source:** Congressional Budget Office. Figures are the standardised budget surplus or deficit as a share of potential GDP.

# The fiscal stimulus has been bigger in this recovery than previous ones but has had a smaller impact on GDP growth

stagnant employment growth may be associated with rising health care costs, and ultimately with the country's distinct mode of financing health insurance.

## The impact of the fiscal stimulus

The third factor is the nature of the fiscal stimulus, which gave the vast bulk of the tax cuts to wealthy people whose propensity to spend quickly is likely to be less than that of people on middle incomes and below. Table 1 shows that between 2001 and 2003, the US fiscal deficit rose by 3.9 percentage points relative to potential GDP: from a surplus of 1.1% to a deficit of 2.8%. This exceeds the increase in the deficit and the size of stimulus in both the 1980s and 1990s recoveries.

Actual GDP grew by just 8% between 2001 and 2003 despite the huge stimulus. This is a lower growth rate than in the two previous recoveries when the fiscal stimulus was weaker. We suspect that the larger stimulus had a smaller impact on GDP growth because the tax cuts were slanted to the super-wealthy.

## The impact of structural change

Fourth, continuing structural change, the permanent relocation of workers from declining industries to growing ones, has contributed to the jobless recovery. Erica Groshen and Simon Potter show that the share of total employment in industries undergoing structural change was 51% during the mid-1970s and 1980s recoveries and 57% during the 1990s recovery; it is 79% during the current recovery. Their research suggests that the United States is in the middle of a period of reaction to the over-expansion of the 1990s, making structural employment shifts the dominant source of changes in employment.

## The impact of increased productivity

Finally, we reject the idea that increased productivity explains the jobless recovery. This is a circular argument. Increases in productivity due to technological and other innovations shift out the country's aggregate supply curve, which increases the growth of potential GDP and permits greater growth of employment without inflation than would otherwise be the case.

The puzzle is why increased productivity coupled with the fiscal stimulus and low interest rates have not generated enough GDP growth to crank up the great American jobs machine as quickly as they did in all previous recoveries. The surprisingly slow employment recovery raises serious doubts about the Bush administration's economic policies that a few years ago might have looked reasonable in terms of their likely impact on employment even though they were distributionally skewed in favour of the wealthy.

Approaching the election, the administration defended its stimulus package, hoping that eventually employment would pick up. They based their stance on the modest jobs growth that began in early 2004 and did not address the key

question as to why the fiscal stimulus was taking so long to create jobs.

Now that the election is over, we hope that the administration (and its opponents) will look at the causes of the surprising jobless recovery. The United States needs to recouple employment growth with GDP growth lest the current jobless recovery gainsays the label of 'peak capitalist economy' that many bestowed on the country in the 1990s.

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# Seeking a premier economy

**In the 1980s and 1990s, successive UK governments enacted a series of economic reforms to establish a more market-oriented economy. A major new book assesses the impact on productivity, employment and income inequality.**

**O**ver the past 25 years, UK economic policy has had one overarching goal: to arrest the country's long-term decline relative to other advanced countries and to establish a premier league economy that would improve living standards for all citizens.

At the beginning of the period, the UK had a highly regulated economy with large nationalised industries, an extensive welfare state and exceptionally obstreperous industrial relations. By the end of the period, the UK had one of the least regulated and least nationalised economies among advanced countries, with a welfare system based increasingly on in-work benefits rather than benefits to people out of work, and unions concerned more with the 'value added' they bring to the economy.

Indexes of economic freedom that measure the market-friendliness of

economic policies and institutions show that the UK has moved from the middle of the pack of advanced countries to a lead position, close to the United States. Nearly all political parties and interest groups have come to accept many of the initially controversial changes that constituted the 'Thatcher revolution', albeit with different emphases and concerns over how best to assure that the reforms benefited society as a whole.

## **Economic policy changes since 1980**

The extent and breadth of the changes in UK economic policies and institutions introduced since 1980 are breathtaking. They include:

- Privatisation of most of the nationalised industries and of many government functions that had never before been performed by private groups.
- New in-work benefits and a reduction in the incentives for

people to be out of work, accompanied by other more active labour market policies.

- Revised labour laws that limited union powers and increased the potential for members to affect key decisions, leading to substantial changes in union attitudes and policies and the introduction of new modes for union recognition.

- Changes in the structure and financing of the educational system, covering students from the age of four through to university, with the development of a national curriculum and a more centralised education system.

- New modes of financing pensions that shifted the burden of funding from the state to individuals through company pension plans or private plans.

- Tax laws that encouraged employee share ownership.

- Increased housing ownership by the sale of council flats to residents.

- Elimination of restrictions on capital flows.

- Restructuring of the National Health Insurance medical system.

- Elimination of wage councils' modes of setting minimum wages and eventual introduction of a national minimum wage.

■ Regular publication of league tables in the public sector to measure the effectiveness of individual hospitals and schools.

### **Did the reforms improve economic performance and/or increase inequality?**

During this period of reform, the secular decline of UK productivity and GDP per capita relative to other advanced countries came to an end. By the 1990s, the country was outperforming most other advanced economies in both the level of unemployment and the proportion of the population in employment.

At the same time, there was a large rise in income inequality, which was the result of rapidly growing incomes for people at the top of the income distribution rather than of falling incomes for people at the bottom of the distribution. This meant that the UK avoided the US problem of falling real earnings for lower paid workers.

The rough concordance of economic changes with reforms provides weak or circumstantial evidence that the reforms succeeded in altering the UK economy. The macroeconomic evidence is circumstantial because at the level of an entire economy, it is difficult to determine what is the appropriate counterfactual. Perhaps the UK's relative economic performance would have improved even without market-friendly changes in policies. New Zealand introduced diverse market reforms much like those in the UK but its economic performance worsened relative to other countries. Some smaller European countries like Ireland and the Netherlands performed well without undertaking massive pro-market reforms.

To determine whether reforms did in fact contribute to the UK's improved economic performance, to the UK's rise in inequality or to both, we need to examine the microeconomics of particular reforms and their impact on intended and unintended economic outcomes. A new book presents a set

## **The overall ambition of UK economic policy since 1980 has been to arrest long-term relative decline**

of studies assessing many of the economic reforms adopted during the 1980s and 1990s, focusing particularly on the reforms of labour and product markets that are likely to have had an impact on productivity, employment and income inequality.

The work is almost entirely microeconomic, focusing on the effects of particular reforms on closely associated outcomes rather than on the macroeconomy. This approach offers more readily determinable counterfactuals than analyses of aggregate outcomes. It allows researchers to compare specific outcomes before and after reforms and to compare the outcomes for people, firms or sectors more or less affected by the reforms.

Given the measurement error of GDP, any particular reform is likely to have effects on GDP that are hard to discern. Hence the microeconomic approach provides the only reliable way to assess the benefits and costs of particular changes. At the same time, the approach misses the possibility that reforms cumulate to something greater than their linear sum, perhaps producing non-linear synergies for the aggregate economy.

The principal finding of the book is that the bulk of the UK's economic reforms contributed positively to economic performance but with some

## **Market-oriented reforms have accomplished the broad goal of improving relative economic performance**

cost in rising inequality. (But since the real wage rose, policy did not create poverty, although possibly some other set of policy changes might have reduced – or raised – poverty.) Underlying this broad theme is a set of specific findings summarised in what follows.

### **Making the economy more market-friendly**

The reforms accomplished their main policy goal of making the economy – and, in particular, the labour market – more market-friendly. Diverse measures of the degree to which market forces rather than administrative rulings determine economic outcomes show that the UK became one of the most market-friendly economies in the advanced world. These measures range from the broad aggregate indexes of economic freedom developed by conservative think tanks to more specific indexes of labour market and product market regulations developed by the OECD and various independent scholars.

The UK deregulated product markets and privatised nationalised industries earlier and/or to a greater extent than its main European partners. In the labour market, the absence of employment protection and other regulations meant that the UK was more market-dependent than other European countries even while they reduced regulations and the UK did not do so.

### **Privatisation**

Privatisation of traditionally nationalised industries was a major part of the UK reforms and reduced the publicly owned proportion of GDP from 12% in 1979 to 2% two decades later. Much of the privatisation effort was undertaken so that the private sector would make the massive investments needed in the relevant sectors, rather than having the public sector make the investments, which would be counted as part of public spending. In most cases, however, because of the nature of the businesses, privatisation

was accompanied by increased regulatory activity.

Privatisation was associated with improved productivity but the improvement occurred largely before the actual act of privatisation as public sector managers restructured existing plants in order to bring the public firm to market. Whether the firms could have undertaken similar changes while remaining public is uncertain.

### **Foreign-owned firms**

With its freedom to move capital and its extensive stock market, the UK has a particularly open capital market, which makes it easy for foreign firms to enter. Establishments that are foreign-owned tend to have higher and more rapidly increasing labour productivity than domestic firms. This is due primarily to higher levels of investment and a larger proportion of skilled and higher paid workers.

But establishments that change ownership nationality do not experience large changes in productivity. Thus, it appears that it is largely through greater investment in human and physical capital that foreign-owned firms make a special contribution to the UK economy.

### **Employee share ownership**

The UK sought to increase share ownership by workers in their own firms in the hope of improving their commitment and raising productivity. The specific policies to encourage employee ownership and involvement varied modestly over time, but the basic idea in all cases was to give tax breaks to firms that provided profit-sharing, share options or share ownership to workers. Unlike in the United States, where employee share ownership plans encourage collective ownership in retirement plans, the UK schemes encourage individual ownership.

The results of the policy appear to be positive. Firms that reward workers in part on the basis of company performance have a higher incidence of information sharing and consultation with workers than other

## **The UK has avoided the US problem of falling real earnings for lower paid workers**

firms. And while the productivity effects of programmes vary with the particulars, firms that have profit-sharing and employee share ownership tend to outperform other firms in productivity and financial performance.

### **Social policy reform**

In the area of social policy reform, the UK sought to improve the incentive for working in its social welfare system, with some modest success. Some heralded reforms in social programmes, such as changes in benefit schedules, had more modest positive effects on economic performance than proponents anticipated and correspondingly less adverse effects on income distribution than opponents feared.

The reason for this is that the UK's income-linked benefit system is highly interrelated so that declines in the amount received or the eligibility to participate in one benefit programme are often partially offset by increased participation in other benefit programmes. This makes both the incentive and income distribution effects of reforms much less than might appear from analysis of a single programme.

### **Tax credits**

The main thrust of UK reforms of welfare programmes has been to increase the benefits accruing to those in work relative to those not in

work. In 1988, the relevant legislation was the Family Tax Credit of 1988; in 1999, this was replaced by the Working Families Tax Credit.

The UK reforms had a much more modest effect on labour supply than comparable reforms in the United States, where the Earned Income Tax Credit and the Temporary Assistance for Needy Families welfare policy produced a sizeable drop in the number of people on welfare and increased employment among the affected families. The prime reason for this is that in the UK income from in-work benefits counts as income in the computation of housing and other benefits, so that policy reforms have a much dampened impact on the incentive to work. In addition, the UK increased out-of-work benefits while the United States reduced those benefits, providing less incentive to increase labour supply.

### **The New Deal**

UK policies towards unemployed young people were also designed to move people from dependence on the state to work. The New Deal for young people introduced in 1998 had both 'push' and 'pull' elements to get young unemployed people into work. Some of the push involved toughening the work search criterion along lines originally developed in the mid-1980s. The pull involved a job subsidy for employers as well as government or volunteer work for young people unable to find regular jobs.

Despite publicity that implied that the programme involved massive increases in spending and huge numbers of young people, the programme had a marginally positive impact in raising youth employment at a modest additional cost. The net social benefits of the additional employment appear to have outweighed the costs.

### **Pensions**

The basic design of UK pension reforms was to encourage workers and firms to contract out part of

## **Income inequality in the UK has become increasingly similar to that in the United States**



pensions through fully-funded occupational schemes, which would reduce the 'pay-as-you-go' costs of publicly provided pensions. The law required individuals to belong to some pension plan: an employers' scheme, a state-funded scheme or an individually purchased scheme. Favourable tax advantages induced a large proportion of the population to purchase personal pensions in the 1980s and 1990s.

At the end of the 1990s, the government introduced further reforms with its stakeholder pensions for low wage workers. The shift to greater reliance on private pension provision allowed the UK to have the lowest rate of future state spending on pensions among advanced countries. The development of private pensions appears to have improved job mobility, with workers who chose private pensions evincing more mobility than those with company pension plans.

### **Trade unions**

In the area of the labour market and income distribution, the UK moved from reliance on collective bargaining in the determination of wages and working conditions to reliance on the competitive market. The decline was due in part to reforms of labour law designed to curb union power but also to greater competition in the product market, which required firms to reform their industrial relations practices.

Prior to reforms, the UK's unionised sector was marked by lower productivity and considerable strike activity. Faced with a tight macroeconomic environment, greater competition from non-union firms and loss of government statutory and non-statutory support, unionised establishments adopted new work practices that brought labour productivity up to non-union levels. Since UK employers do not have the same anti-union animus of US firms, the government's industrial relations reforms that make it easier for unions to gain recognition from

## **Privatisation has been associated with improved productivity**

firms are likely to have only small consequences for the coverage of collective bargaining.

### **Inequality and the minimum wage**

Institutional changes in the labour market – such as the decline of unionisation and the introduction of the national minimum wage in 1999 – had substantial effects on the level of income inequality. The more rapid decline of unionisation than in the United States was a major factor in the more rapid increase in inequality in the UK.

In contrast, the introduction of the national minimum wage contributed to the convergence in the pattern of inequality among women. Inequality among women was higher than in the United States before the UK enacted its minimum wage and remained higher afterwards. But the minimum wage reduced UK inequality towards the US level in 1999. Overall, the extent and pattern of wage inequality in the UK became increasingly similar to that in the United States as a more market-driven economy was adopted.

### **Mobility and joblessness**

The UK subsidises council housing to tenants and sells the housing to tenants at attractive rates. Although home ownership can be viewed as a positive good in itself, it has been criticised as potentially immobilising

## **Unionised firms have adopted new work practices bringing productivity up to non-union levels**

tenants and thus producing pockets of poverty and unemployment. But the implicit rent subsidy in council housing appears to be less important in reducing mobility than the lack of skills among tenants: UK residential mobility is in the middle of rates in Europe; and the sale of council housing in the 1990s did not produce ghettoised neighbourhoods.

In contrast to the localised job market for non-graduate workers, the UK developed an integrated market for graduate workers. A principal reason for the difference is that unemployed less educated workers rarely move to different regions without having first found a job while university graduates are highly mobile after graduation.

### **Poverty**

In sharp contrast to the convergence of inequality between the UK and the United States, the rates of poverty measured in absolute terms diverged between the two countries. In the UK, expanding government benefits reduced poverty considerably, whereas in the United States the impact of benefits was almost negligible. The greatest divergence in benefits is for workless households, whose proportion has grown sharply in the UK while falling in the United States.

Over the same period, relative poverty, which depends critically on the distribution of wages, rose more sharply in the UK than in the United States, bringing the overall income distribution of the two countries closer together.

This article summarises *Seeking a Premier Economy: The Economic Effects of British Economic Reforms 1980-2000* edited by David Card, Richard Blundell and Richard B Freeman (The University of Chicago Press). The book comprises studies undertaken by a team of leading British and North American economists under the auspices of CEP, the Institute for Fiscal Studies and the National Bureau of Economic Research.

# Productivity: understanding regional differences

Continued from page 7

Answers to this question are given in Table 1. They show that a 10% reduction in average journey times throughout Britain would raise productivity by 1.12% and by nearly twice as much for places where access to cities is increased the most.

**Table 1: Percentage productivity gain from a 10% reduction in all driving times**

	Average	Minimum	Maximum
GB average	1.12		
North East	0.81	0.53	1.04
North West	1.10	0.88	1.44
Yorks-Humberside	1.25	1.07	1.45
East Midlands	1.33	0.69	1.66
West Midlands	1.30	0.88	1.73
East	1.35	0.32	2.22
London	0.90	0.73	1.08
South East	1.31	0.99	1.66
South West	1.08	0.31	1.62
Wales	1.09	0.48	1.57
Scotland	0.80	0.00	1.55

It should be noted that these numbers represent the 'induced' productivity gain and are additional to any effects that would be included in a standard cost-benefit analysis of a transport improvement, such as direct cost and time savings. We have not experimented with reducing travel time on particular routes or in particular regions, but the results of the nationwide experiment are generated for each NUTS3 sub-region.

The table reports the average results for each NUTS1 region and the minimum and maximum values in each of these areas. In very low-density areas, speeding up transport has essentially no induced productivity effect, hence the low minimum values for Scotland and the South West. The highest value is for Peterborough, which would enjoy a 2.22% productivity increase, gaining from improved access to both the London area and the Midlands.

This article summarises 'Spatial Determinants of Productivity: Analysis for the Regions of Great Britain' by Patricia Rice and Anthony J Venables, CEP Discussion Paper No. 642 (<http://cep.lse.ac.uk/pubs/download/dp0642.pdf>). The paper was written as part of the Evidence Based Policy Fund project 'Regional Inequalities in the UK: Productivity, Earnings and Skills'.

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