

Centre Piece

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Immigration

The death of distance

Inequality and productivity

Smoking during pregnancy

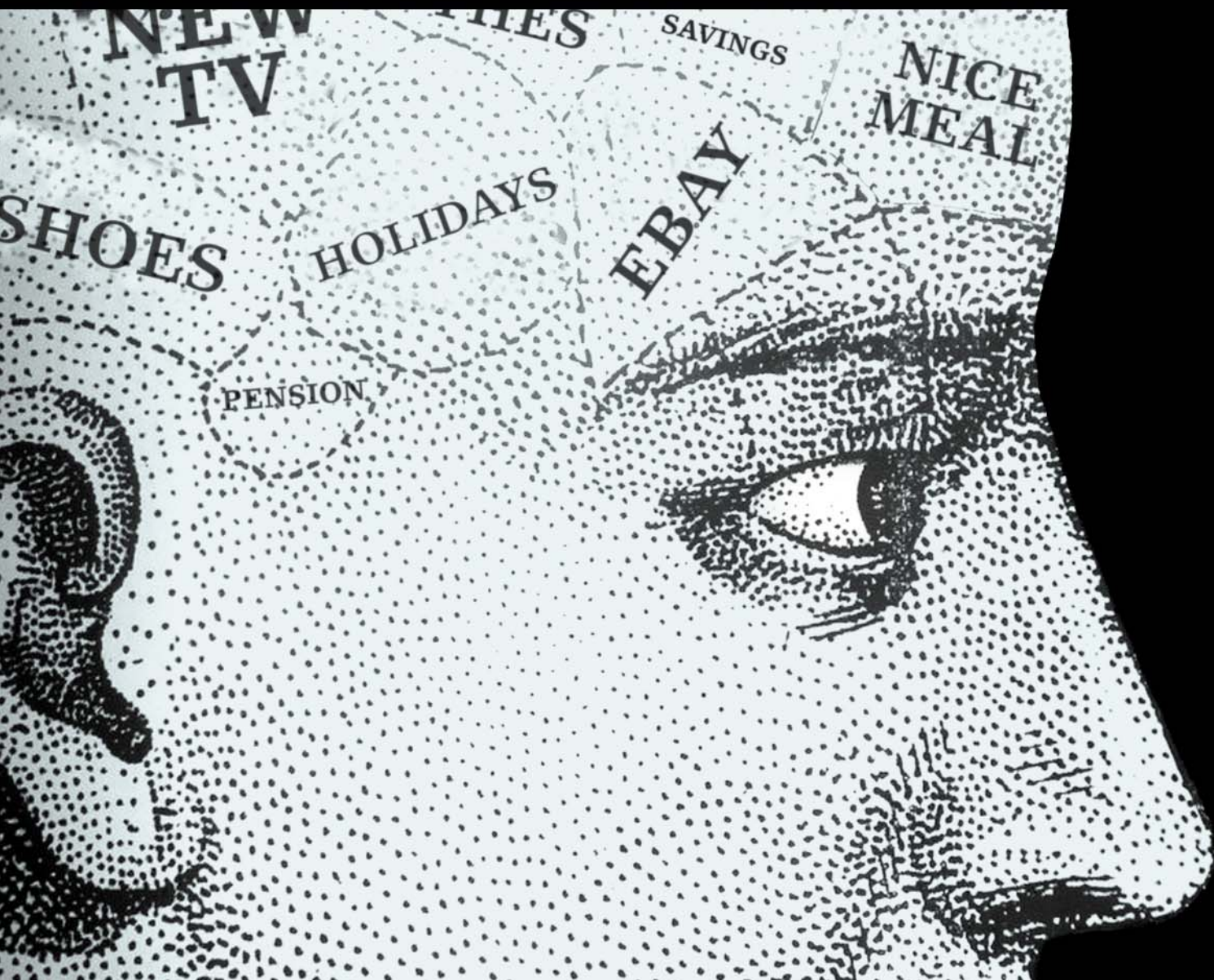
School segregation

Intergenerational mobility

Foreign relations and trade

Computers and crime-fighting

THE PSYCHOLOGY OF SAVINGS



CentrePiece

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Editorial

Our schools are becoming more socially segregated. The life chances of children from poor families are lower nowadays. Immigrants are threatening the jobs of British-born workers. Blunt assertions of this kind are commonplace in the language of politicians and commentators from across the political spectrum. But how true are any of these claims? Which ones reflect reality and which are myths?

The answers can only come from taking a proper look at the evidence. Much of the work of researchers at the Centre for Economic Performance (CEP) aims to do just that, gathering data across a wide range of social phenomena and rigorously applying the tools of economic analysis to see what we can learn about such pressing policy concerns as education, inequality and immigration.

An underlying theme in this *CentrePiece* is the value of research evidence for informing public debate. For example, on whether high- and low-achieving children are being educated

in separate schools, Stephen Gibbons and Shqiponja Telhaj find that there is strong segregation by ability but it does not appear to be increasing over time. And Marco Manacorda and colleagues find that while immigration does have some labour market effects, they seem to be on the wages of earlier migrants.

On intergenerational mobility, a series of CEP studies has revealed that it has indeed fallen between the cohort of British children who grew up in the 1960s and early 1970s and those who grew up in the 1970s and 1980s. But we still know little about changes since then or what has happened in other countries. Here, Maia Güell and colleagues explain a new technique for measuring the importance of family background for people's outcomes in later life.

One area in which it is particularly common to hear bold statements unencumbered by evidence is the impact of computers. Information technology has led to the 'death of

distance', various pundits have asserted. Computers may be in every workplace but they've failed to make us more productive, argue others.

Three studies reported here touch on these issues. One uses patent citations to see if innovations are flowing more quickly between countries. Another examines whether the rise in inequality is linked to firms' use of new technology. And the third investigates whether computers have helped US police departments to fight crime.

As always, your feedback on *CentrePiece* is welcome. And look out for other CEP efforts to summarise the latest research evidence in the policy analyses available on our website: http://cep.lse.ac.uk/_new/publications/series.asp?prog=CEPPA

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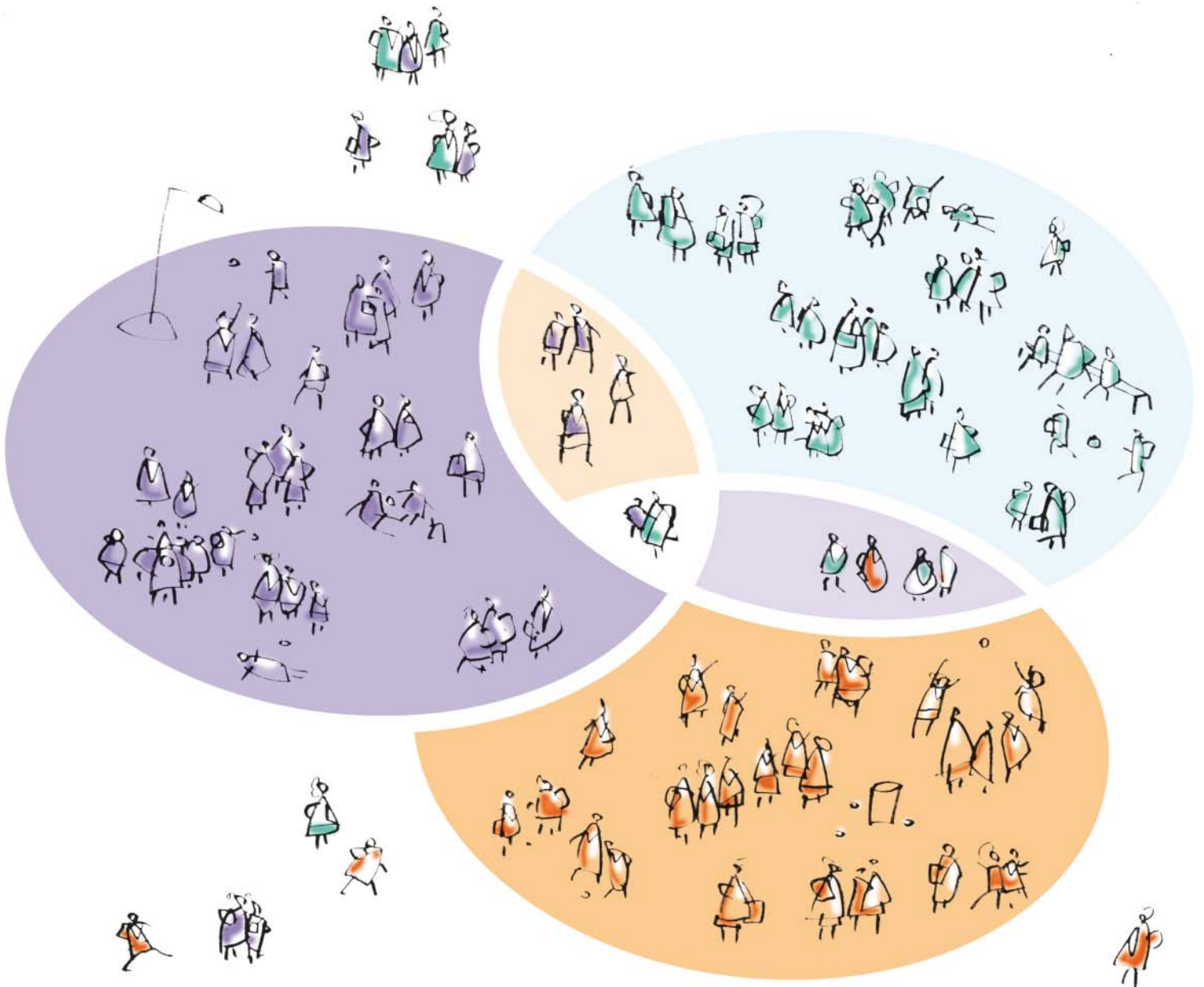
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School segregation and its consequences



To what extent are high-achieving and low-achieving pupils in England separated into and educated in different secondary schools? Research by **Stephen Gibbons** and **Shqiponja Telhaj** looks at patterns of segregation by ability and their impact on educational outcomes.

Expansion of choice has become a central theme of recent educational policy debates in England and internationally. Some argue that freedom of choice ensures that pupils and schools are efficiently matched, and that 'quasi-market' discipline induced by open competition for pupils encourages schools to adopt more efficient teaching methods.

Others point to the possibly adverse consequences of a more 'segregated' school system, in which pupils are less likely to mix with children unlike themselves in terms of background and ability. According to these arguments, more choice is bad – either because segregation seems to imply inequality and is inherently socially undesirable; or because it is claimed that a segregated school system is educationally inefficient.

Setting aside broad and subjective arguments over the desirability of ethnic and social mixing, the most compelling cause for concern is that the separation of pupils into academically advantaged and disadvantaged groups may work to exacerbate inequalities in educational outcomes without producing any overall benefits.

This can occur if children are influenced by the achievements and behaviour of their schoolmates – so-called 'peer group' effects – or simply because disadvantaged pupils place greater pressure on teaching resources and so harm the chances of others in their classroom or school.

These issues have become highly relevant in the light of policies that seek to expand parental choice, and our research


has sought some answers to the key questions: what is the extent of educational segregation? Are the patterns changing? What are the implications for individual pupils in terms of their achievements? And what contribution does this make to educational inequality?

Are secondary school pupils educationally segregated?

Most of the debate about school segregation (and hence much previous research) has been concerned with demographic and socio-economic characteristics. Relatively little attention has been paid to the important issue of segregation that is explicitly along lines of educational advantage and disadvantage – presumably the key concern to those worried about inequality in education. For parents too, the real consideration seems to be the stratification along lines of pupil 'ability' or capacity to achieve.

In the first part of our research, we look explicitly at the extent to which high-achieving and low-achieving pupils are separated into and educated in different secondary schools – and how this changed between 1996 and 2002. We do this by examining differences in the composition of secondary state schools in terms of the academic achievements of pupils at the time they start school.

The analysis is based on pupils' results in their maths, science and English key stage 2 tests at the age of 11, the end of primary school, coupled with information on which secondary schools they move on to. These data are collected for nearly all state school pupils, so we can study what is happening for almost all schools and almost the entire population of pupils in England.



The average ability of children going into the best comprehensive schools is way above the average ability in the worst

What is the best way to analyse differences in the composition of schools? Previous research has typically used various segregation or inequality indices – single numbers that summarise the level of inequality at a particular point in time – but we adopt a more graphical approach.

Imagine ranking all pupils entering secondary schools in increasing order of their test scores at age 11. Pupils in the top 1% receive a score of 100, those in the bottom 1% receive a score of 1 and those in the middle a score of 50, and so on. For each secondary school, we can calculate the position in that ranking of the average pupil, a score that summarises the average intake ability in each school.

Then, with these average school scores, we can rank schools in the same way. The 1% of schools receiving the lowest-achieving average pupil get a score of 1 and the 1% with the highest-achieving average pupil gets a score of 100, and so on.

Plotting each school's average pupil ranking against its own ranking in the distribution of schools provides a fairly complete visual description of the way in which pupils with different prior achievements are segregated into different secondary schools. If there were very little segregation, then there would be very little

difference between the achievement of the average pupil as we move from the worst to the best schools, and the plot would tend towards the horizontal. As pupils become segregated along lines of ability, the plot steepens towards a 45-degree slope with the top 1% of pupils in the top 1% of schools and the bottom 1% of pupils in the bottom 1% of schools.

Figure 1 shows the picture for London for three years: 1996, 1999 and 2002. The top panel shows comprehensive schools only, while the lower panel shows all schools, including religious schools and grammar schools. For comparison, we also draw the 45-degree line that represents a hypothetical school system in which pupils are completely segregated according to their prior achievement.

It is clear that even for comprehensive schools, there is quite strong segregation by ability. The gap between the average pupil in the highest-ranking school and the average pupil in the lowest-ranking school spans almost one-third of the distribution of pupil achievement. In other words, the average pupil in the bottom school is in the bottom third of pupils ranked by test scores at age 11, while the average pupil in the top school is in the top third. In the bottom panel, which adds in other types of schools, the differences are even more pronounced.

What drives differences between school intakes?

Our analysis does not answer this question directly. But since comprehensive schools have no scope to choose pupils, these

Educational segregation is even greater when the analysis includes schools that can 'cream skim' pupils by ability or religion

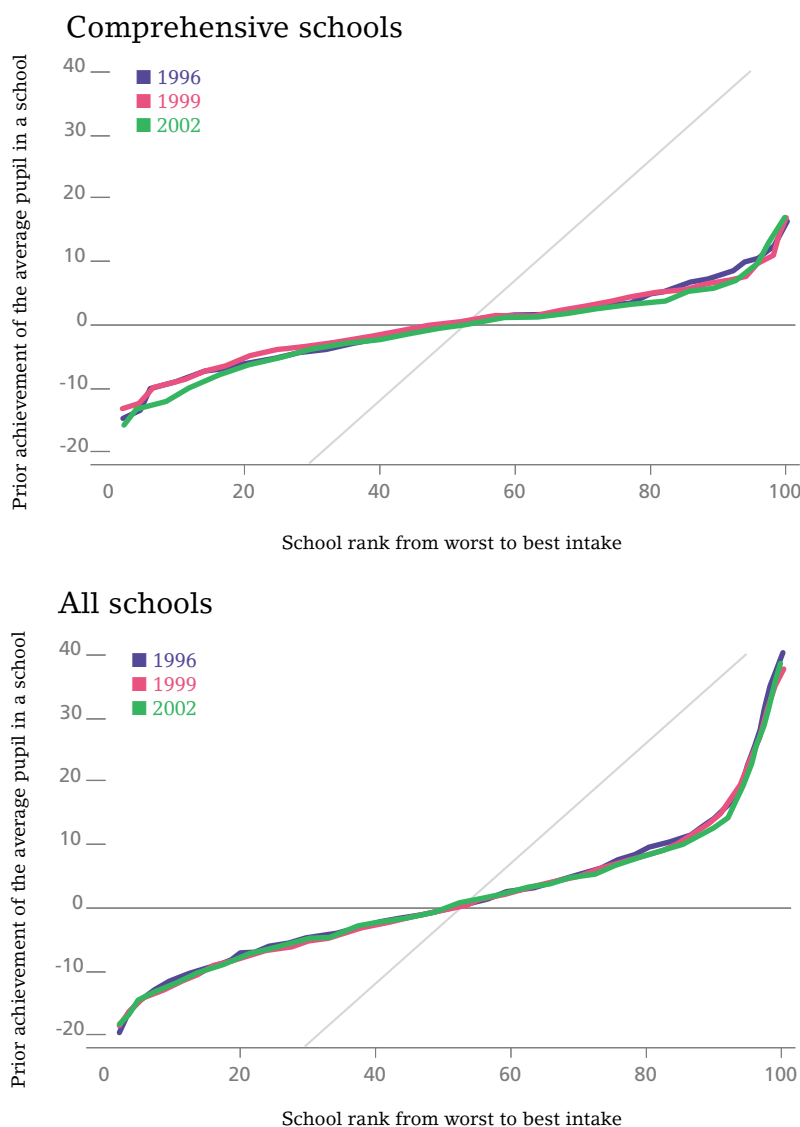
patterns are most likely to arise because these schools serve local neighbourhoods and different neighbourhoods contain pupils from very different socio-economic backgrounds. All the children in a rich neighbourhood go to school together, and all the children in a poor neighbourhood go to school together. Such differences arise not because of the freedom for parents and pupils to choose schools, but because of a lack of choice given where a pupil lives.

In contrast, some segregation could also arise because the highest-ability children are free to choose the same schools as other higher-ability children wherever they live – the story of self-selection that underpins the critique that school choice generates inequalities. This consequence of school choice is illustrated by the bottom panel: educational segregation is even greater when we include schools that can 'cream skim' pupils by picking according to ability or have other attributes – such as religious ethos – that make them likely to attract or choose pupils of different types and abilities.

Whatever the causes of educational segregation, a striking feature of Figure 1 is that there has been almost no change in recent years. Comparing the lines for 1996 to 2002 shows that almost nothing has changed over these years in terms of the way that pupils of different abilities are sorted into different schools. The picture in other regions of England is invariably the same: there are wide inequalities in intake between schools, but there has been no systematic change over the period of our analysis.

Other approaches to the question produce similar answers: for example, there are no regions in which the proportion of schools accommodating pupils with abilities among the top 5% is less in 2002 than in 1996, or where the proportion of schools accommodating pupils from the bottom 5% has decreased. In fact, our findings suggest that the general trend is towards a more

Figure 1: Segregation by achievement in secondary school intakes in London



even distribution of these groups across schools.

So overall, we do not find any dramatic or systematic changes in school composition in terms of the abilities of pupil intakes. This is an important result as it runs counter to the tales of increased stratification and segregation that are commonplace in academic, media and political circles. The idea that pupils of high- and low-ability have become increasingly segregated seems to be something of a myth, at least in recent years.

But there are large and stable differences in intake between schools of the same general type even if they have little autonomy in control of pupil admissions: the average ability of pupils going into the 'best' comprehensive schools is way above the average ability in the worst. It is surely this fundamental contrast – driven for the most part by geographical disparities in pupil background arising from residential segregation – that drives perceptions of inequity in school provision and of failings in the system.

Does segregation matter?

Whether the patterns of segregation that we find are cause for concern depends in part on whether such segregation is considered socially desirable, but also on whether peer group ability has any real impact on individual pupils. Anecdotally, schools often seem to be judged and chosen by parents on the basis of the kind of children they enrol, rather than the quality of their teaching or other facilities.

So do parents' apparent preferences mean that peer groups have a big impact on how well a child does at school and in later life? Certainly, pupils in schools with low-achieving peers are more likely to do badly later on, and pupils in schools surrounded by high-achievers are more likely to do well. But is this just because high-ability pupils tend to go to schools with other high-ability pupils and low-ability pupils go to schools with other low-ability pupils? Or does our peer group really matter for our own success?

Answers to these questions are important for a number of reasons. First, if peer groups matter, then a segregated school system means that children could be disadvantaged by the school they attend, even if teaching standards are as high there as anywhere else. This could lead to persistence or growth in inequality as the

lowest-achievers get the worst deal and high-achievers the best deal in terms of peer group quality. Whether, on balance, this inequality generates benefits or costs for society depends on whether the winners gain more than the losers – a question underlying the familiar debate about the benefits of streaming versus mixing in schools.

Aside from these issues, it is worth knowing if individual pupils respond to their peers, because it can mean that educational interventions that appear beneficial to one pupil in isolation may be even more effective when rolled out to the whole population. This 'social multiplier' effect arises because an intervention, such as a new teaching method, benefits a pupil directly but also indirectly via its impact on his or her schoolmates.

Our evidence on these questions is based on what happens to educational trajectories when pupils move from primary to secondary school and meet new schoolmates. We use this change in peer group quality to examine whether the differences between school intake illustrated in Figure 1 have any influence on a pupil's subsequent progress in tests up to the age of 14.

We find that pupils do make better progress in maths and English in the early stages of secondary school if their new schoolmates have a good record of prior achievement. And it really is prior achievement that seems to matter: other factors, such as ethnic mix, age composition and low-income schoolmates, have no direct effects on a child's progress.

This is encouraging because pupils' prior attainments are surely more amenable to early interventions than socio-economic and demographic characteristics. But it also means that the patterns of segregation in secondary schools could have real consequences in terms of educational inequality.

Even so, in line with most previous

research, we find that any contribution that peer groups make to a child's academic progress is quite small: a move from the worst to the best comprehensive school (in terms of the intake ranking in Figure 1) would make only a slight difference to how well a child progressed in the first few years of secondary school. It seems unlikely that the balance of educational success or failure will be tipped according to whether a child attends a school alongside high- or low-ability children.

This claim might seem puzzling given that parents seem to make great efforts to find schools with good peer groups. But better peer groups may provide other benefits – physical safety, emotional security, familiarity, lifetime friendship networks or simply exclusivity – which makes schools with good peer groups very desirable, even if they offer only slight academic advantages. Perhaps it is here that individuals really win or lose out through both socio-economic and achievement-based school segregation.

This article summarises 'Peer Effects and Pupil Attainment: Evidence from Secondary School Transition' by Stephen Gibbons and Shqiponja Telhaj, Centre for the Economics of Education (CEE) Discussion Paper No. 63 (<http://cee.lse.ac.uk/cee%20dps/ceedp63.pdf>) and 'Are Schools Drifting Apart? Intake Stratification in English Secondary Schools' by Stephen Gibbons and Shqiponja Telhaj, CEE Discussion Paper No. 64 (<http://cee.lse.ac.uk/cee%20dps/ceedp64.pdf>).

Stephen Gibbons is a senior lecturer in economic geography at LSE. **Shqiponja Telhaj** is a lecturer in economics at the University of Sussex. Both are research associates in CEP's education and skills programme.

Patterns of segregation in secondary schools could have real consequences in terms of educational inequality

IDEAS ROUNDABOUT



Only

Home Bias



(A2 (A20) A13)

Eureka Moments
Innovative Activity
A201

METROPOLITAN TABERNACLE
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STRAND UNDERPASS
AND WATERLOO BRIDGE
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FOR EIGHTEEN

Patent office ↑

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RED ROUTE

ALTER



Economists have long been sceptical of claims about the 'death of distance' – the idea that new technology has diminished the significance of geography for economic outcomes. Research by **Rachel Griffith**, **Sokbae Lee** and **John Van Reenen** on patent citations over time finds the first hard evidence that distance is indeed becoming less important.

Is distance dying at last?

Commentators have for years been claiming that economic activity no longer respects international frontiers. But while cheap communication, falling shipping costs and the internet make things easier, face-to-face interaction remains as important as ever, even in high-tech sectors like software and biotechnology – just think of Silicon Valley or Bangalore. And if one looks at trade patterns between countries, international boundaries still matter a lot.

Our new research finds the first evidence that distance really is dying – at least in the world of ideas. Having looked at over two million patent citations over a quarter of a century and broken them down by the country of the inventors (covering just about every nation in the world), we find that national barriers are crumbling when it comes to the flow of innovations, as measured by the relative speed of patent citations across countries.

We find that there was a great deal of 'home bias' between 1975 and 1990: for example, German inventors cited other Germans 14% faster than American inventors cited German patents. But the

really interesting thing is how these citations have changed over time: since 1990, the Americans have been only 5% slower at citing Germans than the Germans themselves; and the French only 1% slower. So even though information is spreading faster within countries, it has also started to flow really quickly between countries.

The importance of geography

Economists dating back to Alfred Marshall in the late nineteenth century have emphasised the importance of geographical proximity for the flow of ideas and the diffusion of technologies. Inventors find it hard to capture knowledge: like water, it 'spills over' to other people. Geographical proximity facilitates this process if face-to-face interaction is important, for example,

where knowledge is 'tacit' so that it is not codified in writing or in standard industry practices. Workers and managers meeting at formal and informal meetings and moving between firms will help to transmit new ideas between organisations.

The idea that closeness matters for the diffusion of knowledge also lies behind a number of government policies. Subsidies for research and development (R&D) generally target activities that are geographically located within the home country. These typically seek to attract shiny high-tech firms to locate in specific areas, based on the premise that their activities will have the highest 'positive externalities' – benefits not only for the investors but also for firms and workers nearby. Other policies aim to encourage clusters of high-tech firms, based on the belief that the sum of benefits from

When it comes to the flow of new ideas, distance is now dying

clusters of firms is greater than the constituent parts.

In contrast to the idea that geographical proximity is important for technology transfer, the notion of the 'death of distance' has recently flourished in the popular imagination (for example, Friedman, 2005; Cairncross, 1997; Coyle, 1997). Messiahs of globalisation claim that information travels around the globe at rapid speed from California to Calcutta through the internet, conferences, telephone and other communication devices. Under this view, geography plays little role.

There are plenty of anecdotes, but what is the hard evidence that distance matters? And to what extent have they changed over time?

Existing research: distance matters

Answering these questions turns out to be difficult for a number of reasons. First, how do we trace knowledge flows? And second, how can we distinguish the importance of geographical proximity for knowledge flows from other factors that may be associated with geography?

Patent citations have become an important source of information on the way that knowledge flows between firms and countries. When an inventor takes out a patent, they have to provide citations to the prior technology from which their ideas are drawn. This is a pretty direct measure of knowledge flows.

One prominent study that uses patent citations in this way is by Adam Jaffe and colleagues (1993). They show that inventors are far more likely to cite other inventors living close by than inventors in more distant locations.

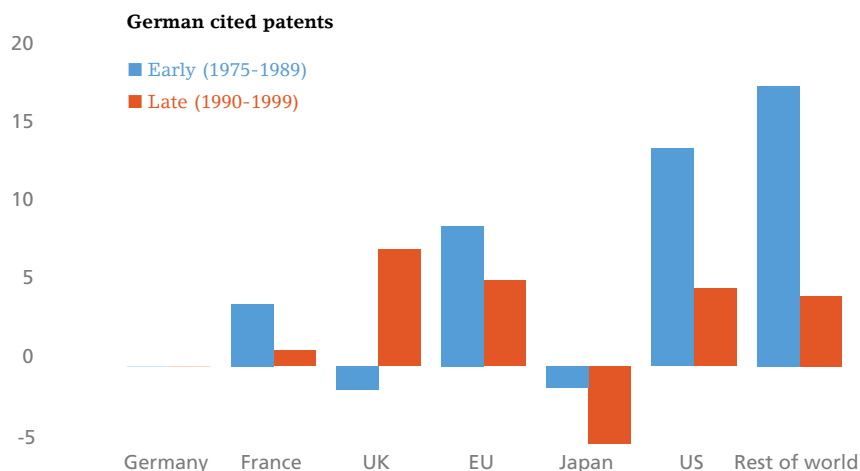
Several studies have followed this approach, and the consensus that has emerged is that knowledge really is subject to a significant degree of home bias. Our earlier study (Griffith et al, 2006) also shows that British firms who locate R&D labs in the United States are better able to tap into American knowledge than those that do not.

New research: distance starting to die

But much of this research uses older data. Our latest study aims to establish whether things have changed recently with

Figure 1: Distance matters less for the flow of ideas

Speed of citation: Example of inventions from Germany



Notes: This graph shows the relative percentage time (in mean number of days) from the date that a German inventor was granted a patent until the first citation of that patent (by the location of the inventor that made the citation). For example, the first bar (blue) for France in the early period indicates that the French inventor took 4% longer to cite a German invention than a German inventor took to cite another German inventor. This fell to 1% in the 1990s (red bar).

Innovations are flowing more quickly between countries, as measured by the relative speed of patent citations over time

innovations such as the internet. We use patent citations to address whether the rumours of the death of distance have been somewhat exaggerated. In particular, we look at the speed of knowledge flows between countries.

A simple look at the raw data suggests substantial evidence of home bias in the way that knowledge is transmitted: being geographically close does make knowledge transfer easier. But we also see evidence that distance has become less important over time for the international transmission of ideas.

Figure 1 plots the relative speed of patent citations across countries and over

Figure 2:
Distance matters less for the flow of ideas

Speed of citation: All other countries



time for the example of inventions discovered in Germany. These are all successful applications to the US Patent Office for inventors living in Germany in an 'early' period (1975-89) on the left and then in a 'later' period (1990-99) on the right.

Looking first at the early period, the height of each bar indicates how much slower foreign inventors were in being first to cite Germans relative to other German inventors. In the 1970s and 1980s, American inventors were about 14% slower in citing Germans than the Germans themselves.

Figure 2 looks at inventions cited in the other OECD countries. The fact that the bars in both Figures 1 and 2 are almost all positive suggests that the phenomenon of home bias in ideas is alive and well – Germans are quicker at citing other Germans, British quicker at citing other British, and so on. What is more interesting is how home bias has changed over time – on average the bars in the later period are lower than the bars in the earlier period. This suggests that home bias in ideas has fallen. After 1990 in Figure 1, the French are only about 1% slower in citing Germans, and the Americans only about 5% slower in citing German inventors, than the Germans themselves (only the British seem to be slower off the block in citing Germans in the 1990s!).

This looks promising and suggests distance is dying. But there are many reasons why the simple patterns in the raw data might be misleading. In particular, knowledge may spread more or less quickly due to many patent characteristics that may be poorly captured by observable characteristics, and may be associated with geography. For example, if high quality patents are cited more quickly than lower quality patents, and if high quality patents are

Notes: As in Figure 1. Height of bar indicates how much slower a country is in citing another country.

geographically clustered for some other reason, then this could give the impression of home bias whereas in fact it is to do with the higher average quality of inventors in one location.

The traditional way to deal with this sort of problem in econometric research is to control for unobserved and correlated 'fixed effects' (things which we don't measure but are pretty much fixed over time). Lee (2007) develops an econometric estimator that allows us to do this by taking 'quasi-differences' over time between multiple citations on the same patent.

Our research suggests that controlling for these unobserved characteristics makes an important difference to estimates of the importance of home bias in innovative activity:

- First, the evidence for home bias is much weaker once we control for fixed effects. The non-fixed effects models (which are standard in the research literature) suggest home bias in a majority of cases, whereas our preferred models indicate home bias in only a minority of cases.
- Second, home bias is much stronger in the 'traditional' sectors of the economy (such as chemicals and mechanical engineering) than in more 'modern' sectors (such as computing). This is consistent with the idea that information diffuses faster internationally in the modern sectors.
- Finally, and most interestingly, we find evidence that home bias has declined over time, being much stronger in the pre-1990 period than the post-1990 period. We interpret this as suggesting that information flows more easily across national boundaries as the cost of international communication and travel has fallen.

Don't bury economic geography just yet

So the bottom line is that when it comes to the flow of new ideas, we find hard evidence that distance has become less



For traditional sectors with mature technologies, distance is not yet dead

important over time. But for many sectors, especially in the more traditional and mature technologies, it is not yet dead.

One policy implication of this research is that it makes less sense to subsidise corporate R&D if the ideas generated benefit other countries very quickly. Similarly, firms may worry more that their innovations may earn them profits for less time than in the past, as foreign firms learn to imitate and leapfrog them.

If new ideas benefit other countries more quickly nowadays, it may make less sense to subsidise corporate R&D

This article summarises 'Is Distance Dying at Last? Falling Home Bias in Fixed Effects Models of Patent Citations' by Rachel Griffith, Sokbae Lee and John Van Reenen, CEP Discussion Paper No. 818 (<http://cep.lse.ac.uk/pubs/download/dp0818.pdf>).

Rachel Griffith and **Sokbae Lee** are at University College London.

John Van Reenen is director of CEP.

Further reading

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in brief...

Smoking during pregnancy

Maternal smoking during pregnancy remains prevalent in many countries despite decades of research testifying to the harm it imposes on the unborn child. Following the 1998 'Smoking Kills' White Paper, which identified ending maternal smoking as a target of future UK government policy, a national telephone helpline was launched to help pregnant mothers devise strategies for quitting smoking.

But since one in five mothers in the UK still smoke while pregnant, current policy does not seem to be having a big impact. To gain a better understanding of how policy can get its message across more strongly and target pregnant mothers more effectively, research by Emma Tominey explores how smoking during pregnancy lowers child health at birth.

The study confirms that mothers who smoke during pregnancy will have smaller babies – typically 5.4% (6.5oz) lighter than other babies. But around half of this damage is because of 'unobservable traits' of the mother – including other health risks she might take, such as drinking alcohol, and her nutrition and knowledge of healthy behaviour.

The research also finds that the lasting harm to babies of smoking during pregnancy is greatest if the mothers have a lower level of education. Children born to mothers who left school at the age of 16 suffer double the harm for each cigarette smoked. This suggests that the government must target its anti-smoking policy directly at poorly educated families.

And it is important to note that women who do smoke in the early stages of pregnancy should not be written off as being too late to help. Surprisingly, the research shows that the harm to the baby is essentially reduced to zero if the mother quits by month five of the pregnancy. This is much longer than conventional wisdom and previous research have suggested.

Possible causes for this finding could either be that the harm from smoking accumulates during the final months of pregnancy, or because the mothers who quit smoking simultaneously reduce their health risks in other ways. Either way, this tells us that there is more time than we thought to help the mothers change their behaviour during pregnancy.

Overall, the research suggests that while stopping mothers smoking during pregnancy is important, it is only half the battle. Other studies have shown that the effects of being born underweight stay with a child throughout its life, affecting its health, education and earnings potential (see Behrman and Rosenzweig, 2004, and Black et al, 2007). This study shows that in order to lower the incidence of underweight births, stopping a mother from smoking must be combined with helping her to be healthier in other areas of her life.

Previous studies have identified a link between smoking and low birth weight, but none have looked in such depth at whether the education of the mother can alter this and how the harm accumulates during pregnancy. Emma Tominey's study analyses data on the lives of 6,500 children and their mothers, and goes into exceptional detail about the mothers' lifestyle, tracking them from their child's birth until the age of 42. This proved to be very important, as not only does the harm vary according to the mother's education, but traits of the mother that are often unobservable account for around half of the harm.

The study calls on the government to alter radically its policy on helping pregnant women quit smoking, in particular targeting the children of poorly educated mothers. A much more holistic approach to improving child health in pregnancy is needed to help thousands of children break out of the poverty trap.

This article summarises 'Maternal Smoking During Pregnancy and Early Child Outcomes' by Emma Tominey, CEP Discussion Paper No. 828 (<http://cep.lse.ac.uk/pubs/download/dp0828.pdf>).

Emma Tominey is an occasional research assistant at CEP.

Further reading

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in brief...

Freedom fries: when international relations damage international trade

When public attitudes towards a foreign country turn negative, what are the effects on trade, and especially trade in firm inputs?

Guy Michaels and **Xiaojia Zhi** explore this question using the deterioration in Americans' opinions of France following the two countries' dispute over the invasion of Iraq – a deterioration so drastic that French fries were renamed 'freedom fries'.

When the French government opposed US efforts to obtain a United Nations mandate to use military force against Iraq in 2002, the resulting standoff led to a massive deterioration in Americans' opinion of France. Our research uses this episode to track the impact of such worsening international relations on the business decisions of firms involved in trade between the two countries. We find significant effects: worsening attitudes decreased trade.

According to US polls of public opinion, in February 2002, 83% of Americans viewed France favourably; by March 2003, this proportion had declined to 35%. Even three

years later, in February 2006, the fraction of Americans with a positive view of the French had recovered only as far as 57%.

Very negative attitudes towards France became common even among affluent, college-educated Americans, so they were likely to be prevalent among managers. By contrast, attitudes towards Germany worsened much less and recovered quite quickly, and attitudes towards Britain, Italy and Spain changed very little.

The US government also singled out France in particular: Condoleezza Rice, then the president's national security

International trade flows may be sensitive to large changes in relations and attitudes



US imports from France declined sharply following the two countries' standoff over Iraq

adviser, was quoted by Reuters in March 2003 telling associates to 'punish France, ignore Germany and forgive Russia'. There were also calls in the media to ban French products, and the House of Representatives cafeteria began to serve 'freedom fries' instead of French fries.

This shock to relations between France and the US provides an ideal opportunity to examine the effect of attitudes on trade. In other circumstances, international trade may in itself affect attitudes. For example, perceived gains from trade may motivate the US and China to improve relations. But at the same time, increased trade may cause Americans to fear that China threatens their jobs, worsening attitudes.

But in the case of the United States and France, there are clear reasons for the worsening attitudes and those reasons are unrelated to trade. The US-France setting also avoids the problem that worsening attitudes may be correlated with increased personal risk; this may be a problem in other circumstances, where worsening attitudes may cause risk of war or terrorism. And using other OECD and eurozone countries as plausible counterfactuals for France makes it possible to net out the short-run changes in trade that may have taken place in the absence of worsening relations.

Our study finds that US imports from France fell by about 15% and US exports to France fell by about 8% compared with other OECD or eurozone countries. This decline was due in large part to a fall in France's share of the quantity of inputs traded with the United States. There was a similarly large decline in both US business trips and tourist visits to France, suggesting that worsening relations did indeed affect transactions between firms.

One interesting aspect of this natural experiment is that it is difficult to rationalise the decline in trade of inputs using standard arguments of firms choosing inputs that minimise their costs of production. The attributes of inputs produced in France and by competing input producers, and the characteristics of firms' production processes in the United States are not likely to have changed in the short run. This suggests that tastes – and not only simple cost-minimising calculations – may affect firms' choice of inputs.

These results also suggest that international trade flows may be sensitive to large changes in relations and attitudes. We conclude that the effect of attitudes may be particularly strong where there are strong incentives to punish a foreign country – as in the case of commodities used by governments – or where the availability of close substitutes lowers the cost of changing a firm's input suppliers. This result may be especially important for understanding the robustness of trade flows between Western countries and other important trade partners.

This article summarises 'Freedom Fries' by Guy Michaels and Xiaojia Zhi, CEP Discussion Paper No. 815 (<http://cep.lse.ac.uk/pubs/download/dp0815.pdf>).

Guy Michaels is a lecturer in economics at LSE and a research associate in CEP's labour markets programme. **Xiaojia Zhi** is a research economist at CEP.

We need a combination of psychology and economics to understand people's savings and investment decisions, according to **David Laibson**, who recently delivered the 2007 Lionel Robbins Memorial Lectures at LSE. *CentrePiece* editor **Romesh Vaitilingam** interviewed him about his work in the new field of behavioural economics.



The psychology of savings and investment

Romesh Vaitilingam: David, you're an economist but your lectures on savings and investment are apparently about psychology. What is it that you're thinking about here?

David Laibson: Well, I am an economist but I spend a lot of time thinking about the psychological factors that influence people's choices and I've titled these lectures 'the psychology of savings and investment' because I want to contrast the psychological approach with the traditional classical economic approach.

When I went to graduate school, we were taught that everyone was rational and that they optimised. More recently, the view has developed that while most of our economic behaviour is pretty rational and pretty optimal, we do occasionally depart from that, and such departures can be studied, measured and modelled. This lecture series is about those efforts to enrich our understanding of economic behaviour by adding the psychological components that, in essence, complete the picture.

RV: So really this is a fairly recent innovation, bringing these psychological

understandings into economics.

DL: The 'big bang' for this field came in 1979, when a very important paper by Danny Kahneman and Amos Tversky was published. The paper was about something called prospect theory – or how people think about risky outcomes. Had Amos not died, they both would have been awarded a Nobel Prize; as it turns out, Danny received the Nobel Prize in 2002.

But even though the field started in 1979, it had very few followers until the 1990s. There was a period in the wilderness in the 1980s when there were just a handful of people actively doing behavioural economics. Then in the 1990s, life really got started in terms of more and more people signing on to this endeavour. And now it's an area that has a great deal of interest, enormous graduate student interest and a lot of research taking place. You could almost say that it's become a fad.

RV: So tell me a little more about how this actually developed. For years and years non-economists have said you guys have this very peculiar view of human nature.

What was it that suddenly made it possible to introduce psychology? Was it something to do with the tools and techniques that economics had developed?

DL: I think there were two sets of developments that happened during the last 25 years. The first thing was that we began to find empirical evidence that contradicted the rational actor model. Now just to be clear: no economist today or 50 years ago believes that people are truly perfectly rational.

What economists have always said is that the rational actor model is a very good approximation of how people behave. It gets things mostly right just like a map gets things mostly right. A map of London may miss out the hills and valleys but it basically tells you how London is laid out. So just as a map can be useful even if it's not perfectly right, so the rational actor model was always felt to be good enough.

But in the last few decades, more and more evidence – both experimental evidence from the laboratory and evidence from real markets – like financial markets – has contradicted many of the predictions of the rational actor model.

By understanding the psychological foundations of human decision-making, we can build institutions that help people do what they want to do

The other set of developments is that we have developed theoretical frameworks that enable us to formalise these departures. We have alternative models for mathematically representing human behaviour. These alternatives don't leave the rational actor model aside but add to it and improve it. Now we have the combination of new data and supplemental models that are jointly moving economics forward.

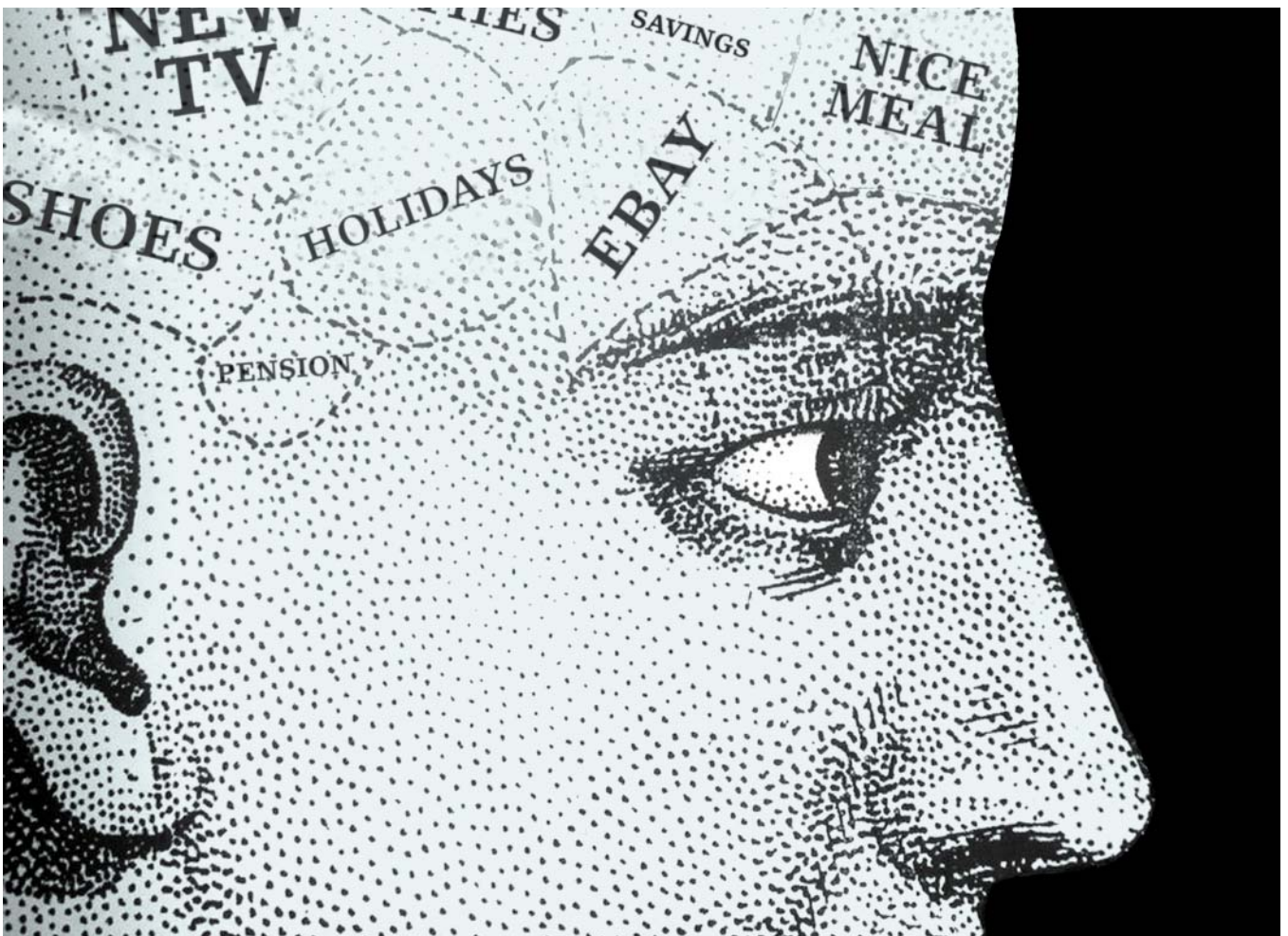
RV: Tell me about your own research programme, and particularly how it relates to one of the great policy challenges, getting people to save enough to pay for their old age. What kind of findings are you coming up with and what lessons can we learn from them?

DL: There are essentially two kinds of thinking in my research. The first aims to understand the foundations of human preferences and human decision-making. And the second is to think about how we can build institutions that help people do

what they want to do.

The underlying psychology is the psychology of instant gratification. It is the psychology of a decision-maker in a household who puts enormous weight on the present and then drastically discounts events that might only be a week away in time. It's the person who says, I know I should exercise and I'll do that next week but right now these chips look very good. Or the person who says, I know I should save and I'm going to start saving very seriously next month but tonight, how about a bottle of champagne?

This psychology can be modelled and measured, and I've spent a lot of my academic career trying to do that. But then the question arises, if people do put enormous weight on the present, it might be awfully hard for them to save. We see that people say that they care a lot about the future. They say, look, I'm not going to save today but I will save tomorrow. I'm not going to exercise now but I will exercise later. So it's not as if we think that our futures are irrelevant, just that we



aren't willing to invest in them right now. We prefer to make those investments next month.

So we need to build institutions that help get us over that hump. And a lot of the work that I'm doing is trying to figure out how to create pension plans or savings systems that help people save for retirement. These are people who might not be able to do it on their own but are thrilled when you make it easier for them by providing, say, a defined contribution pension plan. This would be a system, for example, where you're a new employee at a firm and you're automatically enrolled in the pension scheme, with some fraction of your salary deposited every month directly into a retirement account.

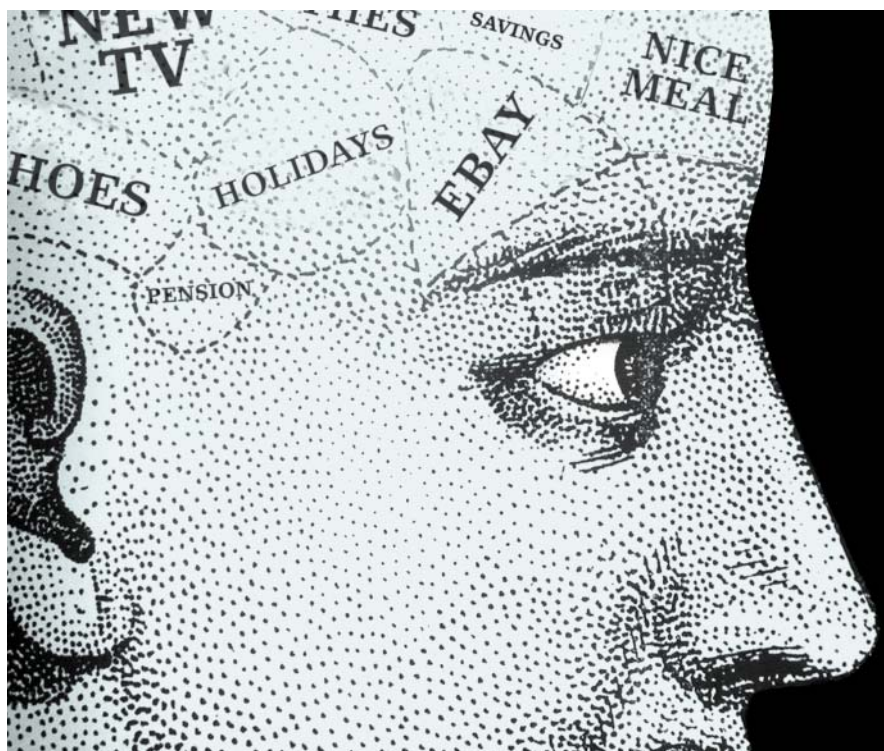
These automatic enrolment plans are highly effective. People like them and they don't opt out of them. They accumulate large bodies of wealth for retirement. Yet, if you were to change the system and set it up so that instead of people being automatically enrolled they are only given the option to enrol, you find that very few people join these plans. It takes years for the typical person to enrol in a plan without automatic enrolment.

So we have a situation where our tendency to procrastinate undermines our willingness to save. One natural way around that is to make savings automatic and when you do that, people are very satisfied with the net result. A lot of what I'll be talking about in these lectures is describing the underlying psychology of resisting savings and the institutions that help people save, which is what they tell us they want to do anyway.

RV: So your work is informing policy that will, in effect, save people from themselves.

DL: That's right. But we don't want to be too paternalistic. I'm an advocate of giving people good defaults and always giving them the option to opt out if they don't want to save. I recognise that government sometimes goes too far and that we don't want to tell people how to live their lives. But I also recognise that left to their own devices completely, people sometimes make bad choices.

So we've defined the middle ground, a hybrid system that nudges people in the right direction, encouraging them to do things that they view as desirable without



compelling them or coercing them in ways that are too paternalistic or heavy-handed. Basically what we want to do is to make savings easy. If you don't want to save, that's fine, you can opt out of the system. But if you want to save, which most people think they should do, then it's made simple for you, not difficult and time-consuming.

RV: Is there also a role for education in this? Few people seem to have a good grasp of basic numbers, but can we teach them to manage their finances more effectively?

DL: Well, it's true that people have very low levels of financial literacy, and some of the work that I've been involved in has been studying these financial vulnerabilities in terms of low levels of education or knowledge about finance. But if we think that education is an important piece of the puzzle, we have to not only document that education is missing but also show that educating people leads them to behave in better ways.

Surprisingly, there's very little evidence that supports that kind of policy. It's not clear that education programmes can

increase people's financial literacy and improve their behaviour in ways that are cost-effective. While it's true that if we gave everyone a PhD in finance, we'd probably see the world saving much more correctly and investing more rationally, that's an awfully expensive intervention.

Then the question becomes, can we strip it down and generate much simpler, cheaper, quicker interventions that get the job done? And the answer so far is, maybe not. It doesn't look like there are easy educational interventions that train people to make optimal or nearly optimal financial decisions.

For example, it's a good idea to have a high school curriculum that emphasises more economic and financial issues. But even if we did, it might well be the case that by the time that 18-year-old reaches 48, the world will have changed. And what she learned in high school may no longer be that relevant for what she will have to do as an adult.

If I had been taught how to save for retirement when I was in high school, I would have been taught, find a company with a good defined benefit pension plan and work there for the rest of your life. And that turns out to be terrible advice. First, all of those plans are being

terminated. And second, in the job market of today, you don't stay at one company your whole life: you move around and if you move around, as you should to advance your career, you're going to lose those pension benefits.

So if we think education is important, we have to first prove that we actually can cost-effectively educate people and help them make better choices. I think that automaticity is a more cost-effective tool in helping people make good choices. Rather than spending a lot of time and energy educating someone, which may or may not get them to make a better choice, I know that if I automatically enrol them in a defined contribution pension plan with a 5, 6 or 7% savings rate and I automatically allocate their assets to a life cycle fund, they're going to do very well. And they're going to basically stick with this good default.

So the question is, do I want to spend thousands of dollars on education for that person or do I want to automatically enrol them in the pension plan with the default savings rate of 7% and the default asset allocation to a life cycle fund with relatively low fees. I know the latter works. It still remains to be shown that the education works.

RV: What about the psychology of investment? How does that fit into your analysis?

DL: Many of the investment choices that the typical investor makes are self-defeating, whether it's return-chasing, avoiding risks because of loss aversion or failing to recognise the importance of fees in reducing returns. Again and again, economists are documenting that people make financial mistakes. We have to identify those mistakes, understand their sources and build institutions that help people avoid them.

So that's where the investment side comes in. It's easy to make bad choices in financial markets: choosing the wrong mutual funds, choosing the wrong asset classes, failing to diversify, failing to hold a world portfolio and instead just holding a domestic portfolio. The typical investor needs help, perhaps through education and perhaps through defaults, to improve their balance sheet.

Another issue is employer stock. In the United States, investors in defined

contribution pension plans often hold an alarmingly high fraction of their wealth in the stock of their employer, which is, of course, putting all their eggs in the same basket. You don't want your job to be on the line and your retirement account to collapse at the same time, which is what happened at Enron and many other firms in the early 2000s.

We've got a lot to do in measuring and then understanding the psychological underpinnings of this kind of investment mistake, which will lead us to build better institutions that help people avoid these mistakes.

RV: So in terms of these institutions you're looking to design, what kind of impact are your research findings and those of your colleagues in this field starting to have on policy-makers? Are these ideas starting to feed into practice?

DL: The work that my collaborators and I are doing and the work of many other economists in this field, have had an effect on what's going on in financial markets and on the regulators both in the United States and around the world.

In 2006, the United States passed the Pension Protection Act (PPA), which basically made defaults the official policy of the US government. The PPA uses defaults to help people save in their retirement accounts. The Department of Labor recently produced a set of regulations that establish what is and what is not an appropriate investment for these default funds. The UK is about to initiate its own major policy programme using defaults. And we're seeing defaults show up in many countries around the world.

So policy-makers are embracing the idea that a) investors sometimes make mistakes and b) institutions that aren't that complex or that controversial can avoid a lot of these problems. And I'm happy to say that I think the pensions world of 2010 is going to look a lot different and a lot more practical and useful to unsophisticated investors than the pensions world of 2000.

The pensions world of 2010 is going to look a lot more useful to unsophisticated investors than the pensions world of 2000

David Laibson's Lionel Robbins lectures were delivered on 19, 20 and 21 November 2007 in the Old Theatre at LSE. Recordings of the lectures and slides from the lectures are available here: <http://cep.lse.ac.uk/interviews/>

David Laibson is professor of economics at Harvard University. More on his research can be found here: <http://www.economics.harvard.edu/faculty/laibson>

Many blame globalisation for growing wage inequality in the UK. But according to research by **Giulia Faggio, Kjell Salvanes** and **John Van Reenen**, the rise in inequality is better explained by increasing dispersion in the productivity of firms related to their use of new technology.

Inequality of individual wages and the dispersion of firm productivity

Wage inequality has increased substantially in both the United States and the UK in the last 30 years. This fact, which is now firmly established, has fuelled debate about appropriate policy responses, including more progressive taxation, education and training, tougher corporate governance to control the remuneration of top management, strengthening unions and minimum wages, curtailing trade and beefing up social security. Some critics of pro-market reforms claim that rising inequality is evidence that liberalisation helps the rich at the expense of the average worker. For others, rising inequality is used to argue for programmes to upgrade skills.

But a proper policy response requires an understanding of what has caused wage inequality. Much research shows (see, for example, the summary in Machin

and Van Reenen, 2007) that an important part of the rise in inequality comes from increases in inequality among similar workers – what economists call ‘within-group’ inequality. This means that workers with a similar age, gender, skill and industry group tend to be paid increasingly dissimilar wages.

Within-group inequality may be driven by the same factors explaining the broader distribution of wages between workers. For example, if technology increases the payoff to a university education it is also more likely to increase the wages of more able graduates more than those of less able graduates. But the increase in within-group inequality may be driven by other factors – such as declining union membership and the minimum wage (Goldin and Katz, 2007).

Technology-based theories of within-group wage inequality share a common prediction: since workers’ pay is linked to

their productivity, increases in wage inequality should be accompanied by increases in ‘productivity dispersion’. In other words, the productivity distribution for firms should have widened.

Our new study looks first at individuals’ earnings and firms’ average wages and shows that the increase in wage dispersion between people is mainly due to an increase in wage inequality between firms. In other words, the internal structure of wages within firms has not widened as much as the difference in average wages between firms (in the same industries). This is an important finding when looking for the causes of wage inequality. It suggests that little of the growth in inequality is the result of changes in the way firms treat their own workers.

Hundreds of papers have documented a close correlation between firms’ average wages and firms’ average productivity

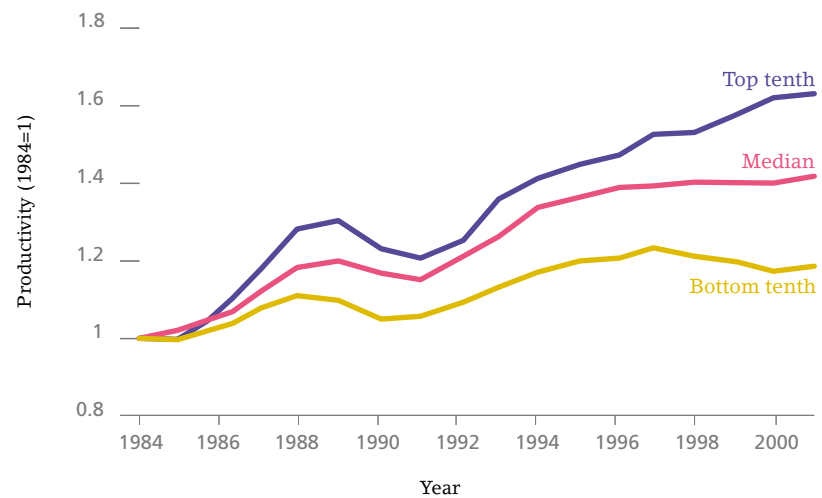
beginning with the pioneering work of ex-Monetary Policy Committee members Sushil Wadhvani and Steve Nickell in the 1980s at the CEP (see, for example, the summary in Layard et al, 2005). We also find that this relationship persists and has grown stronger, suggesting that firms' characteristics are important in understanding the evolution of wage inequality.

To test the link between productivity and inequality, our research looks at changes in firm productivity, mainly measured by value added per worker, over time. We focus on the differences between high- and low-productivity firms among representative samples of hundreds of thousands of British firms.

Previous research has studied the manufacturing sector (Dunne et al, 2004; Haskel and Martin, 2002), but we analyse both the manufacturing and service sectors of the UK economy since the two sectors have experienced very different trends. In particular, the manufacturing sector has been in rapid decline, which means that the least productive firms are disappearing from view, compressing the observed distribution. Consistent with this fact, productivity inequality has risen much faster in services than in the manufacturing sector since the early 1980s.

It is well-known and entirely understandable that different firms have

Figure 1:
Productivity dispersion in the UK economy, 1984-2001



Note: Productivity is defined as the log of value added per worker. Values are indexed to be 1 in 1984, so the lines show the growth in productivity at different parts of the distribution. The upper line is at the 90th percentile, the middle line is the median and the bottom line is at the 10th percentile.

Much of the rise in wage inequality is driven by increasing differences in wages among firms in the same industry



different productivity levels. Some firms are better managed and use better technology than other firms. But an original finding of our work is that this productivity gap between firms has widened. We look at two groups of firms from opposite ends of the productivity distribution: one at the top (90th percentile) and one at the bottom (10th percentile).

So productivity inequality rose substantially over the period (see Figure 1). Between 1984 and 2001, productivity in our sample rose by about 49% (40 log points) for the median firm. But for firms near the bottom (the 10th percentile) there was a rise in productivity of only 22% (20 log points) whereas for firms near the top (90th percentile) productivity has risen by about 82% (60 log points).

Our research shows that changes in labour productivity are mainly driven by changes in 'total factor productivity', rather than changes in the amount of buildings or old capital equipment used. These results suggest that technological differences among firms may be the underlying cause of increasing dispersion. Using data on the use of information and communication technologies (ICT), we show that productivity dispersion rose most strongly in sectors where ICT use grew most rapidly and intensively. The rise in productivity dispersion did not seem closely related to imports or to trade unions.

Finally, we also document a rise in productivity dispersion in France and Norway in the 1990s, although the rise was smaller than in the UK. Such

comparisons are useful because when 'general-purpose technologies' such as ICT become ubiquitous, the impact on firms is felt worldwide. Cross-country comparisons make it possible to distinguish general effects from changes specific to the UK.

In terms of policy, our findings suggest that the causes of rising inequality are primarily structural and related to new technology rather than to trade or institutions. Thus, contrary to what some have argued, greater trade protectionism or the re-energising of unions may do relatively little to reverse the increase in inequality.

A better strategy would be to concentrate on raising the skill and education levels of the workforce, particularly of those at the bottom of the ability distribution. This means not just improving the quantity of schooling for disadvantaged groups, but increasing the quality of school and pre-school education.

The increase in the productivity dispersion of firms is mainly in services, especially in sectors where ICT use grew most rapidly and intensively

This article summarises 'The Evolution of Inequality in Productivity and Wages: Panel Data Evidence' by Giulia Faggio, Kjell Salvanes and John Van Reenen, CEP Discussion Paper No. 821 (<http://cep.lse.ac.uk/pubs/download/dp0821.pdf>).

Giulia Faggio is an economist at Citigroup Inc. in London and a CEP research associate. **Kjell Salvanes** is at the Norwegian School of Economics and Business Administration. **John Van Reenen** is director of CEP.

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A major source of rising inequality is greater dispersion in firms' productivity related to their use of new technology



What are the effects of increased immigration on the wages and employment of people who are already here, whether they are native-born or earlier immigrants? Research by **Marco Manacorda, Alan Manning** and **Jonathan Wadsworth** investigates.

The labour market effects of immigration

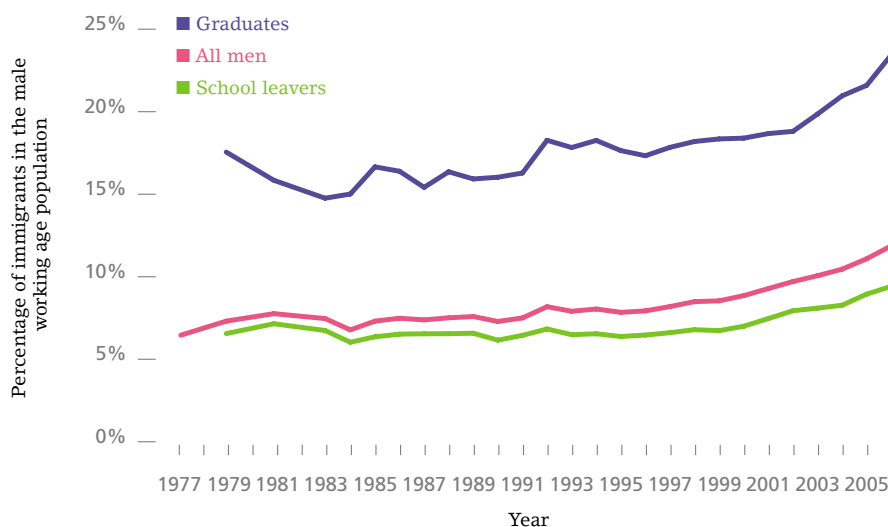
During the past ten years there has been a significant increase in the number of individuals coming to live and work in the UK. By 2007, 12.5% of the working age population had been born overseas, up from 8.5% at the end of the last recession in 1993 and 7% in the mid-1970s.

The addition to the UK labour force over this period caused by the rise in the number of working age immigrants from 2.3 to 4.2 million is about the same as that stemming from the increase in the native-born working age population caused by the baby boom generation reaching adulthood. The relative rise in immigrant numbers in recent years has been greater among those with higher levels of educational attainment (See Figure 1).

These trends have stimulated a heated debate about the effects of immigration, a debate that has taken on renewed vigour following the wave of immigration from the countries that have recently joined the European Union and following evidence of a loosening of the UK labour market.

Yet, despite immigration being at the forefront of the political debate, research-based evidence on its effects on the labour market is far from conclusive. The largest body of evidence comes from the

Figure 1:
Immigrant shares in male population of working age



United States, where researchers have reached different conclusions. In a number of papers, David Card at Berkeley finds little discernible impact of immigration on the wages of native-born workers, while George Borjas at Harvard argues that immigration has a pronounced effect on the native wage structure.

Evidence for the UK is scant and we should not automatically assume that the impact of immigration will be similar to

that found in the United States. The most convincing study – by Christian Dustmann and colleagues – finds that immigration has no large discernible effect on the level of native wages.

At first glance, this finding is puzzling since simple economic reasoning and perhaps popular belief suggest that a large increase in labour supply – such as the one brought about by immigration – should lower the wages and/or

employment of workers in the recipient country. But this conclusion is based on the often unspoken assumption that natives and migrants are highly substitutable in production – that an employer can easily replace a native-born worker with an equally skilled migrant worker. This need not be the case and it is therefore a matter for empirical verification.

A simple test of the degree of substitutability between these different production inputs is the responsiveness of the wage differential between native and migrant workers with any given level of skill to labour force changes brought about by migration. The intuition behind this test is that if natives and migrants are perfectly substitutable in production, we would expect their wages to respond similarly to changes in labour supply, be it

from natives or migrants, leaving the differential unaffected,

Conversely, if we find that the native-migrant wage differential is sensitive to the share of migrants in the population, and in particular if this differential increases as migration rises, this will be evidence of imperfect substitutability, potentially explaining why natives appear to suffer few losses from migration.

To do this, our study focuses on men's labour market outcomes using micro-data spanning the period from the late 1970s to the mid-2000s. Because it is well known that workers with different labour market experience and skills are imperfect substitutes in production, we decompose the labour force into different groups defined by age and education in addition to migration status. We estimate the trends in immigration along these

dimensions as well as the correlation between these trends and the wages and employment of natives and previous migrants.

Measuring migrants' skills is not an easy task with UK data since the definition of qualifications varies between natives and migrants, with large numbers of migrants being classified in official surveys as holding unspecified 'other qualifications'. To cut through this problem, we measure completed education in terms of the age at which the individual left full-time education. According to this metric, over the three decades of analysis, migrants have been on average more skilled than natives and increasingly so.

This is shown in Table 1. The relative supply of skilled to less skilled labour has grown more among immigrants. At the



The main labour market impact of increased immigration to the UK is felt by immigrants who are already here

Table 1:
Male immigrants and native-born workers in Britain
(five year averages)

	1975	1985	1995	2005
Percentage share of university graduates among:				
Native-born	6.0%	12.2%	15.4%	21.6%
Immigrants	9.9%	22.7%	32.9%	40.4%
Percentage wage gap between university graduates and school leavers among:				
Native-born	12.3%	12.2%	16.4%	24.4%
Immigrants	25.7%	24.3%	29.6%	29.9%

same time, the returns to education have risen faster for natives. A way to rationalise this is that the returns to education among each of these groups respond to their own relative supply, implying imperfect substitutability.

Our estimates indicate that a 10% rise in the share of immigrants in the UK population is associated with an *increase* in the native-migrant wage differential of around 1.9%. We take this as evidence that migrants and natives are imperfect substitutes in production.

This finding is highly robust and squares well with our other finding that the extent of occupational segregation between migrants and natives in the UK labour market is sizeable. We show that between 20% and 34% of immigrants would have to change jobs to match the occupational distribution of employment among natives.

Interestingly, we find that migration particularly affects wage differentials between natives and recent migrants as well as those who migrated in adulthood. It appears that newly arrived migrants bear

force brought about by immigration over the three decades of our analysis are due to the inflow of skilled migrants. Because of this, our study is unable to shed much light on what appears to have been a recent increase in unskilled migration. This inflow might have rather different effects on the wage and employment structure of natives than the one estimated in our research.

Indeed our analysis shows that unskilled natives are relatively more substitutable with respect to migrants than skilled natives, although differences between the two groups are not statistically significant. More data and longer time series are needed to estimate this effect precisely.

Newly arrived migrants bear disproportionately the cost of increased migration in terms of lower wages

disproportionately the cost of new migration inflows. This cost manifests itself in terms of lower wages rather than employment losses.

We use these estimates to determine the effect of increased immigration on the level of native wages. Our calculations show that this effect is negligible. This result depends on the imperfect substitutability between migrants and natives coupled with the fact that migrants still account for a relatively low share of the workforce.

Our conclusion does not imply that immigration to the UK has no costs, but rather that the effects on groups other than immigrants themselves has been, on average, small.

As a caveat to our conclusion, recall that most of the changes in the labour

This article summarises 'The Impact of Immigration on the Structure of Male Wages: Theory and Evidence from Britain' by Marco Manacorda, Alan Manning and Jonathan Wadsworth, CEP Discussion Paper No. 754 (<http://cep.lse.ac.uk/pubs/download/dp0754.pdf>).

Marco Manacorda is reader in economics at Queen Mary, University of London and a research associate in CEP's labour markets programme. **Alan Manning** is professor of economics at LSE and director of CEP's labour markets programme. **Jonathan Wadsworth** is at Royal Holloway, University of London and a senior research fellow in CEP's labour markets programme.

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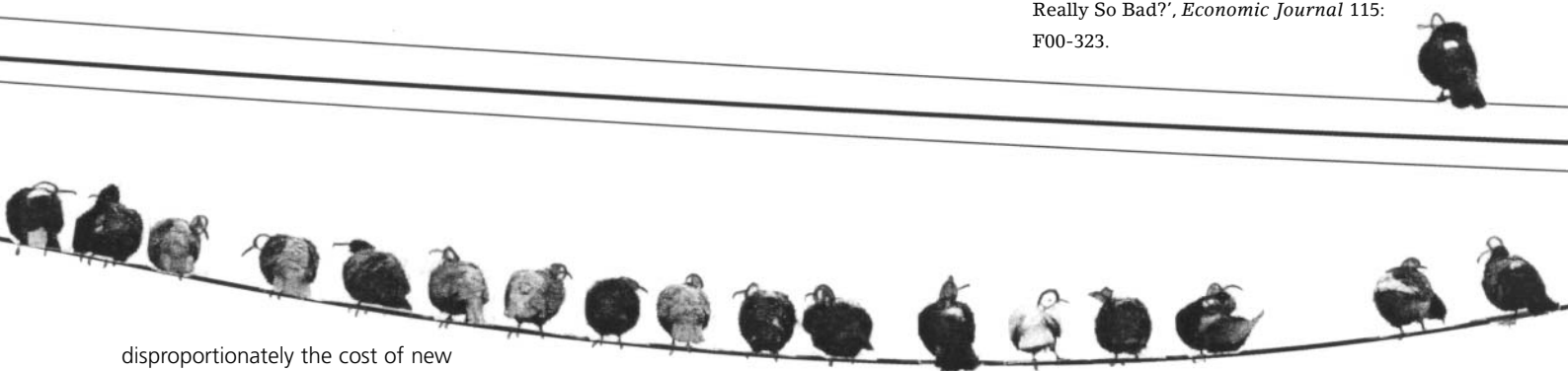
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It is very difficult to measure changes in economic and social mobility across generations and to make comparisons across societies.

Research by **Maia Güell, José V. Rodríguez Mora** and **Chris Telmer** finds that surnames can provide valuable insights into the importance of family background for people's outcomes in later life.

What's in a name?

Information on intergenerational mobility

Almost all children get their surname from their parents. While it is unlikely that a specific surname has much effect on its bearer's wellbeing, surnames are inherited together with other things that actually do affect a child's future life – such as genes, wealth, beauty and education. Surnames can therefore provide us with information about the wellbeing of individuals, not because they matter in themselves but because they travel across generations with things that do matter.

In this way, surnames offer a potential source of data for tracking the importance of family background for outcomes in later life and the degree to which people's economic and social status changes between generations. Surname data can show us how this 'intergenerational mobility' compares across countries and how it evolves over time.

It is notoriously difficult to measure the probability that the child of poor parents will become rich, and vice versa. This is because the traditional procedure (comparing the lifetime income of parents with that of their children) demands very long panels of data, which are hard to obtain. To measure mobility within one

generation, you need the lifetime income of parents and children, a panel of at least 40 years. To measure mobility over two generations, you need lifetime income data for children, parents and grandparents – a minimum of a 70-year panel.

Even when the data are available, it is almost impossible to make comparisons across countries or over time. So we know very little about intergenerational mobility – whether it has risen or fallen over time; whether it is larger in the United States, the UK or continental Europe; or whether it is more prevalent in growing or stagnant societies, in richer or poorer societies or in societies where inequality is high or low.

Our research offers a new way of measuring intergenerational mobility that

escapes from the slavery of panel data. Instead, our method measures the informational content of surnames: the more information a surname reveals about the economic welfare of its bearer, the more that inheritance determines people's economic outcomes. In other words, the more a surname tells us about the wellbeing of an individual, the less intergenerational mobility there is in that society.

The data requirements of this method are infinitely less demanding than the traditional method for measuring mobility, as we use census data (a cross-section of surnames as well as measures of income and education), which are collected in most countries. And by studying the informational content of surnames, it is

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easier to measure changes in mobility over time since every census contains all the relevant information for many generations. We can assess how mobility evolves over time by comparing the informational content of surnames among older and younger cohorts.

In the first stage of our analysis, we develop a methodology for measuring the degree of intergenerational mobility since it is not immediately obvious why surnames should be informative or that the amount of information they contain reveals the degree of intergenerational mobility. Imagine that there are very few surnames, each shared by many individuals who are not necessarily related. In this case, surnames would not be informative, since they would not indicate family linkages. For example, two individuals called Smith are very unlikely to be related, which makes any similarity between their incomes a product of chance and unrelated to the degree of inheritance.

Fortunately, the distribution of surnames is extremely skewed. In other words, there are some very common surnames (their bearers unlikely to be related), but the huge majority of surnames are quite infrequent, accounting for a very large fraction of the population. Two bearers of an uncommon surname are likely to be related. Uncommon surnames are central to our method, because income similarities between

The more a surname tells us about the wellbeing of an individual, the less intergenerational mobility there is in that society

individuals linked by an infrequent surname indicate the significance of background for economic outcomes.

The reason for this skewness is that the process of generation and inheritance of surnames is akin to the genetic process that determines the distribution of DNA. Surnames (lineages) die when the last male bearer of a surname dies without a male descendant (as surnames are inherited via the male line in most western societies). Lineages are born whenever a person changes his surname or an immigrant arrives carrying a distinct surname.

Our research develops a 'genetic' model of the joint distribution of surnames and income. It shows that by looking at the informational content of surnames, we can infer the importance of background. Extensions of the model allow for the possibility of 'assortative mating' (in which 'like marry like') and the introduction of ethnic differences in income (due to discrimination or any other reasons).

The rationale for including assortative

mating is that surnames are inherited only from the father, but background depends on both parents. An increase in assortative mating – so that people are more likely to marry someone from a similar family background to themselves – results in a decrease in mobility and an increase in the informational content of surnames.

Surnames are not only informative about the family to which an individual belongs, but also about his or her ethnicity. Not controlling for ethnicity would bias the results, as the informational content of surnames might reflect ethnicity in addition to specific family background. Fortunately, we can use the surnames themselves to control for ethnicity.

The second stage of our analysis is to test the methodology against some data. We use data from Catalonia, where the Spanish naming convention comes in handy: individuals have two surnames (the first from the father and the second from the mother); they pass only the first of these to their children (the standard western tradition of inheriting the paternal

Dalí Domènech Biedma Alba

surname); and women never change their surname when they get married.

Thus it is possible to identify family background through the first surname and ethnicity through the second surname. Our measure of the informational content of surnames captures how much first surnames explain the variation in individuals' outcomes beyond ethnicity and individual observable characteristics (gender, place of birth, etc.). We find that this is sizeable and, consistent with the model, larger when we focus on infrequent surnames, as these provide a closer approximation to family.

The combination of the two surnames also allows us to identify siblings (as two individuals who share two infrequent surnames in the same order are almost certainly siblings) and to determine the degree of assortative mating among the parents (how much the surname of the father helps to explain the surname of the mother).

Our analysis of the data shows that in Catalonia surnames are informative in a way that is perfectly coherent with the predictions of the model. Surnames contain information about both ethnicity (individuals with Catalan surnames do better) and family background. Furthermore, the amount of information that surnames contain has increased steadily over time, indicating a decrease in mobility.

One way to validate these results (and the methodology) is to identify siblings by using the two surnames. Doing this reveals that the correlation between siblings has increased over time, which also indicates decreased mobility. Moreover, this decrease

in mobility is explained by an increase in assortative mating that predates the increase in the informational content of surnames by one generation.

There are two readings of our results. The first is literal: despite dramatic increases in the provision of public education in modern Spain, the degree of intergenerational mobility has decreased. This fall in mobility is a consequence of assortative mating.

Second, surnames enable us to look at the relevance of family background. This view is strongly reinforced by the fact that the results are identical whether using only one surname (for countries other than Spain) or using two and concentrating on siblings. Thus, the methodology is strongly supported by the results. We can learn a lot by looking at how much surnames say.

This article summarises 'Intergenerational Mobility and the Informative Content of Surnames' by Maia Güell, José V. Rodríguez Mora and Chris Telmer, CEP Discussion Paper No. 810 (<http://cep.lse.ac.uk/pubs/download/dp0810.pdf>).

Maia Güell is professor of economics at the University of Edinburgh and a research associate in CEP's labour markets programme. **José V. Rodríguez Mora** is professor of economics at the University of Edinburgh. **Chris Telmer** is an associate professor at Carnegie-Mellon University.

In Spain, the amount of information that surnames contain has increased steadily over time, indicating a decrease in mobility

Gasol Sáez
Miró Ferrà

Sánchez Vicario

in brief...

Do computers help police fight crime?

Does the increasing computerisation of police work result in more effective crime-fighting? **Paul Heaton** and **Luis Garicano** study the impact of information technology on the organisation and productivity of US police departments.

The adoption of information technology by police departments in the United States is a relatively recent phenomenon. Before 1987, less than 2% of the 2,200 US police departments with fewer than 100 employees used computers. And as recently as 2003, only 40% of police departments had mobile computer terminals.

So did police departments that adopted information technology earliest see changes in organisational practices and drops in crime relative to those that adopted later? Our research addresses this question by comparing the crime-fighting effectiveness and organisational practices of police departments that were early adopters to those that adopted the technology less rapidly (factoring out demographic and other changes, as well as time trends and department-specific effects).

We use two data sources: first, the triennial Law Enforcement Management and Administrative Statistics (LEMAS) surveys, which document US police departments' use of technology between 1987 and 2003; and second, the FBI's uniform crime reports, which collect crime and arrest statistics for the entire country. We also use demographic data from the US censuses to control for population characteristics.

We find that the departments that adopted information technology grew in size by around 8%, increasing the number of specialised jobs and share of support staff

needed as well as the use of written (as opposed to oral) instructions within the department. These departments also increased the educational standards for new officers by raising both the college requirements and their hours of training by around 200 hours. The increase in training hours appears to be mostly related to the use of mobile terminals.

Thus, the greater use of computers by police departments implies a larger, increasingly complex and more highly educated police force. This outcome is not too surprising. Where our results are puzzling is when we turn to the productivity gains related to this technological revolution.

We measure productivity in two ways: first, crime clearance rates (crimes solved relative to crimes committed); and second, offence rates (crimes per head of population). Surprisingly, we find that the use of information technology neither increased crime clearance rates nor decreased offence rates. In fact, if anything, the use of computers is associated with an increase in property crimes. This is a puzzling set of results, particularly given our finding that the use of technology raises the quality of police staff.

So is there some causal link between these results? Our empirical strategy suggests that the answer is yes, given that the results control for geographical and department-specific characteristics as well as time trends. Of course, as

The screenshot shows a web application interface with a blue header. The main heading is "Go on the Beat". Below it, there is a form with several fields:

- Officer name ***: A text input field.
- Rank**: A dropdown menu with a list of options: Constable (checked), Sergeant, Inspector, Chief Inspector, and Superintendent.
- Equipment ***: A dropdown menu with a note below it: "This is also required."
- Route**: A dropdown menu.
- Fixed?**: A checkbox.

At the bottom left, there is a "Choose File" button and the text "no file selected".

Computers increase the effectiveness of police work – but only if it is reorganised to take advantage of their presence

always in social science, it is hard to prove causality unequivocally. To increase our confidence in the findings, we study several alternative hypotheses:

- First, it is not simply the case that the more troubled police departments are the ones that adopted information technology faster (which would yield a spurious link between high investment in information technology and small changes in clearance rates).
- Second, it is not the case that future levels of information technology use are connected to changes in organisation and productivity, as would be expected if information technology were the result, rather than the cause, of the changes studied.
- Third, the results for productivity are unrelated to city size or population growth or decline: they hold across the board for growing and shrinking cities and police departments.
- Fourth, controlling for the size of a department's budget does not alter the result, suggesting that it is not the outcome of growing or shrinking budgets.
- Finally, we use the adoption of information technology by state as a plausible 'exogenous' source of variation for the rate of adoption by police departments, and show that the results are still unchanged.

All of this suggests that the conclusion is causal and raises an important question about whether technology really does help police departments and, if so, how.

One key advantage of computers is improved record-keeping. Our research shows that introducing computers for record-keeping did increase the amount of recorded 'minor crimes' such as larceny, accounting for some, but not all, of the measured ineffectiveness of computers. As would be expected, improved record-keeping did not affect the number of homicides and major crimes recorded. This supplies an explanation for part of the puzzle.

We develop the hypothesis that just as in the private sector, it is not only the increased use of computers that is required for better outcomes, but also changes in the organisation of police work. In the context of policing, the organisation of work around computers might change by the use of geographical patterns to allocate resources and to measure the crime-fighting progress of individual officers.

The best-known example of this use of information technology is the New York City Police Department's CompStat system, associated with Bill Bratton's tenure as police chief during the 1990s under then-Mayor Rudy Giuliani. CompStat is an integrated information and management system for policing, which includes several

Computers plus an integrated information and management system for policing increase crime clearance rates

The image shows a web interface for data entry. At the top, there's a blue header bar. Below it, a 'Crime rate' dropdown menu is open, showing 'Low' selected, 'Medium', and 'High'. Below the dropdown is a date field with labels 'MM', 'DD', and 'YYYY'. Underneath is a 'Category' section with several checkboxes: 'Murder' (checked), 'GBH', 'ABH', 'Common Assault', 'Offensive Weapon', 'Harassment', 'Other Violence' (checked), and 'Violence Against the Person'. At the bottom of the form, there's a section titled 'Upload a scene of crime image' with a 'Choose File' button and the text 'no file selected'. The form is set against a light background with a dark blue header bar at the top.

key elements that the LEMAS data capture: data-driven problem identification, internal accountability, geographical organisation of deployment, and measurable goals.

Our research finds that police departments that adopted computers together with CompStat-style organisational practices did experience reduced property and violent crime and significantly increased crime clearance rates (by around 8%). Thus, we conclude that computers do increase the effectiveness of police work, but only if police work is substantially reorganised to take advantage of their presence.

This article summarises 'Information Technology, Organisation and Productivity in the Public Sector: Evidence from Police Departments' by Luis Garicano and Paul Heaton, CEP Discussion Paper No. 826 (<http://cep.lse.ac.uk/pubs/download/dp0826.pdf>).

Luis Garicano is director of research in LSE's department of management, professor of economics and strategy at the University of Chicago's graduate school of business, and a research associate in CEP's research programme on productivity and innovation. **Paul Heaton** is an associate economist at the RAND Corporation.

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