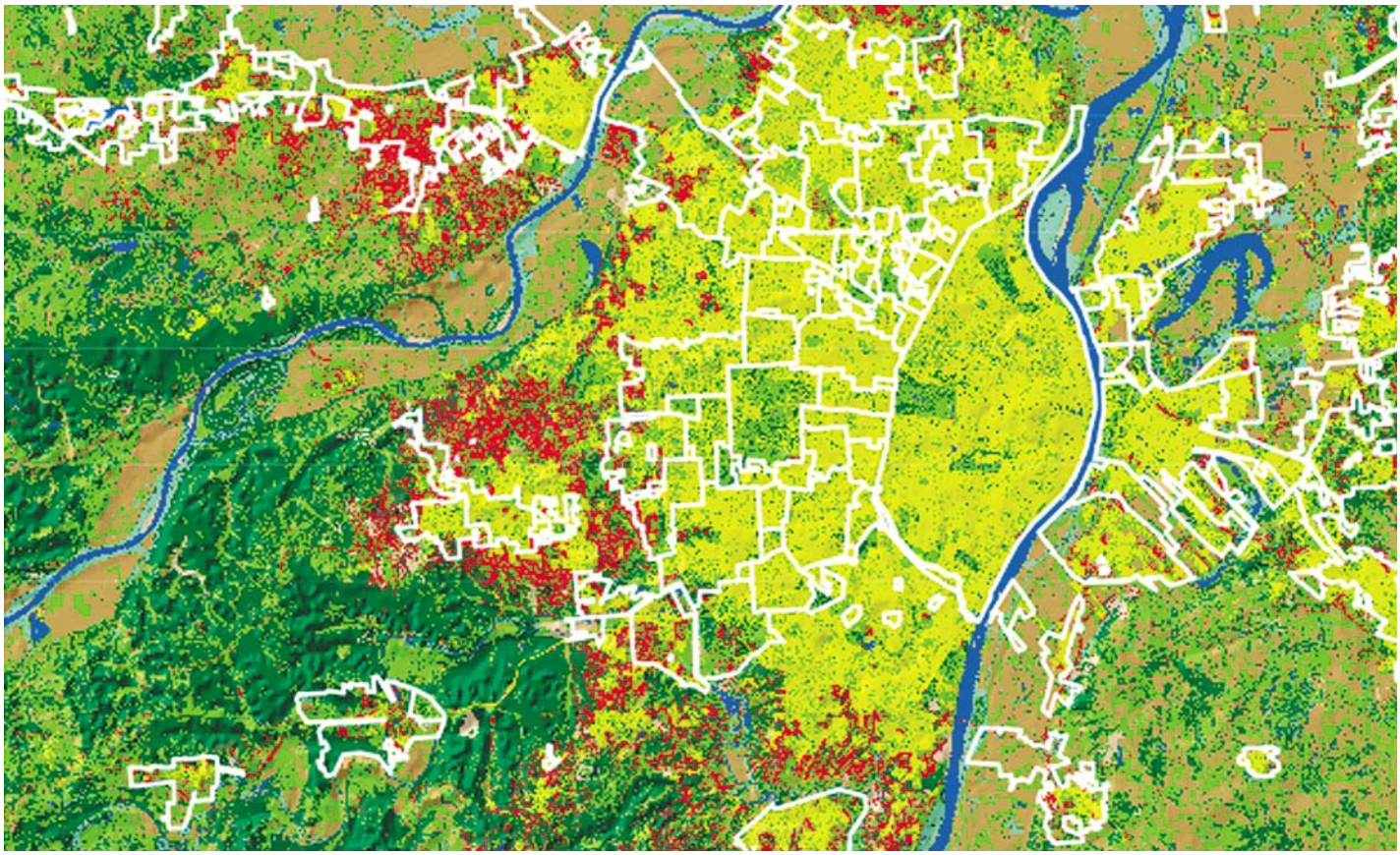
ISSN 1362-3761

CentrePiece

The Magazine of The Centre for Economic Performance

Volume 11 Issue 1 Summer 2006

URBAN SPRAWL



European jobs
New technology in schools
The gender pay gap
Work-life balance

Gay pay
Child labour
Trade unions in China
Cycles of disadvantage

CentrePiece

CentrePiece is the magazine of the Centre for Economic Performance at the London School of Economics. Articles in this issue reflect the opinions of the authors, not of the Centre. Requests for permission to reproduce the articles should be sent to the Editor at the address below.

Volume 11 Issue 1
(ISSN 1362-3761) All rights reserved.

Editor, Romesh Vaitilingam
Design, Raphael Whittle
Print, Ghyllprint Ltd

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

Editorial and Subscriptions Office
Centre for Economic Performance
London School of Economics
Houghton Street
London WC2A 2AE

Annual subscriptions for one year (3 issues):
Individuals £13.00
Students £8.00
Organisations (UK and Europe) £30.00
Rest of world £39.00
Visa and Mastercard accepted
Cheques payable to London School of Economics

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Editorial

???

Romesh Vaitilingam
Editor
romesh@compuserve.com

page 13
The gender pay gap

page 22
Child labour in 1920 urban America

Contents

in brief...

in brief...

Urban sprawl

New research by **Henry Overman** and colleagues provides a detailed picture of how land is used in US cities – and challenges conventional wisdom about urban sprawl.

Urban sprawl is widely regarded as an important environmental and social problem, particularly in the United States. But much of the debate is based on speculation: until now, the data to conduct detailed and systematic measurement of how and where land is converted to urban use have simply not been available. Our research fills that gap by merging high-altitude photos from 1976 with satellite images from 1992 to create a grid of 8.7 billion 30-metre by 30-metre cells that tracks the evolution of land use across the whole of the continental United States.

These new high-resolution data make it possible to observe the amount of open space in the neighbourhood of every house in every US city. Since there is more open space around a house that is far from its neighbours, development is more scattered as this quantity of open space increases. Thus, we can measure urban sprawl by calculating the average amount of open space in the neighbourhood of a house in each city.

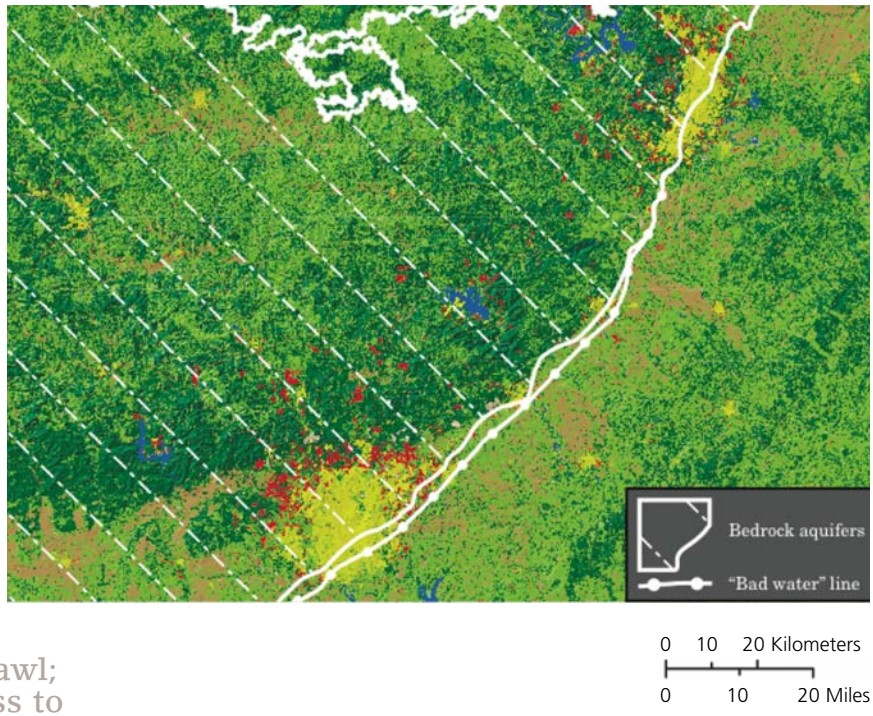
So is urban sprawl really increasing? In fact, we find that residential development in 1992 is no more scattered than development was in 1976. The proportion of open space in the square kilometre of land surrounding the average residential development was 42% in 1976 compared with 43% in 1992. While a substantial amount of scattered residential development was built between 1976 and 1992, overall residential development did not become any more biased towards such sprawling areas.

Of course, any one household might have seen a great deal of change over this period. But if we zoom out and look at the city from a distance, we see little change, at least in terms of the proportions of sprawling and compact development. The new city is just like an enlarged version of the old city.

We also investigate why some cities are more sprawling than others, and find that a city's climate, topography and access to groundwater account for 25% of the variation. For example, when the climate is temperate, people spread

Figure 1 (this page):
Urban land and aquifers in San Antonio and Austin, Texas

Figure 2 (opposite page):
Urban land and incorporated places in St. Louis, Missouri



Roads have no impact on sprawl; climate, topography and access to groundwater do

Overall, cities are not sprawling more than they used to: the new city is just like an enlarged version of the old city

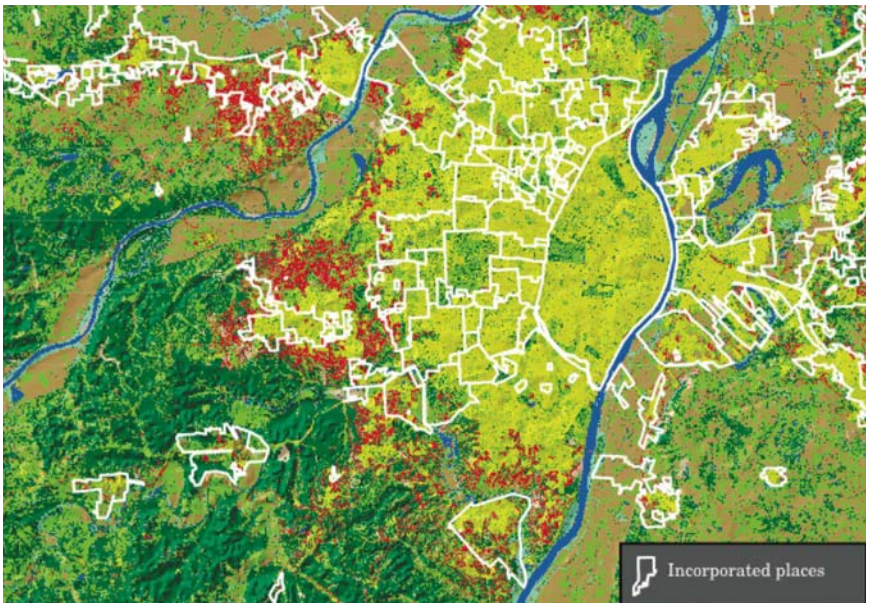
out to have more space to enjoy the weather. Similarly, hilly places see more scattered development as people avoid the costs of building on hillsides. But mountains act as a barrier and lead to more compact development.

Places with easy access to groundwater also see more scattered development since people can supply remote houses with water by drilling inexpensive wells rather than paying for water lines. The presence of aquifers is particularly important (as illustrated in Figure 1, which shows the relationship between aquifers and sprawl in San Antonio and Austin, Texas). This implies that controlling access to groundwater is a way to control whether development sprawls or not.

Roads, in contrast, have no impact on development patterns, despite commonly held beliefs to the contrary. Taking various measures of road density – miles of road per area, average distance to a road and distance to an interstate exit – we find no relationship with the scatteredness of development. This suggests that the road network tends to follow development patterns rather than vice versa.

The number of municipalities in a metropolitan area also has no effect on development patterns. But development near cities is less scattered if it occurs in a municipality as opposed to an unincorporated area of a county (as Figure 2 – a map of St. Louis, Missouri – depicts). This suggests that people may be moving just beyond municipal boundaries to avoid more stringent municipal regulations.

One of the common complaints about urban sprawl is that as development spreads, municipal services such as roads, sewers, police and fire protection are more expensive. It turns out that this concern is well founded. Development in municipalities that receive larger government subsidies is, on average, more scattered. This suggests that when local taxpayers are held accountable for infrastructure costs, they respond by insisting on patterns of development that require less infrastructure spending.



Urban land circa 1976
Urban land built 1976-92
Water
Bare rock and sand
Forest
Range and grassland
Agricultural land
Wetlands
0 5 Kilometers
0 5 Miles

This article summarises 'Causes of Sprawl: A Portrait from Space' by Marcy Burchfield, Henry Overman, Diego Puga and Matthew Turner, *Quarterly Journal of Economics* 121:2 (May 2006).
The photographs are from page 598, ©2006 by the President and Fellows of Harvard College and the Massachusetts Institute of Technology.

Marcy Burchfield is at the Neptis Foundation. **Diego Puga** and **Matthew Turner** are at the University of Toronto. **Henry Overman** is a reader in economic geography at LSE and an associate in CEP's globalisation programme.

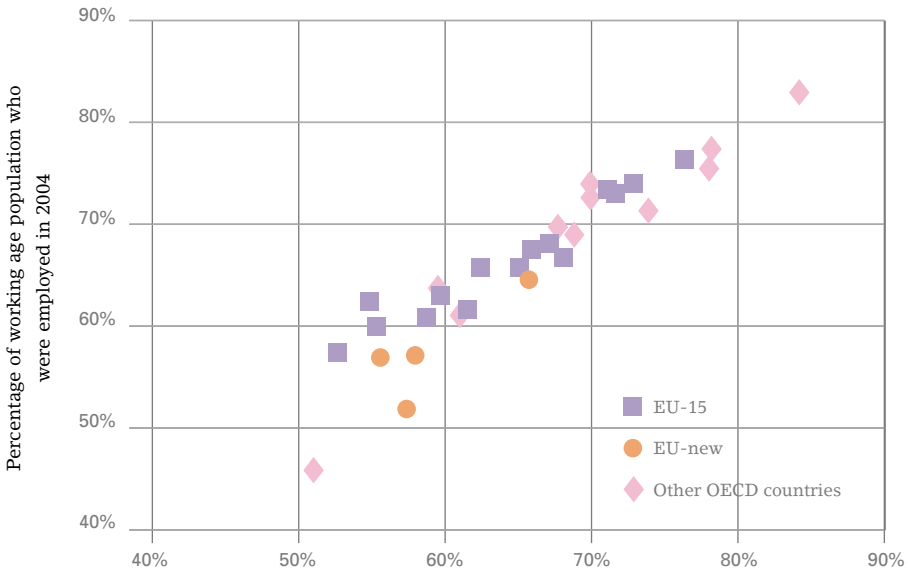
In a world of rapid technological progress and increasing international competition, how can European countries improve their poor employment performance? **Christopher Pissarides** argues that much needs to change in the lower productivity, more labour-intensive service sectors of the economy.

What future for European jobs?

At the Lisbon summit of 2000, the European Union (EU) set an ambitious agenda for making Europe the most competitive economy in the world. Among its many targets were these for employment and growth: by 2010, the EU should have employment rates for the working-age (15-64) population as close as possible to 70%, for women at least 60% and for the 55-64 age group 50%; and as the main driver of growth, spending on research and development (R&D) should be at least 3% of GDP, with two thirds or more done by the private sector.

These targets are unlikely to be achieved. Progress has been slow and a comparison between the EU and other OECD countries shows that although some countries improved their employment performance, in the first five years since Lisbon, no country that was below the

Figure 1:
Employment rates in 1999 and 2004



Percentage of working age population who were employed in 1999

Source: OECD *Employment Outlook*

70% line in 1999 progressed sufficiently far towards the line by 2004 (see Figure 1).

What explains this failure? It seems to me that the central problem is not a lack of knowledge of what policies can work but one of implementation. The European Employment Strategy of 1997 contained several specific measures designed to increase job creation. The OECD has repeatedly emphasised increased flexibility, adaptability, active labour market measures for the unemployed and lower taxes, at least for those at the lower end of the wage distribution. Similar recommendations were made by the European Employment Taskforce, which reported in 2003.

A key part of the problem seems to be that although the types of policies needed are universal (they apply to all countries), the processes needed to implement them are not. The latter must be decided at the national level within the context of the institutions and objectives of the national government, which is much more difficult. And there are likely to be objections from many stakeholders with vested interests in the status quo.

My objective here is not to look at each country's labour market performance and recommend specific measures for reform. Instead, I want to look at policies that can, in principle, be effective in achieving the overall employment targets set at Lisbon.

The novel feature of my approach is that it puts policy in the context of the dynamic evolution of the European economy in a world of rapid technological progress and increasing international competition. We need to understand the underlying causes of low employment in Europe in relation to growth and economic development before a policy prescription can be made.

The connection between jobs and growth

The Lisbon agenda emphasises the 'knowledge economy', which essentially means jobs and growth in high-tech sectors. But much of the job expansion that is needed to satisfy its targets will be in labour-intensive sectors of the economy, which experience low productivity growth. So job creation is not likely to be the main contributor to growth.

Indeed, the link runs the other way: more growth will bring job creation. There is evidence, for example, that increasing the growth rate of labour productivity increases the demand for labour, reduces unemployment and increases participation. My research (Pissarides and Vallanti, 2004) finds that increasing productivity growth by 1 percentage point reduces unemployment by about 1.3 percentage points. Such changes in the growth rate in Europe are feasible given the low starting points.

Of course, high growth is not spread uniformly across the economy. Some sectors will inevitably grow faster than others. And high growth usually does not create many jobs in the sectors that experience it: rather, it creates wealth, which in turn creates demand for services elsewhere.

The jobs growth that comes with productivity growth is more widespread across the economy than the productivity growth itself, and usually more heavily concentrated in low productivity sectors such as retail trade and medical care. The people who take these jobs need to be compensated sufficiently to give them the incentives to enter employment. High compensation in the low-growth sectors is achieved through high prices for their final products, not through more productive use of resources. This is why we experience more price inflation and more job creation in low-productivity service sectors.

The European jobs deficit

How do we know that most jobs will be created in low-productivity sectors? First, in recent European history, employment has been moving out of agriculture and into the low-productivity service sectors, with manufacturing showing either a small fall or no change. In countries that completed the transition out of agriculture early, such as the UK and the United States, the subsequent transition was mainly out of manufacturing and again into services.

Importantly, however, although average hours of work decline with economic development, there is also pressure in these countries for an increase in the participation rates of working-age women, especially those aged 15-50. So historically, European countries should expect that given their small agricultural sectors, there will be pressures on their manufacturing sectors to contract, as well as pressures for an increase in women's employment rates.

The pressures on manufacturing to contract are likely to intensify with the emergence of large Asian manufacturing producers. Trade and export-led growth can provide a cushion for manufacturing, as happened in Japan and Germany in the last 30 years, but it is not likely to continue in the future. Europe has to face the reality of the dynamics of the 21st century: most employment growth is likely to come to service sectors that do not rely on high-tech knowledge or trade.

In some ways, this is good news for the Lisbon employment targets. Economic forces in Europe should be creating demand for job creation in sectors of the

Europe's jobs deficit is in sectors that are labour-intensive with low productivity growth

economy that can easily be met with the existing stock of human capital. But creating demand is not equivalent to creating jobs.

The United States is the most advanced country in this dynamic economic process. Its manufacturing sector is shrinking and service employment is rising; women's labour market participation is also rising. As a result, the main gaps in employment now between Europe and the United States are in service employment. Production industries and agriculture occupy more or less the same fraction of people. Can Europe expect a similar dynamic evolution as the one experienced by the United States and if so, can it sit back and wait for natural economic forces to satisfy the Lisbon targets?

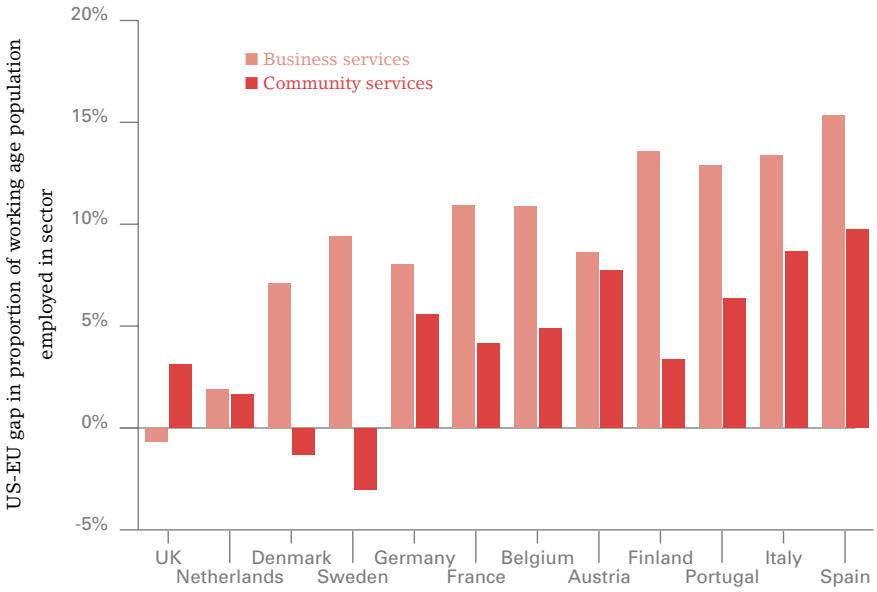
This is a difficult question, but given the different performance of countries within Europe, despite their similar level of economic development, the answer is probably no, at least in the foreseeable future. Big gaps remain in employment between Europe and the United States, and within Europe, mainly between the north and the south. These gaps are mainly in business services (such as finance, retail and transport) and community services (mainly in health and education).

Figure 2 shows the gaps in the two types of services. The main gaps are in business services, with only the UK surpassing the United States because of its large financial sector. But there are also substantial gaps in community services, with the exception of the Scandinavian countries (Sweden and Denmark), which have many community services supported mostly by the state.

Figure 3 breaks down the employment gaps in the business sector. Here the biggest gaps are in retail and wholesale trade. The gaps in transport and communication are relatively small. There are also gaps in financial services, mainly in business services connected with real estate and in the provision of a variety of other services to employers.The biggest gaps in financial services are in the southern European countries.

Figure 4 shows employment growth in the business services sector. Over the last 30 years, European countries have been achieving good rates of growth in finance, real estate and insurance services, which include high-tech computing services. But they have not been able to match the US

Figure 2:
The employment gap in business and community services between the United States and EU countries



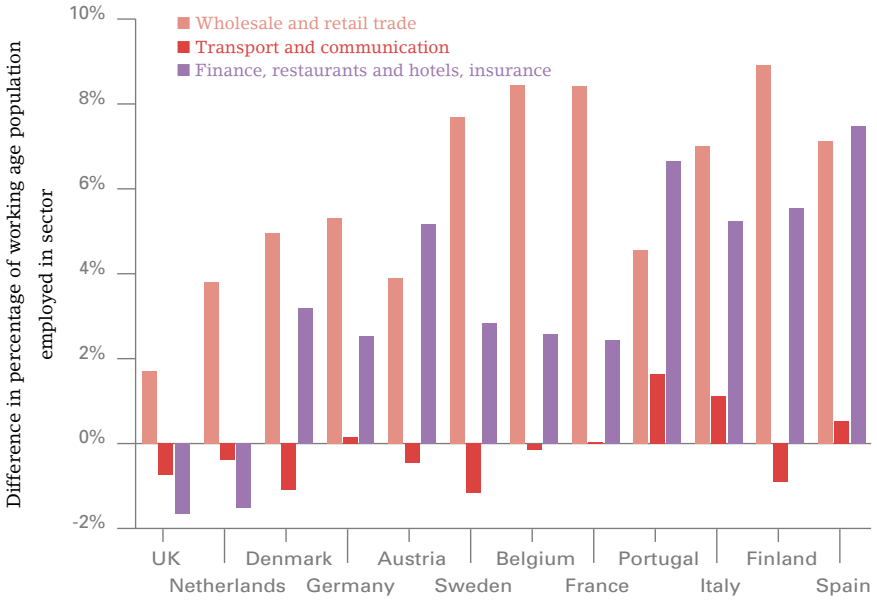
Source: OECD *STAN* database (online)

rate of growth in the retail and wholesale trade sector, which is the one of this group characterised by lower productivity growth.

It is clear that the jobs deficit in Europe is in sectors that are labour-intensive with low productivity growth. Europe has been creating jobs in the knowledge economy at a comparable scale to the United States, although it has not substantially closed the gap yet. But the low-growth sectors in the United States attract big numbers of workers, especially women, which are not matched in Europe.

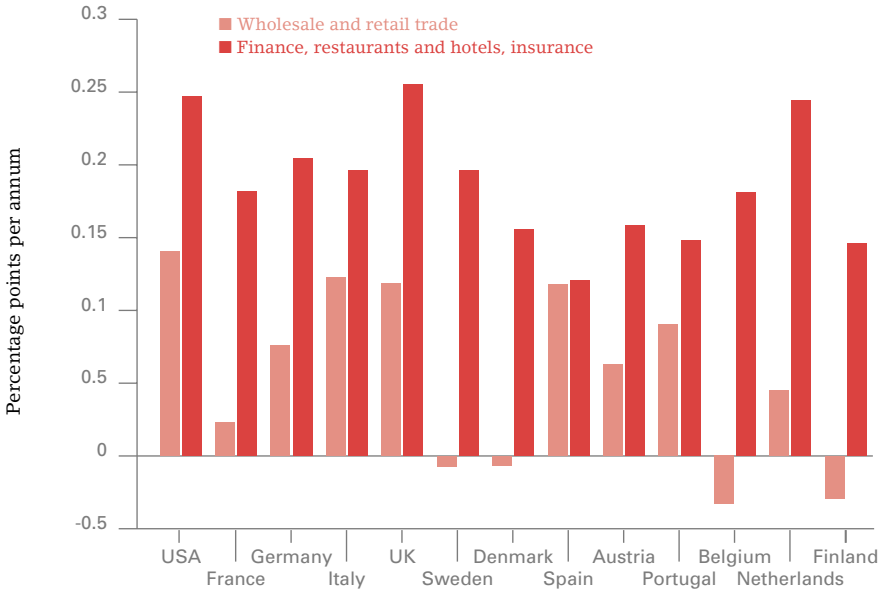
Compensation in these jobs is good in the United States because the prices of their final products are relatively high. The fact that consumers can afford to pay the high prices is itself the result of more

Figure 3:
The employment gap in business services sectors between the United States and EU countries



Source: OECD *STAN* database (online)

Figure 4:
Average annual change in employment rate in business services sectors, 1970-2004



Source: OECD *STAN* database (online)

employment. When women leave the home to take employment, they create demand for market services such as cleaning, food preparation and childcare, which creates more jobs for others.

Why are European economies not creating so many jobs?

The same pressures for an increase in the consumption of business and community services are present in Europe. Europe has more or less caught up with the United States in productivity per hour, but because Americans work more hours, income per head is higher.

But do Americans really work more hours than Europeans? Americans work more hours in the market and so create more jobs, but they work fewer hours at home. Recent research (Freeman and Schettkat, 2005) on the hours worked by Americans and Europeans concludes that they work approximately the same number of hours, but Europeans work much more in the home than Americans (see Table 1). The difference between market and home allocation is particularly marked for women.

European women work on average 8 hours less than American women in the market, but they work 10 hours more in the home. They do more house maintenance, they cook more at home and they look after relatives. They are engaged in 'home production', something Americans do much less.

The Lisbon targets imply that Europeans should move to the market by 'marketising' their home production. It is, of course, debatable whether this is a good policy to encourage, but how could it be done?

The natural conclusion is that to increase employment in Europe, we need to make the market more accessible to women, who now shy away from market work, and we need to create good jobs in labour-intensive sectors of the economy. It is interesting, and encouraging for Europe, that the sectors that lag behind the United States in job creation are women-friendly sectors: retailing, restaurants and hotels, and community services such as childcare and nursing care. Men need not be displaced from their current jobs to make room for women.

An explanation why the market pressures that have given rise to more employment in the United States have not had the same impact in Europe runs as follows. Consumers work out the relative cost of buying some services in the market versus providing them at home. When the price of market goods relative to per capita incomes is lower, more households will choose to use the market for services that have close substitutes in the home. So to understand why Europeans use the market less than Americans, we need to look at the factors that influence the relative costs of buying in the market versus producing at home.

There cannot be large differences in the cost of producing services at home in Europe and the United States. Consumer durables are widely available and homes are as well equipped in Europe as they are in the United States. The factors that can explain the differences in employment patterns in Europe and the United States must therefore be in the returns to market work and in the cost of buying services from the market. The interpretation of these costs must be general, to include convenience factors and not only prices and wages.

Several factors are contributing to making the products of market work in Europe too expensive for consumers and market work itself unattractive for workers. And the two issues are, of course, interconnected: if there are features that make market work unattractive, they could be offset by higher prices for the final product; but higher prices would then choke off demand and so reduce employment.

Table 1:
Weekly hours of work of men and women aged 25-54 in the United States and Europe in the early 1990s

	Men			Women		
	Market	Home	Total	Market	Home	Total
United States	44.1	16.1	60.2	28.7	30.1	58.8
European Union	43.4	13.6	57.0	20.7	40.5	61.2

Source: Freeman and Schettkat (2005)

What can make market work more attractive?

So the key question is what can make market work more attractive, especially to women? First, there are various restrictions on market work, which, although individually seemingly unimportant, when aggregated they add up to a lot. These include flexibility in market work hours, flexibility in shop opening times, and the availability of inexpensive childcare services (see Freeman and Schettkat, 2005). These types of facilities make it easier for women with children, and for those without children who have a household to run, to enter employment.

Examples of European countries that have liberalised restrictions and succeeded in increasing women's employment to the Lisbon targets, include the Netherlands and the UK. Both countries have very large numbers of part-time jobs and, in the UK at least, evenings and weekends are the busiest times in the shops. The Scandinavian countries have also succeeded in raising women's employment. A factor here is not just widely available childcare, but also the fact that many of the community services marketised in the United States are provided by the state, which employs large numbers of women.

Another important factor in the employment of women is education. Employment differentials across countries are lower at higher educational attainments. Women with university degrees have similar rates of employment everywhere. Of course, it would take a long time for substantially more women to acquire university degrees and gain employment. But the impact of higher education on women's employment is not one-for-one. When more women acquire education and gain employment, they create demand for the services of other women with less education. There is a 'multiplier' effect of education, which brings to the market a larger number of women than the ones leaving college with higher qualifications.

The initiative to increase education in Europe comes from the state. But for it to be effective, two pre-conditions need to be satisfied. First, women need to know that jobs will be available and that they would be compensated as well as men's jobs. There is EU legislation against discrimination, but it is not always effectively implemented (see Boeri et al, 2005). Increasing the effectiveness of legislation and making working conditions good for women will certainly improve the chances of satisfying the Lisbon targets. In the United States, there has been high-profile anti-discrimination legislation since the early 1970s and it has contributed to the expansion of women's employment.

Effective labour market reforms include more flexible employment and lower taxation of low-wage jobs

The second pre-condition is that highly qualified women need to know that there will be less qualified people around, mainly women, prepared to do the tasks normally done in the home. This is where childcare services are vital, but equally important (because they affect larger numbers of women) is the availability of people prepared to work as cleaners and in restaurants and laundries.

To achieve this, the EU needs to think seriously about unskilled migration and its potential contribution to the Lisbon agenda. In Cyprus, for example, employment levels are within the Lisbon targets. Educational levels and women's employment rates are unusually high for a Mediterranean country. These rates are supported by large numbers of unskilled immigrants on regulated fixed-term contracts, working in business and community services, mostly domestic service, nursing and retailing.

Making it easier for employers

Job creation needs to be attractive to potential employers too. An obvious policy reform here is that labour markets should be liberalised, especially at the lower end of the skills distribution. This is not new: it has been emphasised in numerous writings by the OECD and the European Commission. But reforms have not been forthcoming.

The administrative burden on companies, especially new, smaller companies, certainly explains some of the gaps in service jobs. Jobs in business and community services are frequently performed within small companies or by individuals working on their own account. If these individuals are to be attracted to the market, it is important that setting up a small company and running it should be easy and inexpensive.

For example, there should be one window for completing all the necessary administrative work for a new company, setting it up should be completed within a week and the company should not be required to report detailed accounts and register for VAT if turnover is expected to be below a certain (generous) limit. Direct assistance from the state for new entrepreneurs is also important.

A study of the French retail sector (Bertrand and Kramarz, 2002) finds that barriers to the setting up of supermarkets have a negative impact on the local labour market. And other studies find that unimpeded entrepreneurship helps in both the diffusion of new technologies and the adaptation of businesses to new challenges. Diffusion and adaptability are important for Europe in a world with the twin challenges of technological catch-up with the United States and globalisation. Indeed, with these two challenges, adaptability is more important than R&D geared to new discoveries.

Another obvious factor in the attractiveness of job creation that has attracted a lot of attention recently is taxation, which can discourage both employers and employees. This follows Edward Prescott's claim that the entire gap between European and American hours of work can be explained by taxation, which makes work in the home relatively more attractive because it is not taxed.

Econometric evidence has so far failed to find a large impact of taxation on employment, and Prescott's work has been criticised for failing to distinguish between different types of taxation and the uses to which the tax revenue is put, which must influence the impact that taxation has on employment. Nevertheless, taxation clearly has a bigger impact on economic activity at the lower end of the productivity distribution. Profit margins and net gains from employment are smaller when productivity is lower so a given tax takes a bigger proportional slice of net gain.

It is now widely accepted that capital should not be taxed much because it is mobile: if one country taxes it, capital will flee to another. The experience with home and market work in Europe shows that low-wage labour is also mobile, between the home and the market. Based on the

same principle, low-wage market work should not be taxed much either. Otherwise, it will flee to the home.

What can the European Commission do?

The most important reforms needed to achieve the Lisbon targets are at the national level. Not all EU countries need the same reforms and it is up to individual governments to decide what is most urgent for their situation. But can the Commission help in any way other than giving advice and exerting moral pressure?

The answer is yes – and although much has been done, much remains to do. The report of Wim Kok's group (European Commission, 2004) highlights five areas of policy that require urgent action. Four of them are firmly in the national domain: encouraging R&D; improving the business climate; improving the performance of the labour market; and ensuring environmental sustainability. But the fifth – the completion of the single market – mainly requires action from European institutions.

Market integration is important because European companies can take advantage of economies of scale. Prices of goods are generally lower in the United States than in Europe and the reason is that US companies have better distribution networks and make better use of diversified locations within the United States. Europe can do the same, but it is not doing it yet.

The main benefits from European integration so far have been the benefits from free trade. The Commission estimates that in the first 10 years of the single market, European GDP gained about 1.5%. This is not very much compared with the annual rate of growth of GDP, corresponding to about a year's growth. There have also been some gains in job creation but with respect to services, the biggest component of GDP, integration has not yet taken place.

The Kok report rightly emphasises that efforts towards completing the single market should be stepped up, especially in the liberalisation of services. Even financial services are not fully integrated, although there is an agreement that they should be. On paper, integration is complete in the goods sector, but the large differences in prices that remain across Europe are evidence that it has not yet fully taken place. The limits here may be due to corporate policies and not a matter of national policies. If that is the case, the Commission can again take action to improve integration.

Beyond this channel, the Commission has mainly emphasised the need for reform and more effort to achieve the Lisbon targets. But it has not taken concrete action. The failure to take the necessary action at the national level is partly the result of countries not doing what they said they would do, and partly not saying or doing what is needed.

The Commission could work out a system or incentives to make countries more willing to take on the necessary measures. For example, it could give some financial compensation for research and other spending that is now financed by national budgets but which contributes to the Lisbon targets. Financial aid or incentives have not been tied closely to the targets. If the Commission wishes to accelerate the reform process, this is one area in which it could contribute a lot.

The central problem is not a lack of knowledge of what policies will create jobs but one of implementation

Conclusions

- The job creation required to achieve the Lisbon targets will be mainly in sectors with low productivity growth: retail trade, a variety of business services and community services.
- European countries have been successful at creating jobs in the 'knowledge sectors', such as financial services, but have been unsuccessful at creating them in the more labour-intensive service sectors.
- Most new employment will come from women now outside the labour force and it will 'marketise' many of the services now done in the home, such as childcare and other personal care, cleaning, shopping, etc.
- To achieve the new job creation, employment needs to be made more women-friendly through more flexibility of working hours, more flexibility in shop opening hours and easier availability of domestic service.
- Education needs to be further advanced and supported by less expensive immigrant labour in the labour-intensive service sectors, including the home.
- Other essential labour market reforms include an increase in the flexibility of employment, less taxation of low-wage jobs and fewer administrative burdens on new entrepreneurs.
- Finally, the failures of the Lisbon agenda are not due to a lack of knowledge of the principles behind the right policies but a lack of urgency in the reform and implementation process needed to put those principles into practice.

This is an edited version of the keynote address by **Christopher Pissarides** delivered at the Austrian Presidency conference on *Innovations in Labour Market Policies: Challenges in Times of Globalisation*, Vienna, 16-17 February 2006. Pissarides is professor of economics at LSE and director of CEP's research programme on macroeconomics.

Further reading

Marianne Bertrand and Francis Kramarz (2002), 'Does Entry Regulation Hinder Job Creation? Evidence from the French Retail Industry', *Quarterly Journal of Economics* 117, 1369-413.

Tito Boeri, Daniela Del Boca and Christopher Pissarides (eds) (2005), *Women at Work: An Economic Perspective*, Oxford University Press.

European Commission (2004), *Facing the Challenge: The Lisbon Strategy for Growth and Employment*, report from the high level group chaired by Wim Kok.

Richard Freeman and Ronald Schettkat (2005), 'Marketization of Household Production and the EU-US Gap in Work', *Economic Policy* 41, 6-50.

Christopher Pissarides and Giovanna Vallanti (2005), 'The Impact of TFP Growth on Steady-state Unemployment', Centre for Economic Policy Research Discussion Paper No. 5002.

Edward Prescott (2004), 'Why Do Americans Work So Much More than Europeans?', *Quarterly Review of the Federal Reserve Bank of Minneapolis*, July, 2-13.

Economists have typically been sceptical that computers improve educational outcomes. But research by **Stephen Machin, Sandra McNally** and **Olmo Silva** finds evidence that new technology can have a positive effect on pupils' performance.

New technology in schools: is there a payoff?

The view that information and communication technology (ICT) is a useful tool for raising educational standards dates back to the 1950s and the findings of Harvard psychologist BF Skinner. More recently, support for the effectiveness of ICT as a teaching and learning device has come from the educational and psychological literature (recently reviewed by Heather Kirkpatrick and Larry Cuban), which tends to make enthusiastic claims for the value of new technology in schools.

Economists have generally been much more cautious, in particular raising concerns about the methodological validity of much of this research. Most of the positive findings are inferred from simple correlations between ICT and test scores. These cannot take account of unobserved school characteristics – such as more motivated teachers – that may lead to both ICT adoption and better attainments.

Indeed, starting with work by Joshua Angrist and Victor Lavy, a small number of economic studies, applying more rigorous methods of analysis, have found it hard to uncover any evidence of a positive causal relationship between computers (and/or computer software) and pupil performance.

This has not stopped the UK government seeing ICT investment in schools as 'crucial to our drive to raise standards' (former secretary of state for education Ruth Kelly) and envisaging ICT being widely used across the whole curriculum in all state schools (see Department for Education and Skills (DfES), 2003, and Office for Standards in Education (Ofsted), 2001).

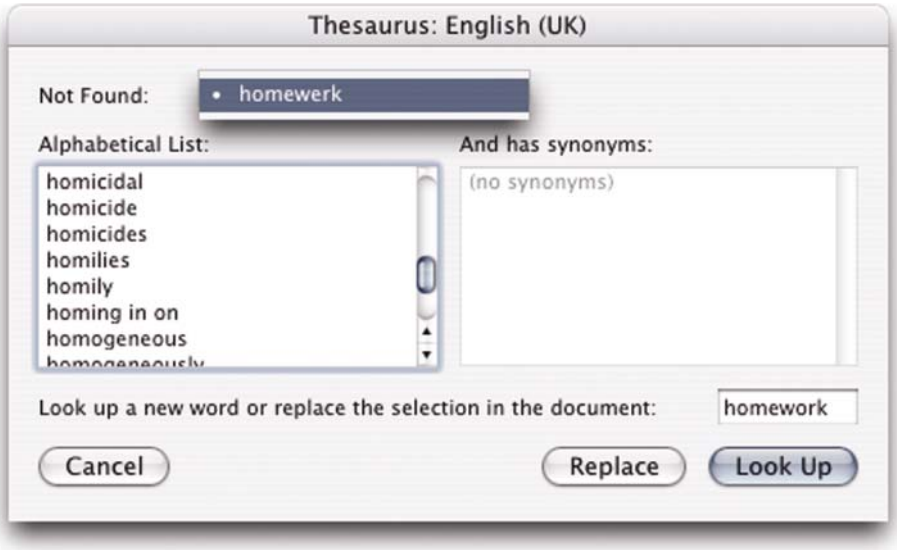
The positive rhetoric has been backed up by considerable public investment. Between 1998 and 2002, ICT expenditure almost doubled in English secondary schools – from an average of £40,100 to just under £75,300 per school, or 3% of overall expenditure – and more than trebled in primary schools – from £3,600 in 1998

Table 1:
How was ICT money spent in schools? Percentage devoted to different items

	1999/00	2001/02	Percentage change
Primary schools			
Hardware	63	53	-16
Software	10	10	0
Internet	8	7	-12
Training	7	11	+57
Technical support	9	13	+44
Administration + other	3	6	+100
Total expenditure per school	£10,000	£14,100	+41
Secondary schools			
Hardware	57	55	-3.5
Software	9	9	0
Internet	4	3	-25
Training	4	6	+50
Technical support	14	17	+21
Administration + other	12	10	-17
Total expenditure per school	£56,500	£76,000	+34.5

Source: Authors' calculations from *ICT Survey of Schools in England* (DfES)

Large increases in ICT funding have improved educational performance in primary schools



to £12,900 in 2002, or 2% of overall expenditure. Most of this dramatic acceleration took place from 2000 and the upward trend continued in 2003 and 2004.

Table 1 shows how primary and secondary schools used these resources in 2000 and 2002. Between these years, the share of ICT expenditure devoted to hardware and software actually decreased – by 16% in primary schools and 3.5% in secondary schools – but as the total amount of ICT funding was increasing, overall expenditure in these two categories grew steadily.

Interestingly, the share of resources devoted to teacher training rose by 57% for primary schools and 50% for secondary schools between 2000 and 2002. This suggests that the extra funding may have improved the quality of ICT use in schools, not simply increasing the quantity of ICT equipment.

Table 2 provides a more complete picture of schools' ICT use, showing how new technology and training grew in response to the extra resources. Although schools were already well resourced, there were quite sizeable changes between 2000 and 2003. For example, the pupils to computer ratio in 2000 was 10 to 1 in primary schools and 7 to 1 in secondary schools; by 2003, the respective ratios were 6 to 1 and 4 to 1.

The indicators of ICT use in the classroom also show fairly high percentage increases over this short time period. What's more, the fraction of teachers trained to use ICT grew substantially. This confirms our intuition that rather than just increasing the quantity of ICT equipment, schools also invested in the quality of ICT use.

Although secondary schools were better equipped with ICT in 2000, the greatest relative increase over time was experienced in primary schools. It is also notable that ICT is used regularly for teaching purposes in a much higher percentage of primary schools than secondary schools. Any effect of ICT on educational performance is therefore likely to be more evident in primary schools than secondary schools.

We also have evidence that ICT is widely used in primary schools to teach

The positive impact of ICT investment is most evident in the teaching of English

English: 65% of primary schools report that they 'substantially use' ICT for teaching this subject. The next most important 'ICT user' is Mathematics, where ICT is 'substantially used' in about 56% of primary schools, followed by Science (35%).

So has the big increase in ICT investment made a difference to educational standards? Our research evaluates whether changes in ICT investment had any causal impact on changes in educational outcomes in English schools between 1999 and 2003. To do this, we rely mainly on administrative data at the level of local education authorities (LEAs), focusing on average achievements at the end of primary education in English, Mathematics and Science. Following DfES targets, we look at the proportion of pupils achieving level 4 or above in the three subjects at age 11, the end of Key Stage 2.

Inferring a causal relationship between ICT investments and pupil achievements from simple correlations can be misleading. For example, we could imagine that schools or LEAs with more motivated teachers and head teachers are both more likely to adopt ICT and to produce better attainments: then, if we did not control for motivations, and just related ICT use to pupil tests, a positive relationship may emerge just because of this unobserved common factor (motivation) driving both observed outcomes.

To overcome this problem and identify the causal impact of ICT use on pupil achievement, we exploit a 2001 policy change that modified the rules for ICT investment in different regions of England.

Table 2:
Trends in ICT expenditure and use of ICT resources

	Primary schools			Secondary schools		
	1999/00	2002/03	Percentage change	1999/00	2002/03	Percentage change
Computers per pupil	0.10	0.16	+60	0.15	0.23	+53
Percentage of teachers using ICT regularly	75	92	+23	38	55	+45
Percentage of teachers trained to use ICT	81	95	+17	75	83	+11
Percentage of teachers with recently updated training	57	85	+49	48	69	+44
Percentage of schools connected to the internet	86	100	+16	99	100	+1

Source: Authors' calculations from *ICT Survey of Schools in England* (DfES)

Before 2001, funding was allocated from central government to LEAs through a bidding process, aiming to direct money towards LEAs with innovative and interesting proposals for the use of ICT funds.

From 2001 onwards, allocations were instead made according to a formula based on school and pupil numbers in LEAs with an adjustment for population density. The change in the allocation mechanism created 'winners' and 'losers' among LEAs: areas that had benefited a lot under the old system stood to lose from the transition to a formula-based system, and vice versa.

In our analysis, we argue (and provide evidence) that money was reshuffled across LEAs in a 'random' way, that is, in a way unrelated to unobservable LEA characteristics that may give rise to a spurious relationship between ICT funding and test scores. We then use the changes in the ICT funding accruing to LEAs to estimate the effects of ICT expenditure on educational standards. Our approach identifies the effect of being a winner or a loser in the new system of ICT allocation.

We estimate the effect of changes in ICT funding per pupil on changes in achievements in English, Mathematics and Science at the end of primary education. We find a positive relationship between ICT funding per pupil and performance in English: a doubling of ICT funding per pupil in schools leads to a 2 percentage point increase in the proportion of pupils achieving level 4 or above at age 11.

Changes in ICT funding of this magnitude really did happen for primary schools over this period, and the impact on performance in English is notable given that the average growth rate of pupils' scores in this subject was around 7% between 1999 and 2003. But it is important to note that this causal effect of ICT is not an average effect for all schools in England. Rather, it is the causal effect of large changes in ICT investment for LEAs that were substantially affected by the rule change – the winners.

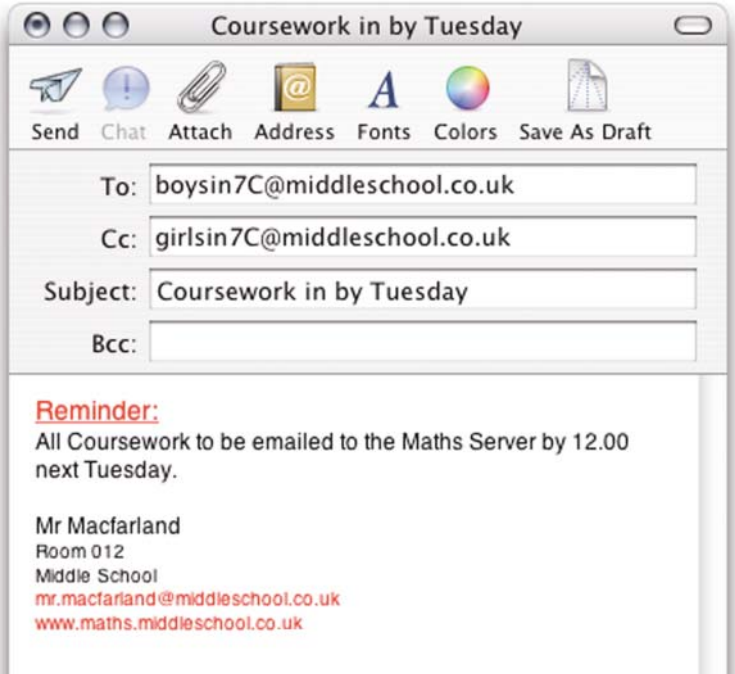
For Mathematics, the impact of ICT on test scores is very close to zero. But there is a positive relationship between ICT and achievements in Science: in this case, a doubling of ICT funding per pupil leads to an increase of 1.6 percentage points in the proportion of pupils achieving level 4 or above.

So, unlike previous economic studies, we find evidence for a positive causal impact of ICT investment on educational performance in primary schools. This is most evident in the teaching of English, where we also find high use of ICT for teaching purposes. We also observe a positive impact for Science, though not for Mathematics. How can we reconcile our evidence with previous research that finds no effect?

Our estimates identify the impact of being a winner or a loser under the new system. After the policy change, the average growth rate of ICT funds among LEAs mostly benefiting from the reform was roughly 60%. This contrasts with a much smaller change of 20% for LEAs that lost more from the introduction of the formula-based system. Intuitively, it is the comparison between these two groups that drives our identification of the impact of ICT on educational outcomes: our strategy mainly captures the impact of large changes in ICT investment on primary school performance.

LEAs benefiting most from the policy change were LEAs with lower overall expenditure per pupil but better educational standards (as measured by exam pass rates and truancy rates). This suggests that resources were redirected to areas that were in a better position to use them efficiently. Furthermore, new technology was already in place in English schools since the mid-1990s, and money redirected after the policy change was mainly spent in updating resources and teachers' skills.

So it appears to be the joint effect of large increases in ICT funding – and a fertile background for making efficient use of it – that led to the positive effects of ICT expenditure on educational performance.



Schools have invested not just in more ICT equipment but also, through teacher training, in better quality ICT use

This article summarises 'New Technology in Schools: Is There a Payoff?' by **Stephen Machin, Sandra McNally** and **Olmo Silva**, Discussion Paper No. 55 from the Centre for the Economics of Education at CEP (http://cee.lse.ac.uk/cee%20dps/ceedp55.pdf). The authors are all CEE researchers and active members of CEP's wider research programme on education and skills.

Further reading

Joshua Angrist and Victor Lavy (2002), 'New Evidence on Classroom Computers and Pupil Learning', *Economic Journal* 112, 735-65.

Department for Education and Skills (2003), *Fulfilling the Potential: Transforming Teaching and Learning through ICT in Schools*.

Heather Kirkpatrick and Larry Cuban (1998), 'Computers Make Kids Smarter – Right?', *TECHNOS Quarterly for Education and Technology* 7(2), 1-11.

Office for Standards in Education (2001), *ICT in Schools: The Impact of Government Initiatives: An Interim Report*.

BF Skinner (1954), 'The Science of Learning and the Art of Teaching', *Harvard Educational Review* 24, 86-97.

BF Skinner (1958), 'Teaching Machines', *Science* 128, 969-77.

In its recent report on how to make further progress in closing the gender pay gap, the Women and Work Commission emphasises policy interventions before women enter the labour market. **Alan Manning** is sceptical about their likely effectiveness.

The gender pay gap

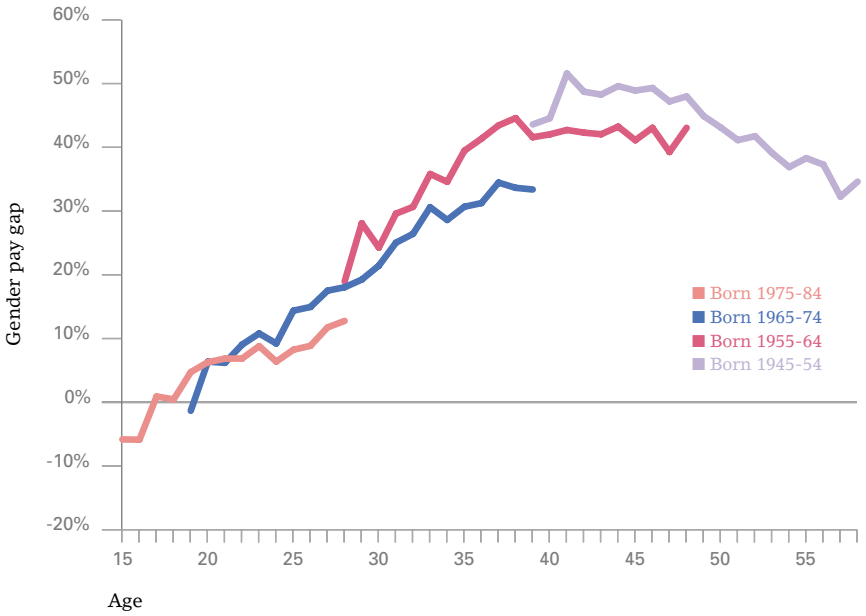
The pay gap between men and women has fallen quite dramatically over the past 30 years though a sizeable gap still remains. But this headline figure masks some less positive developments in recent years. We are used to each generation of women making progress relative to the one before. But this process has slowed substantially with the current generation doing only slightly better than the previous one.

Figure 1 shows how the gender pay gap has evolved over the lifecycle of four generations of women – from those born in 1945-54 to those born in 1975-84. For all four generations, the gender pay gap starts off low (or even negative) and then rises before falling somewhat for older workers.

Each generation of women has done better relative to men than the previous generation, but the pace of improvement has slowed. For example, women born in 1965-74 have a gender pay gap 8 percentage points below those born in 1955-64. But the generation born in 1975-84 is only doing 2 percentage points better than women born in 1965-74. As the gender pay gap at the age of 30 is about 20%, this suggests it will take 150 years at the present rate of progress for this gap to disappear!

It is very likely that the headline gender pay gap will continue to fall quite substantially for several years as women retiring from the labour market (currently those born in the 1940s) will have much higher gender pay gaps than new entrants. But that change is more the product of discrimination 30 or 40 years ago than what is happening now.

Figure 1:
The gender pay gap and the lifecycle for different birth cohorts



The slowing progress of women

So why has the progress of women slowed? There are two main explanations. First, discrimination against women used to be blatant whereas it is now more subtle. Half a century ago, many employers operated a marriage bar preventing women from working once they were married. Before the 1970 Equal Pay Act, it was routine for collective agreements to have women's pay rates below those of men.

The abolition of such discriminatory practices had a big effect on the gender pay gap. But it is much harder now to find practices that have such a large effect and can be directly influenced by policy.

The second explanation for slowing progress is revealed in Figure 2, which shows the gender gap in employment rates for the same four generations of women in Figure 1. The generation born in 1965-74 had much higher levels of labour market attachment than previous generations. But the most recent generation of women – those born in 1975-84 – does not have any stronger attachment to the labour market than the previous generation.

Although the gender gap in employment rates for the 1975-84 generation is small among young workers, it still grows fast. By the age of 30, the employment rate of men is still 20

percentage points higher than that of women. The reason is that most women still take some time out of paid employment when they have children.

The Women and Work Commission

These facts are the backdrop to the Women and Work Commission, established in 2004 to address the causes of the gender pay gap and recommend what to do about it. The Commission's report, published in February 2006, presented what it described as 'a radical programme to end decades of jobs and pay unfairness for women'. It concluded that women are not making full use of their skills and the primary cause is the culture of schools and workplaces.

The report makes 40 detailed suggestions for tackling the problem. Very crudely, these proposals are of two kinds:

- Policies for before (or very soon after) labour market entry, including reducing gender stereotyping in schools and encouraging women to study male-dominated subjects and undertake vocational training in male-dominated occupations. The intended aim here is to reduce occupational segregation among young men and women entering the labour market.
- Policies for after labour market entry, including making more senior jobs available to those who want to work part-time, extending the right to request flexible working and helping women returning to the labour market with job search and skill acquisition.

The current generation of working women is doing only slightly better relative to men than the previous generation

What is different about these recommendations is the emphasis on action before or soon after entry into the labour market. This contrasts with the general thrust of policy over the past 30 years to reduce women's disadvantage at work – including the Equal Pay Act, the 1975 Sex Discrimination Act, stronger maternity rights and rights for part-time workers and the right to request flexible working – all of which have aimed to reduce inequalities within the labour market.

But is the Commission right to conclude that action is now needed before women enter the labour market? The evidence of my research suggests we should be sceptical.

The gender pay gap among young workers

Figure 1's depiction of how the gender pay gap changes over the lifecycle does not suggest that the biggest problem is on labour market entry as the gap is very small among young workers. The Commission is right that there is occupational segregation even among young workers – the jobs done by young men and women are very different. But the fact that there is only a small pay gap at this time suggests that women are not choosing occupations that put them at a big immediate disadvantage.

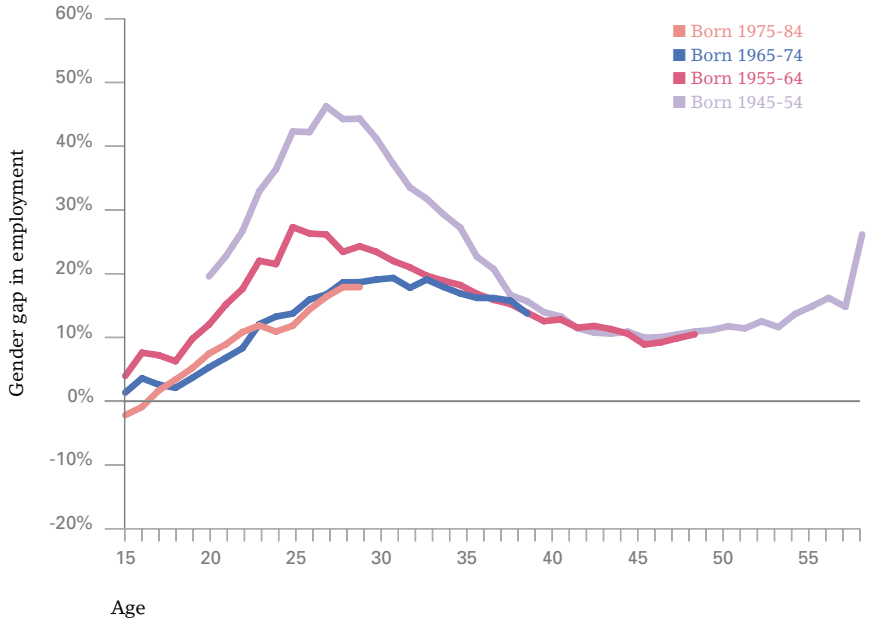
As an indication of the magnitudes involved, consider university graduates. Men and women continue to study very different subjects at university and this is reflected in their occupations when they graduate and enter the labour market. On graduation, there is currently a small gender pay gap of about 2.5%, all of which can be explained by the different subjects men and women study. So eliminating this gender difference might be expected to reduce the gender pay gap by 2.5%. But when the gender pay gap is 25% by the age of 35, this is a non-trivial but small amount.

From this, one might be inclined to dismiss the Commission's argument that we need to pay more attention to what happens prior to labour market entry. But perhaps things are more subtle than that; perhaps women are choosing occupations that offer relatively good wages initially but little prospect for wage growth. The evidence here is less clear. There is some evidence that the subjects studied by women offer lower wage growth than those studied by men but again, the contribution of this seems to be quite small.

One might also argue that policy should not necessarily be directed where the problems are greatest but where the policy will have the most effect. But many of the Commission's proposals are for policies about whose effectiveness we have absolutely no evidence. In some cases, we probably never will.

For example, one recommendation is to

Figure 2:
The gender gap in employment and the lifecycle for different birth cohorts



train early years childcare workers to ensure that 3-5 year olds do not have their horizons limited by gender stereotyping. If implemented, this could only have an effect 20 years down the line. Even then, we would probably be unable to see its effect very directly.

There have clearly been huge changes in attitudes about the role of women and men in society in the last 50 years. But government has primarily reflected not initiated these changes. It may be that policies like teaching maths and science to girls in single-sex classes is effective, but I doubt if the gender pay gap will fall by much as a result.

The gender pay gap after labour market entry

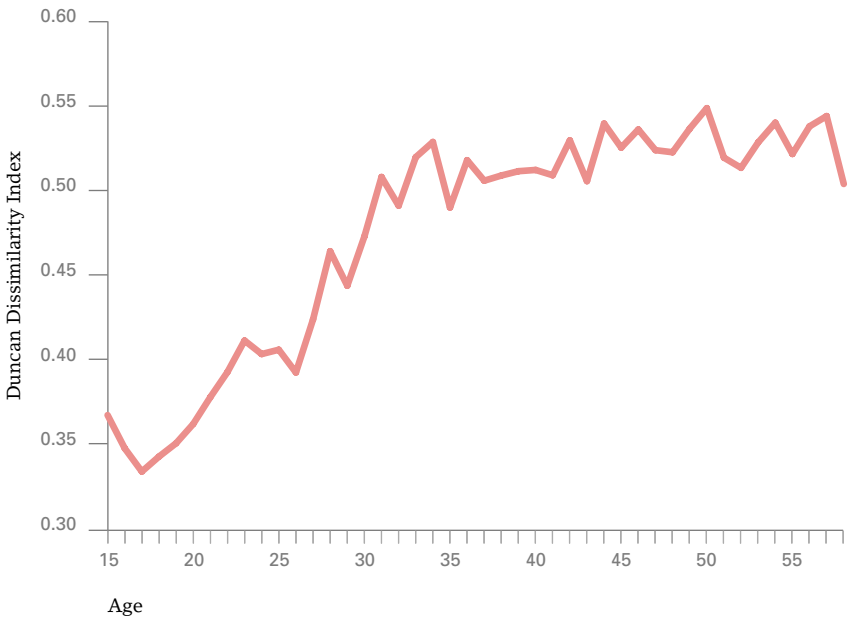
The evidence in Figure 1 shows that the gender pay gap is small on labour market entry but then widens quite rapidly. This suggests that what happens in the labour market is much more important than what happens before entry. That is why my research with Joanna Swaffield tried to understand gender differences in wage growth among young workers. This widening gap after entry is true whether one looks at the pay gap or some other measures of differences between men and women.

For example, Figure 3 shows how occupational segregation evolves over the lifecycle. The measure of occupational segregation here is the Duncan Dissimilarity Index, which calculates the fraction of men and women that would have to change jobs for the proportion of women to be the same in all jobs. Clearly, there is occupational segregation on labour market entry as emphasised by the Commission. But occupational segregation also grows very sharply until the age of 35.

So an awful lot is happening after labour market entry – what are the reasons for this divergence? Joanna Swaffield and I conclude that approximately half of the rise in the gender pay gap is the result of differences in the labour market attachment of women (indicated in Figure 2) and differences in the receipt of training.

The main cause of this is that many women continue to take breaks from paid employment when they have children. The problem is not that women are choosing one career – such as hairdressing – rather than another – such as plumbing. It is that they are continuing to choose family over career at some point in their life.

Figure 3:
Occupational segregation and the lifecycle



What's more, when they return to the labour market, they often work part-time. Our labour market severely punishes those who at any point in their lives sacrifice career for family. So people returning to part-time work often do so in lower-status jobs than they had previously. Very few high-level jobs are done on a part-time basis.

The Women and Work Commission is right to recommend that more should be done to open up high-level jobs to flexible working arrangements. But it is not very specific about what should be done.

For example, my research with Barbara Petrongolo finds little evidence that the right to request flexible working has had any impact on the incidence of the whole range of flexible working practices. It is likely that people will always pay some price for taking periods out of paid employment as experience is valuable to employers. But the price currently paid by women who take career breaks does seem to be disproportionate.

> The gender pay gap is small when women enter the labour market but then widens quite rapidly

Why women don't 'get on' in the labour market

While career breaks clearly have an impact, my research with Joanna Swaffield finds that most of the gender gap in wage growth among young workers cannot be explained by differences in labour market attachment. For example, we estimate that a woman who has worked full-time ever since leaving full-time education can still expect to be paid 12% less than an equivalent man after 10 years. For some reason, women are failing to 'get on'.

One way of seeing this is in the evidence that women are much less likely to become managers. Figure 4 shows the percentage of men and women of different ages who are in managerial occupations. A gap begins to open up when people are in their mid-twenties but then widens very dramatically after the late twenties. This is what is commonly understood as the 'glass ceiling'.

Why do women fail to 'get on' in the labour market? Some recent research

(see Babcock and Laschever) suggests that systematic differences in personality are responsible – for example, that women are intrinsically less competitive than men, tend to be less self-confident and less effective in negotiation. This might be because of intrinsic differences between men and women or because of gender stereotyping within the education system.

Joanna Swaffield and I find that this has little explanatory power. It is true that adolescent women have less self-confidence than men and that the self-confident do significantly better in the labour market in later life. But the effects we uncover are simply too small to be an explanation.

There is still considerable mystery surrounding why women do not make as much progress as men in the labour market. And without a clear understanding of the reasons, it is hard to make recommendations on policy.

Equal pay audits

As we need to know a lot more about why the gender gap persists, one policy idea is to try to force information out into the open through the use of equal pay audits. It is quite likely that without any conscious policy, the promotion decisions in millions of companies add up to a big disadvantage for women.

Employers are very often shocked to discover the size of this disadvantage as they think of their policies as non-discriminatory. If statistics were published on the position of women within firms, this would bring the position out into the open and we would expect women themselves to gravitate to firms where they appear to do better.

Should such a scheme be compulsory or voluntary? Employers do not have a fantastic track record in supporting equal pay measures that few would now oppose: many predecessors of today's executives justified the marriage bar and opposed the Equal Pay Act as being 'bad for business'.

But compulsion is perhaps too far: if we set up a scheme that encourages employers to publish statistics on the position of women in their organisation and perhaps gives a stamp of approval to those who do well, then people can draw their own conclusions about the firms that choose not to publish such information.

Conclusion

There is much that is sensible in the recommendations of the Women and Work Commission's report. But I am a little sceptical about how effective their recommendations are likely to be for the simple reason that it is now not so easy to identify the remaining causes of the gender pay gap.

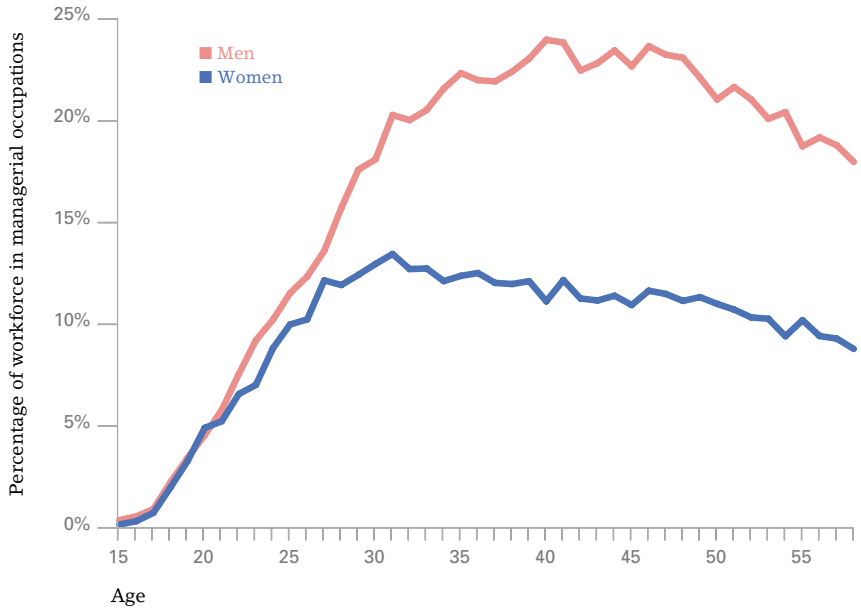
And I have one concern that the Commission may make things worse. The dominant impression from the report is that women are not making full use of their skills and this is bad for the economy as a whole. In phrasing things in these terms, there is a danger of setting 'market work' up as the ideal, reinforcing our culture that says that rewards should go disproportionately to those who work hard, a culture that continues to be to the advantage of men rather than women.

Every time I sit in my garden enjoying the sunshine and 'doing nothing', I am not making full use of my skills and 'UK plc' suffers as a result. But I choose to do this because that is what I prefer. In making that decision, I am probably making a small sacrifice in career terms, but career is not everything.

Perhaps the biggest culture change we need is not in the attitudes and aspirations of women but those of men. It is not more women truck drivers that we need but more male homemakers. On the problem of men, the Women and Work Commission is largely silent.

Alan Manning is professor of economics at LSE and director of CEP's research programme on labour markets.

Figure 4:
Percentage of managers and the lifecycle



Further reading

Linda Babcock and Sara Laschever (2003), *Women Don't Ask: Negotiation and the Gender Divide*, Princeton University Press.

Alan Manning and Barbara Petrongolo (2005), 'The Part-time Pay Penalty', CEP Discussion Paper No. 679 (http://cep.lse.ac.uk/pubs/download/dp0679.pdf).

Alan Manning and Joanna Swaffield (2005), 'The Gender Gap in Early Career Wage Growth', CEP Discussion Paper No. 700 (http://cep.lse.ac.uk/pubs/download/dp0700.pdf).

The Women and Work Commission (2006), *Shaping a Fairer Future* (http://www.womenandequalityunit.gov.uk/women_work_commission/).

Has recent anti-discrimination legislation made a difference to the pay and employment prospects of gay men and lesbian women in the UK? **Reza Arabsheibani**, **Alan Marin** and **Jonathan Wadsworth** investigate.

Gay pay in the UK

Since December 2003, UK law has protected lesbian, gay and bisexual workers from discrimination and harassment at the workplace, giving them the same employment rights as women, disabled and ethnic minority staff. Our research contributes to the small but growing literature on the economics of discrimination according to sexual orientation by presenting the first assessment of the impact of this legislation.

As yet, economists are uncertain how readily their models of discrimination by gender and ethnic origin apply to discrimination by sexual orientation. As with religion or political affiliation, firms may not directly observe the sexuality of workers. And both the type and extent of any discrimination by sexual orientation may be different from discrimination by gender or ethnic origin.

The likelihood of an employer, co-worker or customer discriminating against a gay person could also vary with characteristics such as age, education and the nature and location of the workplace. Equal opportunity policies, for example, were typically adopted earlier in the UK's public sector than in the private sector, allowing the possibility of differential

Gay men in couples earn 6% less than comparable heterosexual men and are less likely to be in work

Table 1:
Pay and employment of individuals in homosexual couples by personal, location and job characteristics

	Hourly wage gaps (percentage)					Employment gaps (percentage points)				
	No controls	Controls	Non-graduate	Aged 40 or younger	Employed in the private sector	No controls	Controls	Non-graduate	Aged 40 or younger	Outside London
Men										
Same sex relative to heterosexual before anti-discrimination legislation	-1	-6	-5	-8	-7	+3	-3	-2	-4	-3
Change in gap after law	0	0	0	0	0	0	0	0	0	0
Women										
Same sex relative to heterosexual before anti-discrimination legislation	+35	+11	+14	+9	+6	+15	+12	+13	+12	+12
Change in gap after law	0	0	0	0	0	0	0	0	0	0

effects across the two sectors. And lesbian and gay individuals may locate in parts of the country that are perceived to be more tolerant.

The size of the homosexual population relative to the number of non-discriminatory employers could also have an effect on wage and employment rates. The smaller the size of the minority group, the easier it may be to find non-discriminatory employers, though a smaller minority group may find it harder to have an effective voice.

We can start to explore these issues by measuring the extent of differences in pay and employment across different groups. This goal is immediately confronted by the shortage of data on sexual orientation. Fortunately the Labour Force Survey has, since 1996, collected information on the subset of homosexual individuals who live together.

The survey categorises people according to whether they are married and living with their spouse. Those who do not belong to this group are then asked whether they are living with someone as a couple and, if so, whether they are in a same sex couple. These same sex couples comprise just 0.2% of the adult working age population.

This method of identifying the homosexual population is not perfect as it does not include those who are married and living with an opposite sex partner or those who do not live with a partner, whether they have one or not. Moreover, it does not include those who live with a same sex partner but do not reveal it in the survey. There is also no information to distinguish between gays, bisexuals or other sexual minority groups.

Although these exclusions may bias the applicability of our results to the entire gay population, by comparing the sample population to an appropriate sample group of non-gays, we can reduce any 'composition bias'. For this reason, we compare the labour market outcomes of homosexuals in our sample with the set of heterosexual couples, both married and unmarried, living together between January 2001 and August 2005.

This gives us 35 months of observations before the law came in and 21 months after, periods that are not too long to be affected by other changes and not too short to prevent any relevant changes showing up.

Lesbian women in couples are paid 11% more than comparable heterosexual women and are considerably more likely to be in work

The raw data show that gay couples are typically younger, more educated and more likely to live in London than heterosexual couples. But we can control for any differences in pay and employment that may be caused by such differences in age, education, race and health as well as differences in regional settlement patterns, occupation or industrial affiliation. If, for example, lesbian and gay individuals make different investments in career paths, then we need to account for such differences that could otherwise show up as differential wage or employment rates.

To test whether the anti-discrimination law had a discernable impact on the pay and employment of homosexual couples, we simply compare the change in their employment and pay levels relative to heterosexual couples over the period before and after the legislation. Heterosexual couples will not have been directly affected by this law and so their pay and employment changes over this period can serve as benchmarks. By comparing changes for same sex couples against these benchmarks, we can determine whether or not the legislation had any effect.

Table 1 shows the percentage differences in hourly pay between homosexual and heterosexual couples. Gay men living in a couple earn, on average, around 1% less than heterosexual men in a couple, not accounting for any differences in

characteristics. In contrast, lesbian women in couples earn around 35% more than heterosexual women in couples.

In the period after the legislation was introduced, there was no significant change in these differentials. So on this basis it would seem that the law had little effect on observable outcomes. We then check to see how robust these differentials are to the addition of controls for observable differences between the gay and heterosexual groups in a set of variables also known to influence wage levels.

For example, since there are more graduates among lesbian women than among heterosexual women, this could help explain why there appears to be a large pay premium for women in a same sex couple. Part of the estimated 'gay effect' would be picking up the 'graduate effect'.

As Table 1 shows, adding controls for age, education, region, occupation and industry shows that the positive pay premium for lesbian women is much reduced but still positive at 11%. But there is still little change in the period after the legislation. For gay men, controlling for differences in characteristics makes the negative pay penalty larger at around 6%. So for the same observed characteristics, gay men appear to be paid less than their heterosexual peers.

Since the legislation may have helped disadvantaged groups of homosexual workers more, we split the data into groups that could be more at risk of discrimination, namely non-graduates, younger workers and those working in the private sector. This shows that the pay gaps for non-graduates are similar to the total figure, but the pay penalty for younger gay men is larger and the pay premium for younger lesbian women and those working in the private sector is much lower. But there are still no changes in the pay differentials after the law came in.

Since discrimination can be manifested in hiring rates as well as wages, it may be that there are differences in employment rates for the homosexual couples or different sub-groups. It is possible that the results for wage rates are, in part, influenced by 'selectivity' – differential employment probabilities mean the unobserved characteristics of those in work could differ between the homosexual and heterosexual couples.

The raw employment rate differentials in Table 1 suggest that gay men and lesbian women are more likely to be in work than heterosexual couples. But controlling for differences in characteristics suggests that gay men are less likely to be in employment than heterosexual men, and that the employment premium for women is reduced substantially. There is rather less heterogeneity in the same sex employment gaps across different sub-groups than there is in pay. But once again, we find no discernable changes in any of these gaps after the anti-discrimination legislation.

So more than two years after the introduction of anti-discrimination legislation, gay men appear to be paid around 6% less than their heterosexual counterparts with similar observed characteristics and are three percentage points less likely to be in work. Lesbian women, however, appear to be paid around 11% more than heterosexual women living in a couple and are 12 percentage points more likely to be in work.

Differentials of this magnitude could be observed before the legislation took hold and it is hard to conclude that the legislation has had much effect on these outcomes, though it may of course have other effects in the workplace.

The average pay differentials do conceal much variation across age groups, education, regions and sectors of the economy. Whether these differentials reflect different discriminatory practices in different regions, in different sectors or across different sub-groups within the minority population is a moot point, though again it is hard to discern a differential effect of anti-discrimination legislation across these groups.

This article summarises 'Variations in Gay Pay in the UK and USA' by Reza Arabsheibani, Alan Marin and Jonathan Wadsworth, forthcoming in *Sexual Orientation Discrimination: An International Perspective* edited by Lee Badgett and Jeff Frank (Routledge). A good source of information on the employment rights of lesbian, gay and bisexual workers is the Stonewall website (http://www.stonewall.org.uk).

Reza Arabsheibani is at the University of Wales, Swansea. **Alan Marin** is at LSE. **Jonathan Wadsworth** is at Royal Holloway College, University of London and a senior research fellow in CEP's labour markets programme.

Gay couples are typically younger, more educated and more likely to live in London than heterosexual couples

in brief...

Work-life balance: the links with management practices and productivity

Does good management and higher productivity come at the expense of work-life balance? Or is good work-life balance an important component of the management of successful firms? New research by **Nick Bloom, Tobias Kretschmer** and **John Van Reenen** finds evidence for a hybrid view between these two polar extremes.

Companies that are bigger, more globalised and better managed provide a better work-life balance for their employees, according to the evidence of our research. What's more, tough product market competition improves management practices but without any detrimental impact on work-life balance.

At the same time, we find no evidence that firms with good practices on work-life balance – shorter hours, flexible working, family-friendly policies, etc. – have higher productivity once we control for better management in general.

Our study uses an innovative survey tool on over 700 manufacturing firms in France, Germany, the UK and the United States to ask questions about management practices and work-life balance. We find that:

- Well-managed firms do not work 'harder' but 'smarter' – employees in well-run firms typically have a better work-life balance.
- In particular, management practices associated with good 'people management' – such as fostering talent, rewarding and retaining well performing staff and providing consistent training opportunities – are likely to work in conjunction with good work-life balance practices – family-friendly policies, flexible working, shorter hours, more holidays, childcare subsidies, etc.
- In well-managed firms, the hours worked by both managerial and non-managerial staff are not significantly higher than those in badly run firms. This again confirms the finding that working smarter not harder is the key determinant to successful management.
- The share of women in management relative to non-management is significantly higher in firms with better work-life balance. In other words, the 'glass ceiling' does not seem to exist nearly as strongly in firms that treat their employees well.

We describe two opposing views on the effects and efficacy of good management practices on work-life balance – the pessimistic 'trade-off' view and the optimistic 'win-win' view:

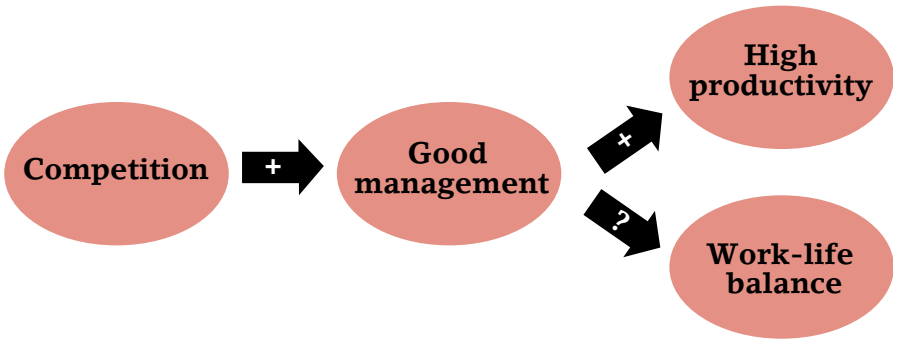
- The trade-off view is that 'Anglo-Saxon neo-liberalism', encapsulated by tougher product market competition and globalisation has undesirable consequences. Although these forces raise productivity, they come at the expense of misery for workers in the form of long hours, job insecurity and intense and unsatisfying work.
- The win-win view argues that better work-life balance will improve productivity and employers are mistakenly failing to treat their workers as assets and implement better work-life balance practices.

This study finds evidence for a hybrid view between these two polar extremes (see Figure 1 and Table 1):

- The evidence does not support the trade-off view: there is, in fact, a positive association between good management and work-life balance. Similarly, the view that competition and globalisation are bad for work-life balance is not supported: there is no relationship

Employees in larger, more globalised firms seem to be much better off in terms of their working lives

Figure 1:
Hybrid view of competition, management and work-life balance



Good work-life balance seems to be something that well-run firms in competitive markets do naturally

Table 1:
Correlations predicted by the different theories

	Theories		
Correlation of work-life balance and:	**Trade-off**	**Win-Win**	**Hybrid**
Competition	Negative	Ambiguous	Ambiguous
Management	Negative	Positive	Ambiguous
Productivity	Negative	Positive	Zero

between tougher competition and work-life balance. And larger firms – which are typically more globalised – also have better work-life balance practices.

- But the win-win view that better work-life balance will improve productivity is also rejected: there is no relationship between productivity and work-life balance once good management is accounted for.

- Instead, well-managed firms can choose to introduce better work-life balance practices or not. If they do introduce them, this neither penalises them in terms of productivity nor does it significantly reward them.

Based on these results, it simply is not true that globalisation is such a disaster for employees. Employees in larger, more globalised firms seem to be much better off in terms of their working lives than those in smaller, more national firms.

This conclusion suggests that improving work-life balance is socially desirable – workers obviously like it and firm productivity does not suffer. For firms, this will be worth weighing up more seriously. Most of the best-run firms in our sample treated their employees very well.

But we also need to be cautious before inferring that the results give a *carte blanche* for governments to regulate for better work-life balance. Good work-life balance seems to be something that well-run firms in competitive markets do naturally. They need to treat their employees well to keep them – if not, their competitors will hire them away. Government policies on work-life balance should take this into account.

This article summarises 'Work-Life Balance, Management Practices and Productivity' by Nick Bloom, Tobias Kretschmer and John Van Reenen (http://cep.lse.ac.uk/management/worklifebalance_research.pdf).

Nick Bloom is assistant professor of economics at Stanford University and director of CEP's research programme on productivity and innovation. **Tobias Kretschmer** is a research associate in the programme and a lecturer in strategy and economics at LSE's Interdisciplinary Institute of Management. **John Van Reenen** is director of CEP and professor of economics at LSE.

The research is financially supported by the Anglo-German Foundation, the Economic and Social Research Council and the Advanced Institute for Management Research.

in brief...

Child labour in 1920 urban America

When poor children are working rather than going to school, do their parents work less? And what happens to their siblings? **Marco Manacorda** looks for answers in the experience of child labour in urban America at the dawn of the jazz age.

Most of us will be enraged by seeing children in poorer countries at work in the fields, selling goods on the street or simply helping out their parents in the family shop. One imagines, perhaps rightly, that these children are condemned to a lifetime of poverty because of their lack of access to education and the permanent scars from working at an early age. Because of this, many people would advocate policies banning child labour and establishing compulsory school attendance.

Economists are rather more cautious about such conclusions. Yes, child labour is obviously bad but what is the alternative for these children? If they were forced to attend school rather than going to work, would they or their families be unequivocally better off?

Some amount of child labour might allow a child or his siblings to afford an education or satisfy basic feeding needs, in which case a ban on child labour would not necessarily be desirable. Perhaps instead, it is parents who might work more to sustain their children in school, which would provide some justification for public policy intervention.

My research explores these issues, in particular analysing the impact of working children on their parents' work and their siblings' work and education.

Assessing empirically how parents and siblings respond to a child working is easier said than done. Both parents and siblings from poorer families will presumably be more likely to work. Hence, one will find a positive correlation between parents' and children's labour, which would be hard to interpret as the 'causal effect' of child labour on household labour supply.

The solution devised in this paper is to look at the impact of child labour laws in 1920 urban America. What makes this worth studying is that the minimum working age varied across US states: some states imposed an age as low as 12 while others prevented children younger than 16 from working. This provides the opportunity for a 'natural experiment'.

My research shows that the laws had an impact. Analysis of data from the 1920 US census shows that a child sufficiently old to work in his state of residence tended to work more than a child of the same age living in a different state where he was not allowed to work.

To check that this difference does not reflect unobserved differences across states in children's work opportunities or their need to work – both of which might in turn explain a lower legal working age – I compare this difference to the difference in participation between a pair of younger children living in the two states who are both not allowed to work.

I then compare the difference in employment of the parents of the first pair of children relative to the difference in the second pair. I attribute this 'difference in difference' in participation to the effect of the differential eligibility for work of these adults' children. Using this strategy, I find no statistically significant evidence of parents working less in response to their children entering the labour market.

To infer the effect of child labour on siblings' work and school participation, I use a slightly different strategy. The idea here is to compare the effect of a child being eligible for work on both his own probability of work and the probability of work of a child chosen at random from his household (the child himself or one of his siblings). If the second effect is smaller, it implies that when a child works

It seems to be extreme poverty rather than parental exploitation that lies behind child labour

more, his siblings respond by working less. Indeed, this is what happened: the response to a child becoming eligible for work was for his siblings to work less and be more likely to attend school.

What do we learn from this analysis? Parents do not appear to adjust their work effort in response to their children's change in labour market participation. This is consistent with the notion that parents of working children cannot possibly work more than they actually do. If one accepts this interpretation, it seems to be extreme poverty rather than parental exploitation that lies behind child labour.

A second and potentially more novel result is that the siblings of working children appear to benefit from one child in the household working in terms of increased school attendance and reduced labour. This raises concerns about the distribution of work and school across children within the same households: it appears that the costs of sending some children to school in poor families are borne in part by their working siblings.

This article summarises 'Child Labour and the Labour Supply of Other Household Members: Evidence from 1920 America' by Marco Manacorda, CEP Discussion Paper No. 590 (http://cep.lse.ac.uk/pubs/download/dp0590.pdf) and forthcoming in the *American Economic Review*.

Marco Manacorda is at Queen Mary, University of London and a research associate in CEP's labour markets programme.

Image: Library of Congress, Prints & Photographs Division, National Child Labor Committee Collection, [reproduction number, LC-DIG-nclc-00744]

China apparently has more trade union members than the rest of the world put together. But as **David Metcalf** and **Jianwei Li** have found, Chinese unions function very differently from unions in the West.

Trade unions in China

Trade unions in China have many members: 137 million according to the official figure from the All China Federation of Trade Unions (ACFTU) as indicated in Figure 1. But they are virtually impotent when it comes to representing workers.

Because the Chinese party-state recognises that such frailty may lead to instability, it has passed labour laws promoting collective contracts and established tripartite institutions to mediate in individual disputes. But while these new laws and institutions are welcome, they are largely hollow. Collective contracts are very different from collective bargaining and the incidence of cases dealt with by tripartite institutions is tiny.

Although China does not have properly functioning unions, it is worth remembering that the whole notion of a 'labour market' is only a decade or so old, reflecting the previous Marxist aversion to exchanging labour for money.

Since the 1994 Labour Law, which introduced labour contracts, the labour market has become firmly established in China. But there is no evidence whatsoever of a parallel development in functioning unions. The inability of workers to develop proper representation for their common interests, coupled with the rapid spread and deepening of the market mechanisms, implies that despite their huge membership, unions are likely to remain largely nugatory in Chinese labour relations.

In detailed case studies conducted in 2004 and 2005, we looked at three companies in Hainan Province: a joint venture producing tinplate; the largest coconut juice producer in the world; and a listed pig farm conglomerate. In all three companies, unions are a sideshow in terms of 'voice' and dispute resolution. At Tinplate, for example, voice arrangements are entirely via frequent direct meetings between management and workers, and the union chair is the top sales manager. We were told the union 'is only for show… irrelevant… just organises sport and entertainment… will soon fade away'.

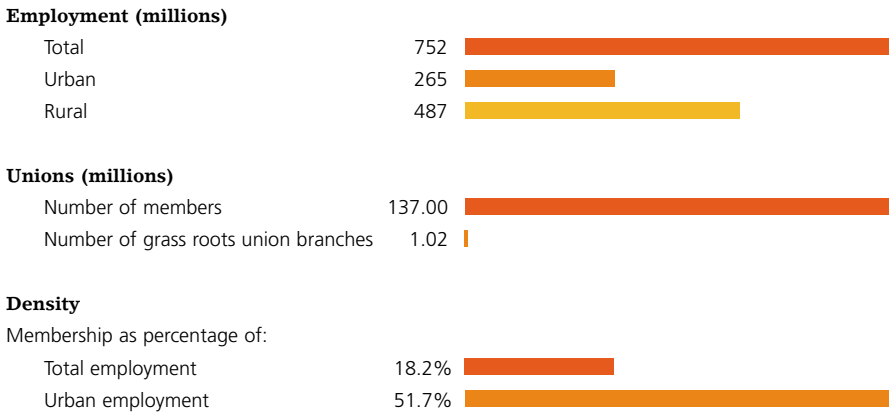
At Coconut Palm, which is employee-owned, it is the shareholders committee that filters management decisions. These are then validated by the workers congress, a sort of works council and a hangover from when the company was state-owned. The union 'just plays a welfare role'.

In the West, a major role for unions is to negotiate collective contracts and to be involved in the detail of payment systems. By contrast, the unions in our three cases played, at best, a peripheral role in such matters.

Chinese labour law now encourages unions to sign and perhaps bargain collectively to negotiate collective contracts. Both Pig Farm and Coconut Palm said that they do have such collective contracts but not as a result of negotiation with the grass roots union branch. Rather, the contracts set out the minimum standards in matters like minimum wages, working time and safety as required by national and local law. Such collective contracts were referred to derisorily by management at Coconut Palm as simply setting out 'themes' but having no real content. Tinplate simply dismissed the notion of collective contracts.

Instead, all three companies emphasised the importance of individual contracts. Pig Farm uses the model individual contract issued by the labour bureau in Haikou City (the capital of Hainan Province) but with its own amendments. This contract is re-signed every five years. At Tinplate, the individual contract is for one year. We were told that this short duration is a deliberate stick to elicit effort: 'we could provide three- or

Figure 1:
Employment, union membership and union density in China, 2004



Chinese unions have many members but are virtually impotent when it comes to representing workers

two-year contracts but the one-year contract yields more discipline'.

The reason that individual contracts are paramount is not hard to find. All three companies have powerful versions of performance-related pay. Our evidence mirrors the remarkable change from the traditional system of an egalitarian, non-performance related pay system towards company, team and individual performance pay with a low base component. In the three companies, these systems were devised and implemented by management with no real input from unions or workers.

Pig Farm sets team-level production targets with severe penalties for missing the target and generous rewards for exceeding it. Tinplate has a company-wide performance-based system such that, on average, production workers' pay is composed of a base amount of 40% and an output-related amount of 60%. More importantly, there is an 'inverse tournament': each worker is given a rigorous annual performance appraisal and the worker with the lowest rating is automatically dismissed.

At Coconut Palm, the performance pay system uses salary, bonus, dividends and fines. Quality control is achieved by teams monitoring the output quality of the previous team on the assembly line. A defective can would, for example, result in a fine of more than one day's pay. Managers and union officials emphasised that when this system was introduced in the 1990s, many workers left because they could not cope with the risk sharing and extra effort required.

In her stunning family history *Wild Swans*, Jung Chan notes that during the famine (1959-61), 'telling fantasies to oneself as well as others, and believing them, was practised to an incredible degree… "self-deception while deceiving others" gripped the nation'. If we turn the clock forward almost half a century, unions inhabit a similar dream world.

The plain fact is that Chinese unions are feeble. Thriving unions need, initially at least, some common interest among workers to flower. This has not developed, and is unlikely to evolve for a number of reasons:

- First, the basic union unit is the workplace or enterprise, which makes it difficult to develop the rallying cry of

western unions for much of the late nineteenth and twentieth century – 'the rate for the job' or 'common rule'.

- Second, the party-state does not recognise any conflict between capital and labour.
- Third, even if class consciousness is enhanced – by, for example, the dreadful and worsening safety record (in 2002, workplace accidents caused 140,000 deaths and 250,000 workers lost body parts and suffered other injuries), growing wage and income inequality and the exploitation of workers, particularly by foreign-invested firms – any manifestations of common interests are likely to be suppressed by the party-state.
- Fourth, even the ACFTU's top officials consider the members to be entirely separate from 'the union'. ACFTU chairman Wang Zhaoguo has said that Chinese unions must 'forge closer links with workers' and 'consistently keep close ties with the masses of workers as the lifeline of trade union work'. Such statements confirm that members' interests are presently a low priority.

Furthermore, the spread of the market mechanism to product and labour markets means that, whatever the law says, many firms do not wish to treat with unions. Under the market system, unions can thrive either if they can impose costs on the employer or if they can demonstrably provide benefits by boosting the efficiency of the enterprise. Unions are incapable of imposing costs and all the evidence suggests that managers in the growing non-state-owned segment of the economy believe that the efficiency of the enterprise depends on their actions, utterly independent of any unions' role.

Thus, collective contracts and tripartite institutions are treated with a shrug of the shoulders – implemented because it is the law but not embraced. And all the while employees have a low priority. A 2004 survey of over 3,000 private sector enterprises asked: 'If you want to be a good employer in the private sector, which kind of good things would you like to do?' There were six items and the employer could answer 'yes' to as many as s/he liked. Only 29% said 'yes' to 'treating workers well'.

Unions will remain nugatory while they rest content as a transmission belt such that they convey government policies to workers and enforce labour discipline to promote those policies, as opposed to representing workers in dealing with employers and the government.

Real wages have trebled in China in the last 20 years. But collective action by unions is utterly irrelevant to this huge advance in workers' well-being, which simply mirrors the very rapid growth of productivity. On the other hand, representation, voice, greater safety and a tempering of exploitation surely do require both collective action and autonomous organisation.

If the Chinese government wants the unions to provide an effective safety valve, then it has to allow them a degree of independence and permit, if not encourage, them to play a representative role. But the 2003 ACFTU Congress marked a major setback for progressive union developments, with the installation of a more conservative leadership.

The need for more effective collective representation is recognised by far-seeing albeit cautious ACFTU officials. Their 2004 report for the World Bank concluded with what is, in effect, a manifesto for reform, including the need to help workers develop their collective interests because unions are 'the weakest ring' in the labour market; autonomous negotiations and the right to strike; and a much stronger labour inspectorate, to cover social security payments, labour contracts and collective agreements (though not safety). But such reasonable reforms do seem a long way off.

Many Chinese companies now use powerful versions of performance-related pay

This article summarises 'Chinese Unions: Nugatory or Transforming? An *Alice* Analysis' by David Metcalf and Jianwei Li, CEP Discussion Paper No. 708 (http://cep.lse.ac.uk/pubs/download/dp0708.pdf) and forthcoming in *Advances in Industrial and Labor Relations*.

David Metcalf is professor of industrial relations at LSE and a research associate in CEP's labour markets programme. **Jianwei Li** is a member of the Haikou City foreign affairs ministry and was a CEP research assistant 2003/4.

in brief...

Cycles of disadvantage

More than a quarter of Britain's children are growing up in poverty. New research by **Jo Blanden** and **Steve Gibbons** measures the extent to which children's experience of relative financial hardship increases their chances of being poor in adulthood – and whether that 'persistence' of poverty across generations has got worse.

The fact that roughly 3.4 million children – or 27% of the child population – are living in poverty is a critical policy issue. Much has been made of the government's commitment to reducing child poverty, particularly its first target of a 25% fall in the numbers in poverty between 1998/99 and 2004/05, which has just been narrowly missed.

This concern about child poverty relates not just to the immediate effects of poverty. More importantly, the experience of poverty in childhood may influence social, economic and health outcomes throughout later life, leading to the 'persistence' of poverty into adulthood and consequences for the next generation.

In order to investigate the long-term impact of growing up in poverty, we need to observe children's family circumstances and then return to see how they are doing later in life. Such information can be found in the two British cohort studies: the National Child Development Study and the British Cohort Study. The availability of these two data sources – one a cohort born in 1958, the other a cohort born in 1970 – allows us to compare the fortunes of people who were teenagers in the 1970s and the 1980s.

Our initial estimates of the persistence of poverty compare the poverty rates of people in their early thirties between those who grew up in poverty and those who did not:

- Of people whose families were poor when they were 16 in the 1970s, 19% were poor in their early thirties and 81% were not. So the 'odds' against growing up to be poor if your parents were poor were over four-to-one.

- Of people whose families were *not* poor when they were 16 in the 1970s, 90% were not poor in their early thirties while 10% were poor. So the 'odds' against growing up to be poor if your parents were *not* poor were about nine-to-one.

Persistence of poverty can be measured by dividing the odds of being poor if one's parents were poor by the odds of being poor if they were not – a number called the 'odds ratio'.

Calculations of this odds ratio show that for a teenager in the 1970s, the odds of being poor as an adult were doubled if his or her parents were poor. Similar calculations for the later cohort who were teenagers in the 1980s show that the odds of being poor in adulthood were nearly quadrupled by having poor parents (see Figure 1). Comparing these odds across the cohorts indicates that the strength of poverty persistence has approximately doubled, with an increase for men that is slightly greater than for women.

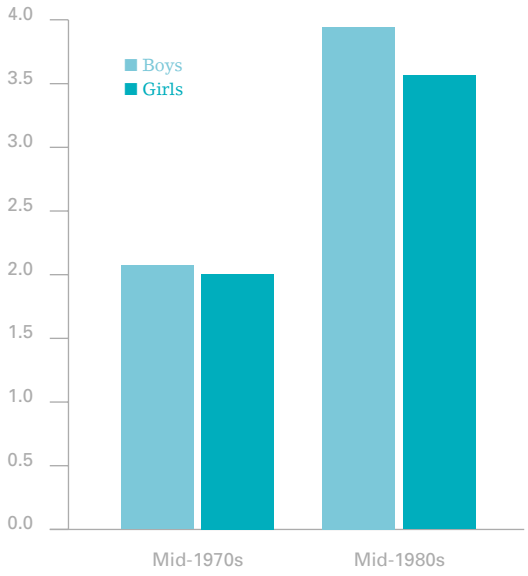
For teenagers growing up in the 1970s, teenage poverty doubled the odds of being poor at age 33. For this older cohort, it is also possible to observe their situations at age 42. The impact of teenage poverty on poverty at age 42 is very similar to its impact at age 33, also doubling the chances of being poor. For this group, teenage poverty is therefore as strongly related to middle-age poverty as to poverty in earlier adulthood.

This is perhaps surprising: we might expect the influence of teenage poverty to fade as the years go by. One explanation could be that teenage poverty influences poverty in early adulthood, and this then links through to poverty in later life. But accounting for poverty at age 33 has very little impact on the odds ratios for poverty at age 42. The link between poverty in teenhood and adulthood continues through to middle age, regardless of whether or not an individual is recorded as poor in their thirties.

These results raise an important policy question: what is it about growing up in poverty that makes it more likely that poor children will experience disadvantage in later life? This is crucial in terms of putting in place effective policies to alleviate the effects of early disadvantage. For example, if we can show that it is lack of money in itself

Growing up in poverty makes it more likely that children will be poor in later life

Figure 1:
How teenage poverty affects the odds of being poor as an adult



Note: The bars report the odds ratios for poverty at 16 in a logit model of poverty at age 33 for the earlier cohort and age 30 for the later cohort.

that is causing children to do badly, then redistribution is an obvious solution and reducing child poverty through benefits will have important effects.

We know that poor families differ in many ways from those who are not poor: they are more likely to be headed by lone parents and/or parents with low education and employment. Policy prescriptions are more difficult if it is these factors that lead to disadvantageous outcomes for children, as they are much less subject to change. The cohort studies include information on family characteristics, which makes it possible to measure the extent to which they are connected with poverty in later life:

- For the teenagers growing up in the 1970s, it seems that the impact of these factors on children can explain all of the higher later poverty rates for children who experienced poverty as teenagers. It was their family characteristics, in particular their parents' lack of education and work, that resulted in their later poverty and not the fact that their parents lacked income per se.

- For those who were teenagers in the 1980s, this is not the case: even when taking account of their family characteristics, there is evidence that poverty in itself puts these young people at a significant disadvantage.

Teenagers who lived in poverty in the 1980s are twice as likely to be poor in adulthood as their 1970s counterparts

These results could be taken to imply that straightforward redistribution would have had substantial benefits for the younger group. But this conclusion is too simplistic as it does not take account of the ways in which poor and non-poor families differ that are difficult to observe.

For example, we do not have a measure of parents' ability to help and encourage their children to learn and persevere. Evidence from other studies suggests that policies to reduce child poverty through transfers must be coupled with policies that help children's learning and development, particularly at early ages.

The most striking finding from this research is that the persistence of poverty from the teens into the early thirties has risen over time, with teenage poverty having a greater impact on later outcomes for teenagers in the 1980s compared with teenagers in the 1970s. This finding adds to the wider evidence that family background has had a growing impact on later outcomes between these cohorts.

This article summarises *The Persistence of Poverty across Generations: A View from two British Cohorts* by Jo Blanden and Steve Gibbons, published for the Joseph Rowntree Foundation by The Policy Press (http://www.jrf.org.uk/bookshop/details.asp?pubID=778).

Jo Blanden is a lecturer in economics at the University of Surrey. **Steve Gibbons** is a lecturer in economic geography at LSE. Both are research associates in CEP's education and skills programme.

New from the CEP

CEP Discussion Papers are now available as electronic copies free to download from the Centre's website:

http://cep.lse.ac.uk/pubs/dp.asp?prog=CEPDP

UNIONS, WITHIN-WORKPLACE JOB CUTS AND JOB SECURITY GUARANTEES
by Alex Bryson and Michael White
Discussion Paper No. 733
July 2006

ON THE THEORY OF ETHNIC CONFLICT
by Francesco Caselli and Wilbur John Coleman II
Discussion Paper No. 732
July 2006

WHAT VOICE DO BRITISH WORKERS WANT?
by Alex Bryson and Richard Freeman
Discussion Paper No. 731
July 2006

PATTERNS OF WORK ACROSS THE OECD
by Giulia Faggio and Stephen Nickell
Discussion Paper No. 730
June 2006

THE IMPACT OF ROYALTY SHARING INCENTIVES OR TECHNOLOGY LICENSING IN UNIVERSITIES
by Saul Lach and Mark Schankerman
Discussion Paper No. 729
June 2006

THE UNEQUAL EFFECTS OF LIBERALISATION: EVIDENCE FROM DISMANTLING THE LICENSE RAJ IN INDIA
by Philippe Aghion, Robin Burgess, Stephen Redding and Fabrizio Zilibotti
Discussion Paper No. 728
June 2006

TRADE AND GROWTH WITH HETEROGENEOUS FIRMS
by Richard Baldwin and Frédéric Robert-Nicoud
Discussion Paper No. 727
June 2006

New report

THE DEPRESSION REPORT: A NEW DEAL FOR DEPRESSION AND ANXIETY DISORDERS
The Centre for Economic Performance's Mental Health Policy Group

Published in hard copy and online, June 2006
Available free of charge.

Contact cep_info@lse.ac.uk
or download from
http://cep.lse.ac.uk/textonly/research/mentalhealth/DEPRESSION_REPORT_LAYARD.pdf

For further information on CEP publications and events please contact:
The Publications Unit
Centre for Economic Performance
Houghton Street, London WC2A 2AE
Telephone +44 (0) 207 955 7673
Fax +44 (0) 207 955 7595
Email cep_info@lse.ac.uk
We accept Visa, Access and Mastercard for payment by post, fax and phone. Overseas rates on request.

CentrePiece

CentrePiece is the magazine of the Centre for Economic Performance at the London School of Economics. Articles in this issue reflect the opinions of the authors, not of the Centre. Requests for permission to reproduce the articles should be sent to the Editor at the address below.

Editorial and Subscriptions Office
Centre for Economic Performance
London School of Economics
Houghton Street
London WC2A 2AE

Volume 11 Issue 1
(ISSN 1362-3761)

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

E·S·R·C
ECONOMIC & SOCIAL RESEARCH COUNCIL

The back issues