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Towards a High-Skilled, Low-Waged Workforce? A Review of Global Trends in Education, Employment and the Labour Market

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Editor's Foreword

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Abstract

This monograph examines the claim that national economic competitiveness, social justice and individual prosperity, depend on developing a high-skill, high-wage workforce. Based on an analysis of global trends in education, employment and the labour market, we challenge the policy focus on upgrading the skills of the workforce, as it will fail to meet its policy objectives. Without a broader industrial strategy, high skills are a declining source of competitive advantage, given the exponential increase in the global supply of 'knowledge' workers. Equally, the assumption that it would take decades for emerging economies to compete for high-end manufacturing and services, including research and development, have been rapidly undermined. Global competition is now based on quality *and* price, transforming the relationship between education, jobs and rewards. While we identify a need for further detailed analysis of these issues, there is enough evidence to suggest that the human capital assumption on which government policy rests is no longer 'fit for purpose'.

Introduction

The nature and consequences of economic globalisation are widely contested (Ohmae, 1990; Gray, 1998). Within government and policy circles, it is believed to present new opportunities and challenges to both the developed as well as emerging nations within the world economy. But what is surprising about much of the current debate is that it has generated more political heat than hard evidence. This is because the debate is often polarised between the protagonists of 'free trade' and those who oppose it for various reasons (de Rivero, 2001; Wolf, 2004).

The purpose of this monograph is not to add our voice to either the pro- or anti-globalisation lobby, or to review their relative intellectual merits, but to undertake a systematic review of current trends in education, employment and the global labour market. This is an urgent requirement as virtually all national governments in both developed and emerging economies view the upgrading of skills as key to economic competitiveness, social justice and a cohesive society.[1]

In undertaking this review, we will focus on Britain and the United States. Political leaders in both countries have extolled the virtues of free trade and flexible labour markets. They assert that there are no longer British or American jobs but only British and American workers, who must compete with workers from other nations on their knowledge, skills and enterprise. Therefore, the prosperity of nations, the profitability of companies and the livelihoods of individuals and their families are believed to depend on winning a competitive advantage in the knowledge-driven global economy. Britain and the United States have staked their future prosperity, with all its social ramifications, on out-smarting other nations in the competition for high-skilled, high-waged employment.

The win-win scenario

We have witnessed a shift in emphasis within the win-win scenario, although faith in the mutual benefits of global integration to both developing and developed economies remains unchallenged, as do its policy implications. Initially it was assumed that while emerging economies will compete on their 'price' advantage for low-skilled work, 'quality' high-skilled, high-waged employment will remain within those developed economies with the most innovative, technologically advanced and employable people. Robert Reich states:

> Skilled labour has become a key barrier against low wage competitions for the simple reason that it is the only dimension of production in which existing capitalist powers retain an advantage. Technological innovation may be bought or imitated by anyone. High-volume standardised production facilities may be established anywhere. But production processes that depend on skilled labour must stay where it is.[2]

In the developed economies, it was assumed that prosperity could no longer be based on the low-skilled, high-waged employment that characterised the mass production of standardised goods and services in the 1960s and 1970s. New communication technologies, cheaper transportation and increasing price competition were already leading to the export of low-skilled tasks that could be done at a fraction of the labour costs in emerging economies. But it was also assumed that there was little prospect of emerging economies such as China and India being able to compete for high-skilled jobs, such as research, design and advanced engineering. Initially, the price advantage of the less developed economies was viewed as a positive sum game, as it gave them an opportunity to develop their economies, at the same time as forcing countries such as Britain, Japan and the US to compete on quality rather than price.

More recently the success of China and India in moving into the production of high value-added, high-tech product markets, has caused political leaders and their advisors to re-evaluate the win, win scenario. In 2004 the OECD Council of Ministers asked their senior advisors to shed light on the issues 'since solid evidence to underpin policy discussion and formulation was scarce'. The subsequent 2007 Report acknowledged the key role of multinationals in enabling developing economies, including China and India, to move up the value-chain to compete with Western companies for high-tech products and R&D investment. However, their policy prescriptions re-affirmed a commitment to free-trade, innovation and skills up-grading, 'openness to trade and investment and well-functioning markets are the key to the upgrading process, this will help move resources from firms and industries that are no longer able to compete in the global market to those that are successful' (OECD, 2007).

The win-win scenario is sustained, but this time it is not through the quality of the high-tech goods produced in the West but through the ability of these economies to introduce change, innovation and productivity growth. The policy implications are to support innovation and entrepreneurship and crucially to produce 'more highly skilled workers' through education and training policy focussed on life-long learning,

to sustain a shift toward more high value-added areas that might remain within the economies of the OECD.

This analysis was reflected in the policy advocated by the UK Prime Minster, Gordon Brown (2008), who recently announced that the UK had entered a 'global skills' race.

> Already our Asian rivals are competing not just in low-skilled manufacturing, but in high-tech products and services. Once, we worried about a global arms race. The challenge this century is a global skills race and that is why we need to push ahead faster with our reforms to extend education opportunities for all… In a globally competitive national economy, there will be almost no limits to aspirations for upward mobility. Globalisation dictates that the nations that succeed will be those that bring out the best in people and their potential. And this is the new opportunity for Britain. Put simply: in the past, we unlocked only some of the talents of some of the people; the challenge now is to unlock all the talents of all of the people.

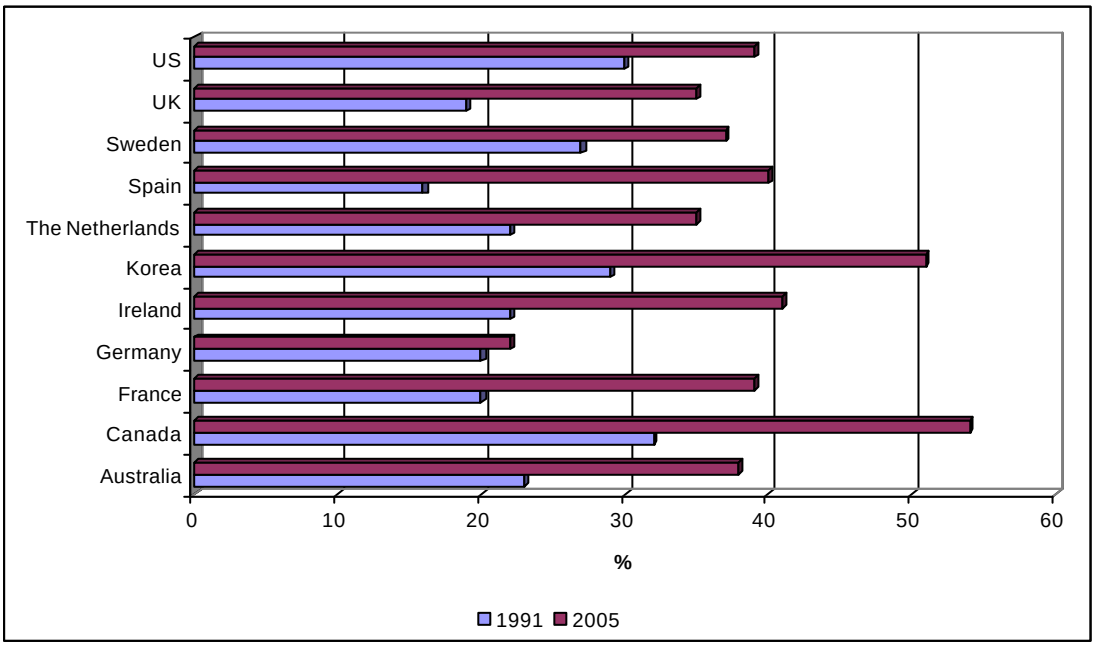
The scale of this challenge is widely acknowledged in Britain and the US, as widening income inequalities since the late 1970s are seen to reflect differences in the ability of workers to develop the marketable skills that are highly valued within the global labour market. Therefore, the win-win scenario not only assumes that both emerging and developed economies will benefit from further global integration, but it also assumes a domestic bargain. The route to individual prosperity is education. Through the investment of time, energy and money, those people who develop their employability within the knowledge-driven economy will derive significant financial benefits over the medium term. The challenge of income inequalities can be met by raising the education and training standards of socially disadvantaged groups giving them the opportunity to compete for the global supply of high-skilled, high-waged jobs. The challenge is to outsmart other nations in the 'knowledge wars' of the future (Brown and Lauder, 2006).

Do current trends in education, work and the global labour market support this optimistic interpretation of the win-win scenario – at least from a British or an American perspective? Our argument is that far from supporting the win-win scenario, current trends raise urgent questions about the nature of the global challenge and its policy consequences. This monograph will present some of the latest evidence and conclude with an outline of its broader implications for public policy.

High skills: a declining advantage?

We begin by considering recent trends in educational investments, especially at the tertiary level. The argument that a knowledge-driven economy demands a larger proportion of the workforce with a university education and with access to lifelong learning opportunities has had a major impact on participation rates in tertiary education. University is no longer the preserve of elites, as has been the case in many OECD countries. Whatever the merits of the economic case for expanding higher education, there has been a major expansion across OECD countries. Figure 1 shows that there was significant expansion in all of these countries with the exception of Germany. Canada was the first country to achieve the target of over 50 percent of people aged 25 and 34 to enter the job market with a tertiary level qualification, followed by Korea, which has engineered a massive growth in tertiary provision since 1991. Germany is the exception due to its continued commitment to the dual system of workplace and off-the-job training.

Figure 1: Trends in educational attainment at tertiary level (1991-2005) Aged 25-34.[3]



Source: OECD, Education at a Glance, 2003, 2007

There is little to suggest that this expansionary phase will end in the near future as most countries benchmark themselves against those with the highest participation rates, although its relationship to employment, productivity and economic growth remain unclear (Ashton and Green, 1996). It also suggests that the

value of educational investments as a source of competitive advantage may not deliver what national policy advisers and politicians anticipate: if everyone adopts the same tactic, then no advantage is gained; but at the same time such investments remain vital as a source of 'defensive expenditure' (Thurow, 1977; Brown, 2003). Although it may not create the conditions required to become a 'magnet' economy for high-skilled employment, failure to invest will do little to enhance competitiveness.

We will return to this issue, but what is also ignored in most debates about improving the employability of the workforce are the strategies now being pursued by some of the major emerging economies, as it has been assumed that it will take decades for them to build the infrastructure required to generate a high-skilled workforce. This view fails to take account of how some of the emerging economies have responded to the global challenge. Singapore, for instance, did not become an independent city state until the 1960s and has continued to depend on inward investment from multinational companies. While Singapore's competitive strategy was initially based on low-skilled, low-waged work, it has since pursued a high-skills strategy that has made it the second most competitive economy according to the *World Competitiveness Yearbook 2008*.[4]

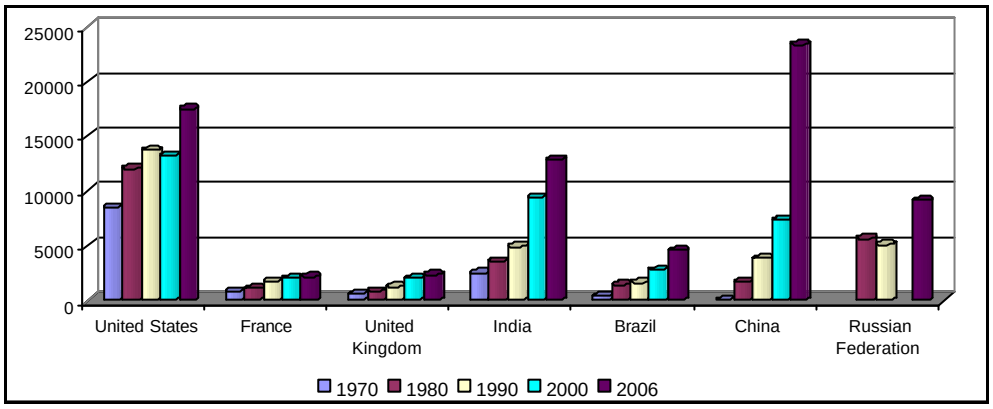
Table 1: Trends in International Mathematics and Science Study (TIMSS) rank order for mathematics and science achievement of eighth-graders (13-year-olds), 2003

Mathematics		Science	
Nation	**Average**	**Nation**	**Average**
Singapore	605	Singapore	578
Korea, Republic of	589	Chinese Taipei	571
Hong Kong SAR	586	Korea, Republic of	558
Chinese Taipei	585	Hong Kong SAR	556
Japan	570	Estonia	552
Belgium-Flemish	537	Japan	552
Netherlands	536	Hungary	543
Estonia	531	Netherlands	536
Hungary	529	USA	527
Malaysia	508	Australia	527
Latvia	508	Sweden	524
Russian Federation	508	Slovenia	520
Slovak Republic	508	New Zealand	520
Australia	505	Lithuania	519

Source: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2003. For notes see http://nces.ed.gov/timss/Results03.asp

Table 1 shows that students in Singapore are high achievers on international tests for both mathematics and science. Singapore has also introduced reforms to encourage creative potential and individual enterprise. Given that Singapore has a population of four and a half million, it does not pose a major economic challenge to Britain or the US. But the collapse of communism, further economic integration and advances in information technologies have brought China, India and Russia, along with a number of smaller nations, into the global competition for education, knowledge and high-skilled employment.

Figure 2: The expansion of tertiary education in selected emerging and developed economies (enrolments), in thousands

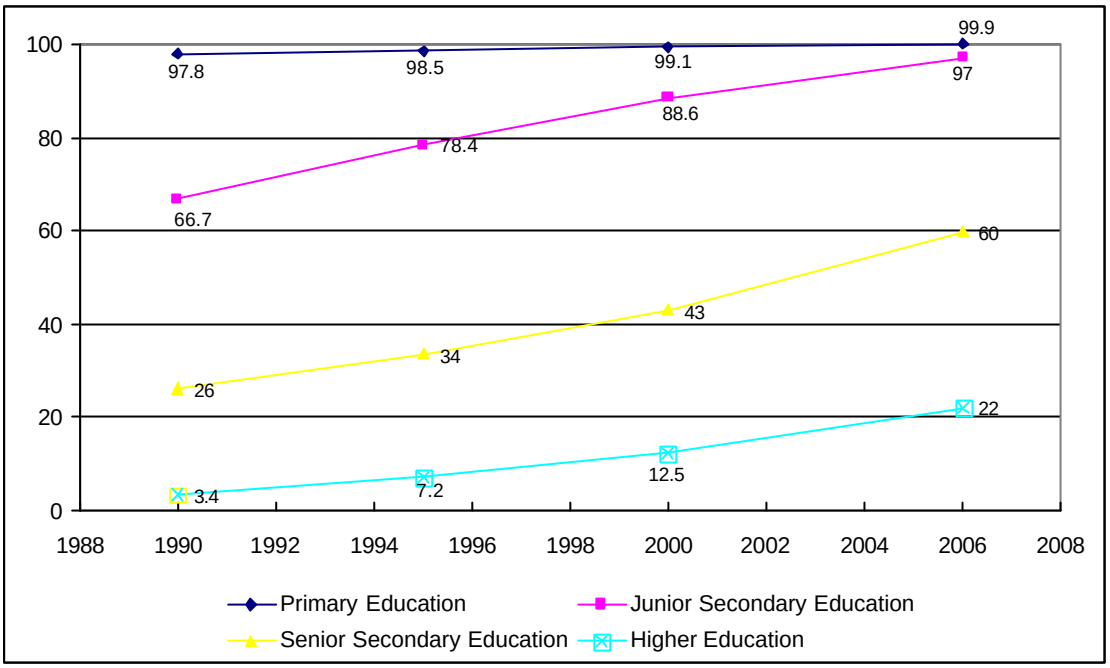


Brazil 2005 instead of 2006
Source: Compiled by the authors from the Worldbank website:
http://devdata.worldbank.org/edstats/cd5.asp

Figure 2 shows that in 2006, China had over ten times as many university students as the UK and almost six million more than the US. But perhaps the most extraordinary statistic on the expansion of education in China is enrolment to senior secondary schools (shown in Figure 3), which witnessed an increase in enrolment rate from 26 percent to almost 60 percent since 1990. Figure 3 also shows the participation in higher education increased from a little over 3 percent in 1990 to 22 percent in 2006.[5] These figures reflect a broader skills strategy captured in an official policy statement on employment prospects to 2020:

> It is necessary to fully utilize various education resources, strengthen the improvement in human resources quality, direct major efforts to the promotion of quality-oriented education, stress cultivation of practical abilities, and make efforts in improving education quality, so as to train millions of high-calibre workers, thousands of special talents and a large number of outstanding innovative talents for the socialist modernization drive.[6]

Figure 3: Enrolment rates primary, secondary (junior and senior) and higher education enrolment rates for China 1990, 1995, 2000, and 2006 (in percentage)



Source: China Education Yearbooks 2001-2006, Ministry of Education of PR China. Taken from Cheng, J. *Update in Chinese Higher Education Developments*, Asia-Pacific Association for International Education (APAIE), http://www.apaie.org/hoge2008piyo/final_ppt/1-2-1_Jack_CHENG.pdf Accessed on 26-06-2008.

The expansion of higher education in India is following a similar path. In 2006 there were almost 13 million in tertiary education, but there are plans for major expansion outlined in India's Eleventh Five-Year Plan (2007-2012) including a major increase in central government support for education, representing what Prime Minister Manmohan Singh views as 'an unprecedented increase in allocation for education in the history of our country'.[7] This includes funding for 30 new Central Universities, five new Indian Institutes of Science, Education and Research, eight new Indian Institutes of Technology, seven new Indian Institutes of Management and 20 new Indian Institutes of Information Technology.[8] Mr Singh, suggested that a five-fold increase in education expenditure was required because, 'it is through universal literacy, access to education and knowledge based agricultural and industrial development that India must henceforth march ahead to join the front ranks of the great nations of the world.'[9]

There is little sense of countries, whether in Asia or Eastern Europe, being content with doing the 'body' work within the global economy while the 'brain' work is left to the developed economies such as the US, Japan, Germany and Britain.

Returning to Figure 2 we can see that since 1990, the combined numbers of degree-level students in China, India and Russia have more than trebled from a total of 13.9 to over 45 million students; this is more than double the combined total for the US and the UK at 19.8 million.

Richard Freeman has highlighted the importance of what he called 'the great doubling' referring to the increasing size of global labour pool from around 1.46 billion workers to 2.93 billion workers (Freeman, 2006). But there is another great doubling. Based on our further analysis of enrolment figures for 98 countries, we found that tertiary level enrolments (undergraduate and postgraduate) virtually doubled within a decade from 33.4 million in 1995 to 62.9 million in 2005 (See Table 2). While these data should be treated as indicative and remembering that enrolment figures do not tell us how many actually enter the global job market on an annual basis due to high levels of drop-out in some countries, it nevertheless shows that the expansion of higher education has not been limited to OECD member states.

Table 2: Enrolment terti ary education total for 98 countries, for 1995 and 2005 (in thousands)

Country	1995	2005	Remarks	Country	1995	2005	Remarks	Country	1995	2005	Remarks
Germany	4 288	4 288		Spain	1 592	1 840		Mozambique	7	28	
Greece	329	647		Sweden	261	430		South Africa	618	735	
Hungary	195	436		Switzerland	148	196		Swaziland	6	6	1996*
Iceland	7	15		Tajikistan	108	119	1994*	Tanzania	13	51	
Ireland	128	187		Turkey	1 174	2 106	1994*	Uganda	30	88	2004**
Italy	1 775	2 015		Ukraine	1 541	2 605		Argentina	1 070	2 117	2004/1994
Kazakhstan	419	753		United Kingdom	1 821	2 288		Bolivia	189	346	1996/2004
Kyrgyz Republic	50	220		Canada	1 763	1 327	2004**	Brazil	1 869	4 275	1996/2004
Latvia	44	131		United States	1 4262	17 272		Chile	343	664	
Lithuania	76	195		India	5 696	11 777		Colombia	588	1 224	
Luxembourg	2	3	2004**	Nepal	106	147	1996/2004	Cuba	122	472	
Macedonia, FYR	30	49		Botswana	8	11		Dominican Republic	177	294	1996/2004
Moldova	88	119		Burkina Faso	9	28		Ecuador	203	213	
Netherlands	492	565		Chad	3	10		El Salvador	115	122	1994/2004
Norway	180	214		Eritrea	3	5	2004**	Guatemala	80	112	2006**
Poland	1 021	2 118		Ethiopia	35	191		Guyana	8	7	
Portugal	320	381		The Gambia	2	2	1994/2004	Honduras	61	123	1996/2004
Romania	370	739	1994*	Ghana	20	120	1993*	Mexico	1 533	2 385	
Russian Federation	4 458	9 003	1994*	Guinea	8	24		Panama	77	126	
Slovak Republic	92	165		Lesotho	4	8		Paraguay	41	149	2004**
Czech Republic	192	336		Madagascar	29	45		Peru	672	909	
Denmark	175	232		Malawi	6	5	2004**	St. Lucia	3	3	
Estonia	40	68		Mali	10	33	2004**	Uruguay	80	103	
Finland	214	306		Mauritania	8	9					
Slovenia	48	104		Mauritius	6	17		**Total**	**3 3288**	**62 906**	

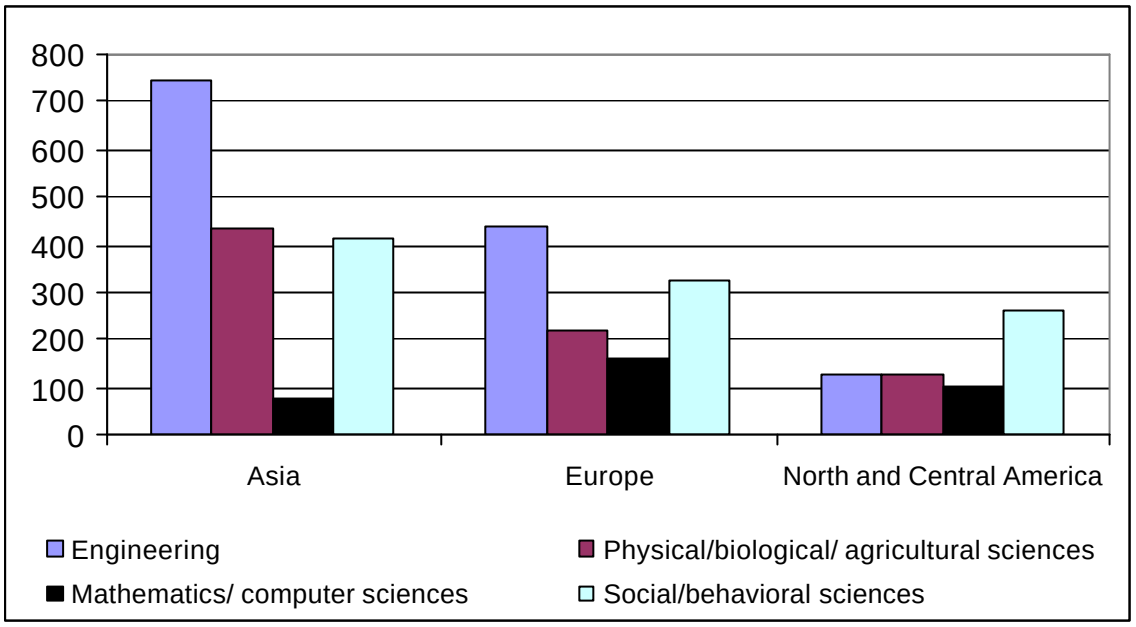
*instead of 1995

**instead of 2005

Source: Derived from the Worldbank, Edstats online database, http://go.worldbank.org/47P3PLE940

Data originates from UNESCO Institute for Statistics (UIS).

Figure 4: First university degrees in science and engineering fields in Asia, Europe and North America, by field: 2004 or most recent years (thousands).



Note: Natural sciences include physical, biological, earth, atmospheric and ocean sciences.

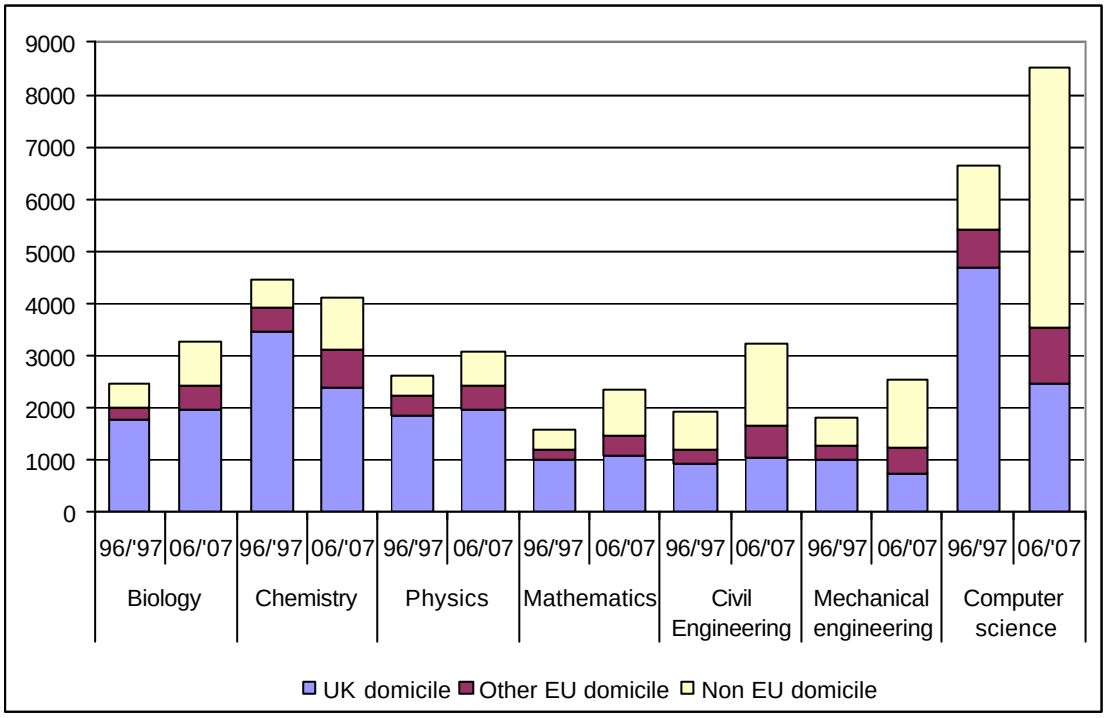
Source: Science and Engineering Indicators 2008 http://www.nsf.gov/statistics/seind08/c2/fig02-34.xls

Figure 4 also offers little comfort to those who argue that, even if these countries are producing large numbers of graduates, they will lack the quality of education received in the West, especially in terms of new scientific knowledge. Although the quality of education is likely to vary in countries experiencing rapid expansion of educational provision, it is nevertheless the case that Asia is producing more engineers and physical scientists than Europe and North America combined. In the case of engineering Asia is already producing double the combined number of America and Europe.

In the US, close to half of those gaining a doctoral degree in engineering, mathematics and computer science are foreign students. Some of these remain within the developed economies, but others return to their indigenous countries, adding to the stock of highly skilled workers (Saxenian, 2002). Alone, South Korea graduates as many engineers as the US and, according to recent evidence from a US Business Roundtable report, by 2010 more than 90 percent of all scientists and engineers in the world will be living in Asia, although such figures should be treated with a high degree of scepticism.[10]

In the UK, home students make up less that half those studying for postgraduate degrees in science subjects. Even in Computing, a discipline that stands at the heart of high-tech industry, there has been a significant decline in the proportion of UK domiciled students, at the same time as a major increase in the category of non-EU domiciled students (see Figure 5). The number of UK computing students in higher education fell by 22.3 percent in three years between 2003 and 2006, a decline of over 30,000 students. During the same period the numbers taking A-level computing fell by 33.9 percent from 8,488 to 5,610.[11]

Figure 5: UK Full-time postgraduates of selected science subjects and domicile for 1996/1997 and 2006/07



Source: Higher Education Statistics Agency, Students in Higher Education Institutions, 1996/1997 & 2006/07

The World Bank also estimates that Russia has the third-highest numbers of scientists and engineers per capita in the world and other Eastern European countries also have a growing proportion of well-educated scientists and IT specialists (Trombly, 2003). Elika Trifonova (2003) observed that:

> because the Russian education system continues to be heavily weighted toward math and science, Russian scientists are often considered the best in the world. Consequently, Russian IT companies present an attractive investment opportunity because these businesses can draw upon Russia's large 'intellectual resource' of world-class scientists and engineers.

Equally, in an interview conducted with a leading global corporation that hires large numbers of engineers and scientists, we were told that the company experienced little problem finding enough highly educated workers due to the supply from emerging markets. But it was also stated that in engineering it is Western nations that will need to work hard to catch up:

> It's not a problem to get enough highly educated people in these markets… Education level usually is very good. This… applies to Russia, it also applies to China. Educational level is pretty high in particular in Russia where people are very well educated. Although they have to get accustomed to, let's say, to the way business is done from a more western perspective, that's quite normal. The consequence for… western countries is that they have really to work hard to catch up. We can see this also in the United States.[12]

In Britain, the chances of catching up look remote. Despite the major expansion of higher education since the mid-1990s, the numbers of UK domiciled students studying mechanical engineering and chemistry also fell along with computer science, although there was a slight increase in the numbers studying physics (See Figure 5). To make matters worse, a significant number of STEM (science, technology, engineering and mathematics) graduates enter jobs in non-STEM related occupations. There are now twice as many students studying business and administration than engineering and technology.[13] A similar picture emerges in the US where there has been a 20 percent decline in the number of engineering degrees awarded compared to 1985.[14]

It could be concluded that the problem, at least in STEM subject areas, reflects this decline in student numbers, but this may not be the case as a recent analysis of US data makes clear. Harold Salzman (2007), argues, 'The available data indicate that the United States' education system produces a supply of qualified STEM graduates in much greater numbers than jobs available. If there are shortages, it is most likely a demand-side problem of STEM career opportunities that are less attractive than career opportunities in other fields… Standard labor market indicators do not indicate any shortage' (2007:2). This conclusion is based on evidence showing that the STEM workforce in the United States totals about 4.8 million, which amounts to less than a third of the 15.7 million workers who hold at least one STEM degree (Salzman, 2007:8).

A rising demand for knowledge workers?

The trends in education discussed here would not represent a major problem if employment within the world economy continued to expand and if a growing proportion of these jobs were high-skilled. While the global economy has seen growth in GDP, and total employment has grown by 441 million between 1997-2007, official figures presented in Table 3 show that unemployment has also increased during the same period. In 2007 it stood at 190 million; an underestimate of real levels of unemployment, especially in less developed economies lacking state funded unemployment benefits. It alas takes no account of the 2008 financial crash, which will inevitably result in significant job losses around the world. Nevertheless, it does not appear to support Jeremy Rifkin's argument that we are losing jobs all over the world, although the composition of the workforce may well be changing, as he cites a study by Alliance Capital Management that found that manufacturing jobs are even being eliminated in China. Indeed, the rate of decline in China was reported to be faster than in any other country. Between 1995 and 2002, China lost more than 15 million factory jobs, constituting 15 percent of its total manufacturing workforce (Rifkin, 2004).

Table 3: Global labour market indicators, 1997 and 2007

	Female		**Male**		**Total**	
	1997	**2007***	**1997**	**2007***	**1997**	**2007***
Labour force (millions)	1071.7	1267.7	1625.0	1895.3	2696.7	3163
Employment (millions)	1001.6	1186.1	1530.3	1787	2531.9	2973.1
Unemployment (millions)	70.2	81.6	94.6	108.3	164.8	189.9
Youth unemployment	12.3	12.5	12.0	12.2	12.1***	12.3***
Labour force participation rate (%)	52.9	52.5	80.4	78.8	66.7	65.6
Employment-to-population ratio (%)**	49.5	49.1	75.7	74.3	62.6	61.7
Unemployment rate (%)	6.5	6.4	5.8	5.7	6.1	6.0

*2007 data are preliminary.

**Employment-to-population ratio: the number of employed persons as a percentage of the working-age population. This indicator measures the proportion of the population who could be working (the working age population) who are working, and as such provides some information on the efficacy of the economy to create jobs.

***Due to lack of data, the total youth unemployment rates are calculated as the mean male and female unemployment rates, assuming equal sizes.

Source: International Labour Office Global Employment Trends for Women - March 2008 p.25-26 http://digitalcommons.ilr.cornell.edu/intl/47

In a context of growing concerns about demographic trends and the ageing workforce, it is sobering to note that a significant proportion of the unemployed are young people. In the region of 85 million people between the ages of 15-24 were officially unemployed in 2005.[15] There is no shortage of young people to contribute to the national economies of those countries that confront a rapidly aging population (Britain and America are in the low-risk category), but some young people are living in the wrong places (Jackson and Howe, 2003). The global oversupply of labour is also characterised by the fact that it is increasingly educated.

The issue of jobless growth was a hot issue in the US. George Bush was the first President since Herbert Hoover in the early 1930s to preside over a net loss of jobs in a four-year term of office (Seager, 2004). But it is not only the issue of job creation that is important here, but the quality of these jobs. We need a clearer picture of the demand for high-skilled workers in the developed economies given that much of the investment in education and training is based on the idea that we have entered a new global economic era based on knowledge, innovation, technologies and new ways of doing business.

This new economy has been variously described as the informational, digital or knowledge economy. Whatever label is applied, it is widely believed that there has been an exponential increase in the demand for high-skilled workers. Some commentators estimate that around half to three-quarters of employees are 'knowledge' workers in developed economies. It is also claimed that in the region of 80 percent of new jobs require a university degree within the British economy (Brown and Hesketh, 2004; Keep and Mayhew, 2004).

If the demand for high-skilled workers is consistent with the supply, then there is less reason for concern, as the expansion of education would mirror the technological upgrading of the workforce. The problem for the proponents of the knowledge economy is that the evidence fails to support the argument that today's economy requires a significant, let alone exponential, increase in demand for high-skilled workers.

Table 4: Employment by education and training category, USA, 2000-2010[16]

Most significant source of education or training	Number		Percent distribution	
	2006	2016	2006	2016
Total, all occupations (thousands)	150 620	167 754	100.0	100.0
First professional degree	1 970	2 247	1.3	1.4
Doctoral degree	2 025	2 462	1.3	1.5
Master's degree	2 167	2 575	1.4	1.5
Bachelor's or higher degree, plus work experience	6 524	7 117	4.3	4.3
Bachelor's degree	18 585	21 659	12.3	13.0
Associate degree	5 812	6 899	3.9	4.2
Post-secondary vocational award	7 901	8 973	5.2	5.4
Work experience in a related occupation	14 579	15 889	9.7	9.6
Long-term on-the-job training	11 489	12 200	7.6	7.3
Moderate-term on-the-job training	27 230	29 248	18.1	17.6
Short-term on-the-job training	52 339	56 951	34.7	34.4

Source: Arlene Dohm & Lynn Shniper, Employment Outlook: 2006-16 Occupational Employment Projections to 2016, *Monthly Labor Review*, November 2007 p.103.
http://www.bls.gov/opub/mlr/2007/11/art5full.pdf

Although many of the jobs with the fastest rate of growth in the American economy require a college or university degree, most Americans will continue to work in occupations that require low levels of education and training. Table 4 shows that the proportion of the workforce requiring a bachelor's degree or higher is expected to rise by just 1.1 percentage point between 2006 and 2016, from 20.6 percent to 21.7 percent. This amounts to around one in five of all jobs, whereas the majority of the workforce (52%) will remain engaged in activities that require, at best, 'moderate' work-related training. Indeed, the proportion of jobs requiring virtually no training is not anticipated to decline, representing over a third of the American workforce. There is little prospect here of a new economy emerging on the basis of 'knowledge' work.

Official occupational projects for the UK have shown a consistently higher demand for managerial, professional and technical occupations. This may reveal more about the way occupations are classified, especially the role of manager, and the way

projections have been calculated, than they do about the realities of the UK workforce. This is an issue that is in need of urgent investigation as there seems to be a significant mismatch between official figures that have led to claims that up to 80 percent of new jobs will require a university education, and other sources which present a somewhat different picture.

Table 5: UK Occupational changes and projections using SOC 2000 major categories, in share of total (as percentage)

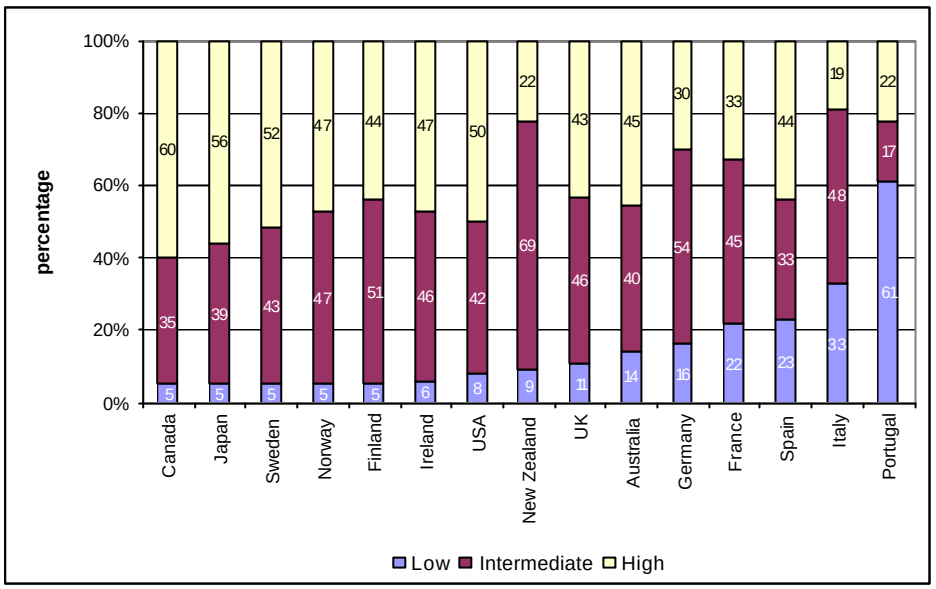
	1984	1994	2004	2009	2014	2020
1. Managers and senior officials	12.1	13.6	15.3	15.9	16.6	17.0
2. Professional occupations	8.4	10.0	11.8	12.6	13.5	14.0
3. Associate professional and technical	10.1	12.0	14.3	14.7	15.1	15.4
4. Administrative and secretarial	15.0	14.8	12.6	11.9	11.1	10.6
5. Skilled trades occupations	16.4	13.6	11.4	10.8	10.3	10.1
6. Personal service occupations	4.1	5.6	7.5	8.1	8.6	8.9
7. Sales and customer service occupations	6.1	7.0	8.0	8.5	8.9	9.2
8. Machine and transport operatives	11.8	9.7	7.9	7.5	7.1	6.9
9. Elementary occupations	16.1	13.7	11.3	10.0	8.7	7.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Rachel Beaven, Derek Bosworth, Richard Lewney and Rob Wilson (2005) *Alternative Skills Scenarios to 2020 for the UK Economy*, Cambridge Econometrics and the Warwick Institute for Employment Research, p.33
http://www.hm-treasury.gov.uk/media/D/E/alternative_skills_scenarios_chapters.pdf

Table 5 shows a 5 percent point increase in demand for those jobs that typically require university credentials (managers, senior officials, professionals, associate professionals and technicians), rising from a combined total of 41.4 in 2004 to 46.4 percent in 2020. Moreover, unlike official US statistics, elementary occupations are projected to decline from 11.3 to 7.9 percent of jobs during the same time period. This would involve the UK creating over twice the proportion of professional and managerial jobs than the US if current UK projections are to be met.[17]

Given these projections, the Leitch Review of Skills has set various targets for improving the skills profile of the workforce, including a commitment to a 50 percent participation rate in higher education by 2010 in line with government policy. A key assumption of the Leitch Review is that the UK needs to improve its skill profile relative to other developed economies. Based on current projections shown in Figure 6 it suggests that the UK will have 43 percent of its workforce in the high skills category, with the USA at 50 percent; Japan at 56 percent and Canada at 60 percent.

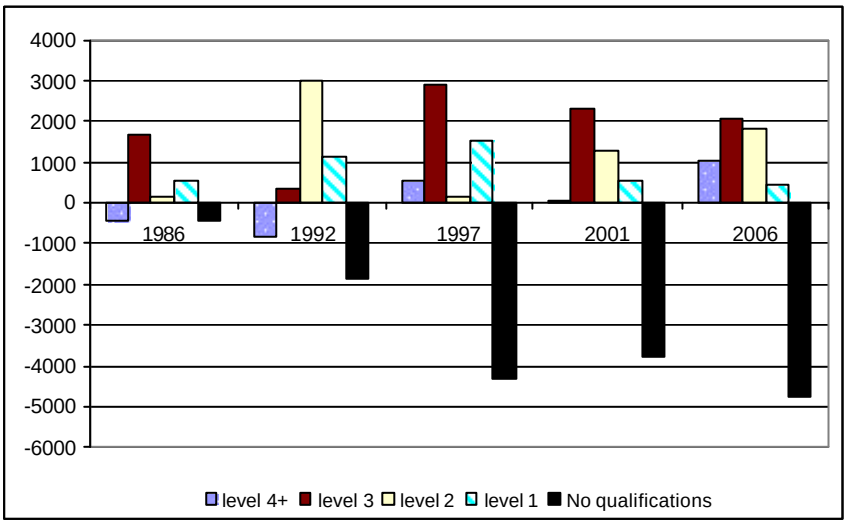
Figure 6: Projected skill compositions of the populations (aged 25 to 64) of a selection of OECD countries for 2020



Note: Low skills = no qualifications and skill level 1 combined; Intermediate skills= skill level 2 and level 3 combined; High skills= skill level 4 and higher. See endnote[18]

Source: Leitch Review of Skills; Prosperity for all in the global economy - world class skills. Final Report, December 2006, HM Treasury, http://www.hm-treasury.gov.uk/d/leitch_finalreport051206.pdf

Figure 7: UK Trends in the Balance of Supply and Demand for Qualifications, 1986-2006



See: endnote 18 for definitions of skill levels

The balance of supply (+) or demand (-) at each level is the difference between the number of people holding highest qualifications at that level and the number of jobs with highest qualifications requirements at that level plus an estimate of the number of vacancies at each of these qualification levels.

Source: Alan Felstead, Duncan Gallie, Francis Green and Ying Zhou, Skills at Work, 1986 to 2006, ESRC Centre on Skills, Knowledge and Organisational Performance based at the Universities of Cardiff and Oxford, 2007.
http://www.skope.ox.ac.uk/WorkingPapers/2006SkillsSurvey.FinalDraft4.pdf p.80

The problem is that such analyses seem to bear little relationship to the reality of national or global job markets. There seems to be little account of changes in the global distribution of high skilled work, to say nothing of the potential impact of new technologies to reduce, as well as increase, the demand for high skills (Brown, Lauder and Ashton, 2008). If the United States was to achieve its projection in Figure 6, it would confront a huge problem of over-qualification given the anticipated demand for degree level workers presented in Table 4 above.

The Skills at Work surveys (1986-2006) in the UK also questions this blind commitment to supply side solutions found in official policy statements from the New Labour government in the UK. Figure 7 shows the balance sheet between the supply of qualified workers and the demand for qualified labour from employers. As Felstead and colleagues (2007) suggest, 'the most notable change in recent years has taken place at graduate level. The difference between the supply of graduates and the numbers of jobs requiring graduates for entry into them, standing at 1.1 million people in 2006, was less than 300,000 in 1986. This change is largely the result of the supply of graduates outpacing the growth of jobs where degrees are perceived by jobholders to be required for entry.' (2007:60). Figure 7 also reveals a huge undersupply of people who require no qualifications for job entry. This suggests that the problem of over-education is found across the UK workforce, although jobs requiring no formal qualifications may offer some on-the-job training.

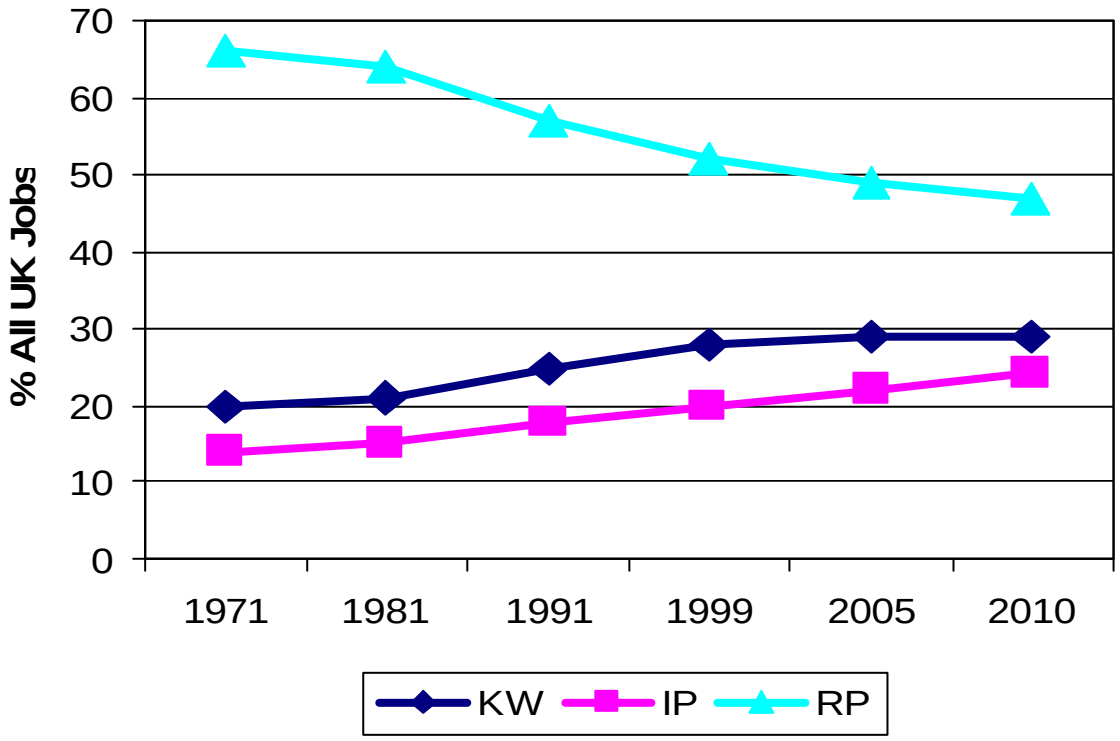
Hesketh (2005) has analysed the demand for 'knowledge' workers in the UK based on what employees actually do rather than the qualifications held by employees or what is required to get a particular job.[19] This analysis draws on categories originally formulated by Robert Reich (1991; Brown & Hesketh, 2004). The category of 'knowledge workers' (Reich called them 'symbolic analysts') includes corporate managers and administrators; managers/proprietors in agriculture and services; science and engineering professionals; teaching professionals; health professionals; other professional occupations; science and engineering associate professionals; health associate professionals; and other associate professional occupations.[20]

The category of knowledge workers is distinct from 'in-person service' (IP) workers, which includes secretarial occupations, personal service occupations, buyers, brokers and sales representatives and other sales occupations; and also from 'routine production' (RP) workers, which includes clerical occupations, skilled construction trades, skilled engineering trades, protective service occupations, industrial plant and

machine operators and assemblers, drivers and mobile machine operators, other occupations in agriculture, forestry and fishing and other elementary occupations.

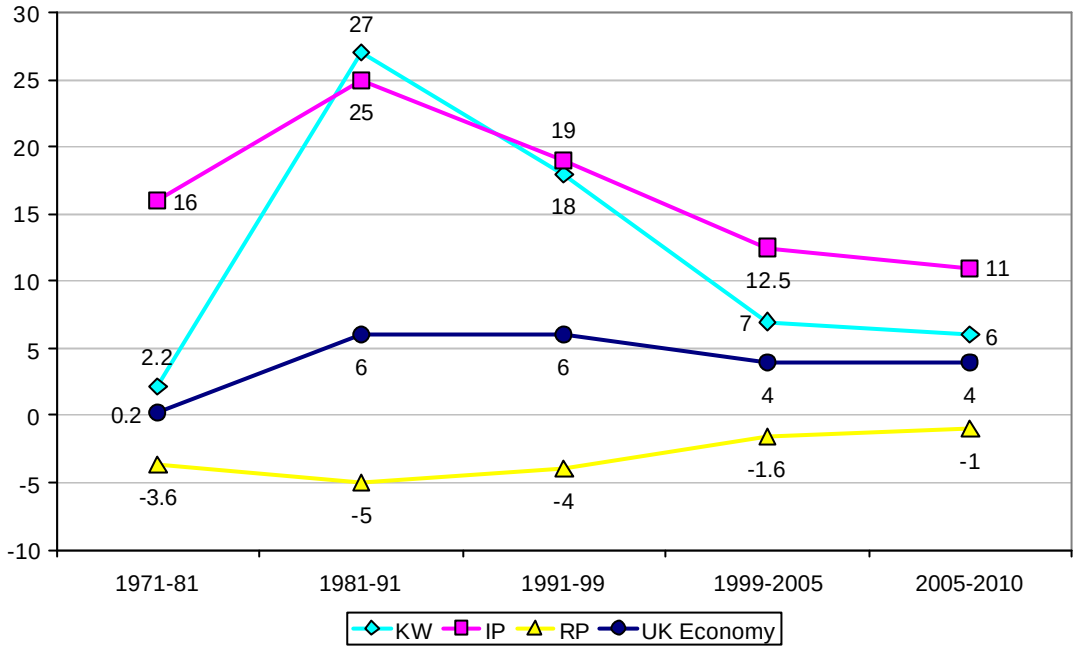
Figure 8 shows a significant increase in knowledge-intensive jobs in the 1980s and 1990s, from approximately 20 percent of the UK workforce in 1971 to 28 percent by the beginning of the 21st century, but there is little evidence of a further increase to 2010. The question of the future demand for knowledge workers can also be studied by considering the rates of increase/decrease for each of the three categories of workers for the UK economy as a whole. Figure 9 shows that during the 1980s, the rates of increase for knowledge workers were four times that of the growth in the total number of jobs in the UK economy. However, this rate of change was not maintained in the 1990s and there is little expectation of a further acceleration in the demand for knowledge workers in the near future.

Figure 8: Job classifications, all UK jobs, 1971-2010



Soure: Hesketh, A. (2005) *The Knowledge-Based Economy in Wales: A Comparative Analysis*, National Assembly of Wales.

Figure 9: Percentage changes within categories within periods (UK)



Source: Anthony Hesketh (2005) *The Knowledge-Based Economy in Wales: A Comparative Analysis*, National Assembly of Wales.

Offshoring: From low to high skills

The failure of the developed economies to create the numbers of high-skilled jobs to meet the requirements of mass higher education is now being fuelled by global trend towards 'offshoring' – the movement of jobs from developed to emerging economies given the price advantage of the latter.[21] The increasing importance companies attach to cross-border labour arbitrage is outlined by Kenichi Ohmae (2000:64) in the following terms:

> Arbitrage simply means the playing off of one supplier against another, to continually bring the price of goods and services down, and the quality up – not through control or negotiating, but simply through choice. If you are dissatisfied with the old sources of supply, you eliminate the difficulties by finding new partners that operate in a less fettered way. Giving up your fettered partners may mean making some people unhappy, eliminating some middle people, or changing your habitual practices, but the savings are so great that the new choice is necessary. No business can justify refusing the advantages of an arbitraging choice.

To date, this has been part of the win-win scenario, as companies have shifted an increasing share of low-skilled work to low-waged economies. The cost savings that can be achieved are illustrated in Table 6, which shows the relative hourly compensation costs for production workers in selected counties. Although it does not include China, where high levels of global production have been concentrated, it

reveals significant differences in labour costs in Sri Lanka, Philippines and Mexico compared to Denmark, Germany or the US - although we should not under-estimate the hidden costs of offshore activities (Meisler, 2004).

Table 6: Hourly Compensation Costs for Production Workers (in U.S. Dollars)

	1992	2000	2006
Brazil	NA	3.50	4.91
US	15.95	19.65	24.18
Japan	16.13	21.93	20.20
Sri Lanka*	0.40	0.48	0.54
Mexico	2.16	2.07	2.75
France	17.32	15.43	24.90
Germany**	23.89	22.67	34.21
Denmark	20.41	20.13	35.45
Philippines	0.78	0.77	1.07
Singapore	4.91	7.30	8.55
Korea, Republic of	5.21	8.23	14.72
Taiwan	5.12	6.19	6.43

*2005 instead of 2006
**1993 instead of 1992

Source: U.S. Bureau of Labor Statistics, May 2008

It is precisely such differences in wages that have led some Western governments to give up the fight for low-skilled jobs enabling emerging economies to benefit from new export-oriented employment, at the same time that the developed economies are left to compete for the global supply of high-skilled, high-waged jobs. But, as we have already seen, what Western governments are coming to recognise is that the competition for skilled employment is no longer restricted to a privileged minority of wealthy nations – some of the emerging nations including China and India have entered the competition for high-skilled work in key sectors of the global economy. These are countries with populations of over a billion people. This presents a major problem for the developed economies, because of the prospect of increasing areas of skilled work being subject to long-term price competition. Labour arbitrage no longer stops with factories or call centres.

In the US, for instance, eight out of ten fast-growing jobs that required advanced training were related to information technology, a sector that is being successfully targeted by countries such as India.[22] This trend toward the offshoring of high skilled jobs is inevitable given the relative costs of employing a chip design engineer in selected countries.[23] Table 7 shows that a chip designer in the US costs

over four times more than a designer in Korea and ten times or over the costs associated with the same workers in India and China.

Table 7: Annual cost of employing a chip design engineer, 2002 (US dollars)

Location	Annual cost*
United States	300 000
Canada	150 000
Ireland	75 000
Republic of Korea	65 000
Taiwan	60 000
India	30 000
China (Shanghai)	28 000
China (Suzhou)	24 000

*Including salary, benefits, equipment, office space and other infrastructure.

Sources: UNCTAD, based on PMC-Sierra Inc, Burnaby, Canada (for Silicon Valley, Canada, Ireland, India) cited in Ernst 2005. Taken from United Nations Conference on Trade and Development, World Investment Report 2005, p.174.

Grave warnings have also become commonplace in the case of financial services. According to the consultancy firm A T Kearney, 500,000 jobs within the sector will move overseas by 2008. This represents about eight percent of those working in the sector and an estimated US$30bn in annual savings for the companies that move offshore. This report also noted that 'relocations will involve a wider range of high-end internal functions… including financial analysis, research, regulatory reporting, accounting, human resources and graphic design. Until recently, offshore job transfers have primarily focused on back office functions such as data entry, transaction processing and account reconciliation.' This report concludes that 'any function that does not require face-to-face contact is now perceived as a candidate for offshore relocation'.[24]

Chris Gentle at Deloitte Consulting suggests that around 13 million people are employed in the financial services sector in the mature industrial economies. He estimates that companies expect to transfer around two million jobs offshore by 2008, the bulk of which will be from North America and Western Europe, with the promise of savings estimated at US$138bn (see Box 2). Again these transfers will not be restricted to back-office functions, but will include front-office areas such as application development, accounting and finance and operation processing and administration.

It is very difficult to gain a comprehensive picture of offshore activities [see Boxes 1 & 2]. Estimates vary, for example McKinsey Global Institute based on 'representative' sectors in advanced economies estimated that only about 11 percent worldwide of private sector employment might potentially be offshored to developing countries.[25] On the other hand in the ICT sector, the OECD estimates that ITC-enabled offshoring may affect up to up to 20 percent of employment.[26] In what is the most comprehensive study to date, Blinder has developed an index of 'offshorability' to calculate the number of jobs that are potentially offshorable in the US.[27] Essentially, he differentiates between jobs which are personally delivered (janitors, child-care workers and surgeons) and those which are impersonally delivered (call-centre operators and scientists). Using a comprehensive US data base he calculates that between 22 percent and 29 percent of all US jobs are impersonally delivered in that they can potentially be delivered electronically over long distance with little or no degradation in quality, and are therefore potentially offshorable. Of course not all these jobs will be offshored in the same way that not all manufacturing jobs have been offshored but the potential is there for a major change. But Blinder's study, also found 'little or no correlation between an occupation's "offshorability" and the skill level of its workers (as measured by educational attainment or wages)'.[28] Similarly an OECD Report (2007) on offshoring and employment found that skilled jobs were no longer safe from being sent offshore as it increasingly spreads to technology-intensive industries such as software, computer services and other information technology services.[29] Clearly we are now in the early stages of a process that is affecting all skill levels.

This poses a major problem for the developed economies as their economic policies have been based on the assumption that investments in education and training would translate into a growing proportion of high-skilled, high-waged jobs. What is yet to be fully grasped is that the magnetic effect of the supply of high skills is not necessarily limited to the glitter and glitz of the developed economies. Indeed, in an increasingly competitive marketplace where companies are searching for new ways to meet the demands of Wall Street and the City, and to remain profitable following the credit crunch, the prospect of skilled workers at a much lower price may prove irresistible. As Craig Barrett, chief executive of Intel observed, 'to be competitive, we have to move up the skill chain overseas.'[30]

Box 1: Evidence on offshore activity in information technologies and financial service sectors: quotations

Source	Quote
Andrea Bierce, A T Kearney (2002)	"Any function that does not require face-to-face contact is now perceived as a candidate for offshore relocation."
Ravindra Datar, principal analyst for IT services at Gartner India Research and Advisory Services (2003)	"The economic necessity of outsourcing to other locations where one can get work cheaper and better is likely to outlive any opposition to outsourcing to offshore locations."
John Challenger, CEO of outplacement firm Challenger, Gray & Christmas (2003)	"There is no difference sending work from San Francisco to San Jose over the internet than sending it from Bangalore to San Jose over the internet, so there is going to be declining pay for technology workers in a global marketplace."
Marcu Courtney, chief organiser for the Washington Alliance of Technology Workers in Seattle (2003)	"Every single job is up for grabs these days."
Andrew Grove, chairman of Intel (2003)	"Is software and services next? It's a very valid question and it would be a miracle if it didn't happen."
Jim Foley, professor at Georgia Tech's College of Computing (2003)	"This is now knowledge work toward the top of the food chain, as opposed to unskilled or semiskilled work."
Supid Nandy, vice president for Europe at Wipro, the India-based outsourcing provider (2003)	"Over the last 10 years the mindset on India has changed from outsourcing non-critical, stand-alone, well-defined systems, to outsourcing mission-critical systems."
Mark Kobayashi-Hillary, author of *Outsourcing to India: The Offshore Advantage* (2003)	"In India offshore work now includes accountancy services, equity research for banks, para-legal research for lawyers, and medical graduates writing up UK-based health research work. I was in Bangalore recently and visited one engineering and design company which is carrying out all the R&D development for Pratt and Whitney aircraft engines in the USA."
Rob Muth, HSBC's head of global resourcing (2005)	"The further you go in to high-value work, the more it is going to become a team effort between people in high-cost countries and those in lower-cost ones."
Dieter Ernst, senior fellow in the Economics Study Area of the East –West Center Research Program, US-Asia Pacific Council. (2006)	"It is time to correct earlier claims that only low-level service jobs will move offshore and there is little evidence of a major push by American companies to set up research operations in the developing world. Innovation offshoring goes far beyond the migration of relatively routine services like call centers, software programming, and business process support-the subject of current public debates on "outsourcing." Beyond adaptation, innovation offshoring in Asia now also encompasses the creation of new products and processes."
Phil Morris, managing director of EquaTerra in Europe (2008)	"Business people are making the decision to outsource to India because they cannot find the same resources in the UK."
Malcolm Frank, Cognizant vice president of marketing and strategy (2007)	"Offshoring is likely to disappear as a term, and pointed to the fact that Accenture has more Indian than American employees in its business, and that IBM is the largest private employer in India, with 70 to 80 thousand Indian associates. When those multi national firms have moved to that footprint, it is just sourcing for the industry."

Box 2: Evidence on offshore activity in information technologies and financial services sectors: predictions and research

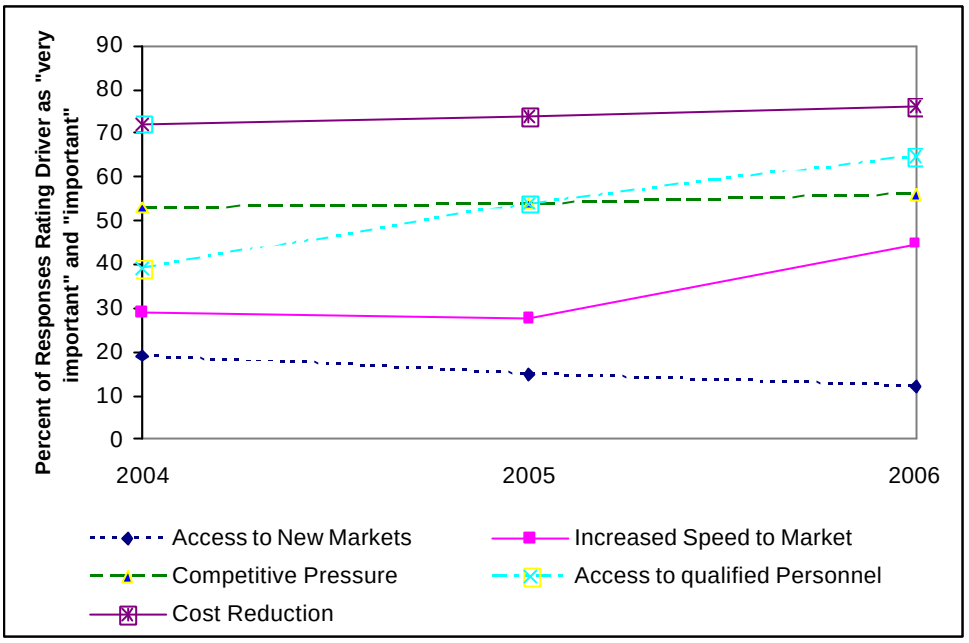
Source	Message
Deloitte Research (2003)	World's 100 largest financial services companies indicate they expect to transfer an estimated $356bn of their operations and two million jobs offshore over the next five years.
Amicus (2003)	Predicts that 200,000 call centre and back-office processing jobs can be expected to leave British soil by the end of the decade.
Ovum Holway (2003)	Forecasts that between 20,000 and 25,000 jobs may be lost in the UK IT industry over the next few years as a direct result of work moving offshore.
Mark Zandi, economist (2003)	Calculates that 995,000 US jobs have been lost to foreign employment since the last recession began in March 2001.
Forrester (2002)	Estimates US businesses will send 588,000 service jobs abroad by 2005, 3.3 million by 2015. Computer-related service jobs will suffer some of the worst losses: 473,000 in the next 12 years.
NASSCOM (2003)	Estimates that India's IT-enabled outsourcing industry currently employs around 171,000 workers, and predicts that number will grow to 1.1 million by 2008.The US accounted for 90 per cent of the outsourcing industry's $2bn in revenue for the year ended March 31.
A T Kearney (2003)	Their study predicts that US financial services firms will move more than 500,000 jobs overseas over the next five years. This will involve a wide range of high-end internal functions.
Fisher Center Research (2003)	They set the outer limit of potential direct job losses because of outsourcing at 14 million. This is 11 per cent of all occupations.
PricewaterhouseCoopers (2005)	Their survey of more than 150 senior executives of financial services firms worldwide finds that the percentage of respondents who expect their firms to offshore up to ten per cent and 20 per cent of their workforces respectively is set to virtually double by 2008.
Economist Intelligence group (2004)	Their survey of 104 senior MNC executives revealed that 71% of the executives cite the ability to exploits pools of skilled labour a key benefit to globalising R&D.
The Financial Express (2007)	Reports that the world's largest financial services firm Citigroup Inc plans to move 9,500 positions to India and other low-cost locations especially for equity research, investment banking and back-office transaction-related activities.
A.T. Kearney Global Services Location Index (2007)	Their findings strongly indicate that key to maintaining and enhancing long-term competitiveness for offshore destinations lies in skills development, infrastructure investment and the regulatory environment—not in attempts to control wages. Failure to improve the skills of the work force and the business environment will likely translate to a loss of competitiveness in the fast-moving remote services business.
XMG (2007)	Expects the global outsourcing market for IT, business process outsourcing, and call centre services to grow by 19.3 percent to top US$297 billion in 2007. By 2010, the market is projected to be worth US$450 billion.
Gartner (2007)	Offshore IT services spending will grow 40 percent in the United States and 60 percent in Europe in 2008.
The Deloitte Touche Tohmatsu's Global Financial Services Industry (2007)	Estimates there has been an 18-fold increase in the average number of staff each financial institution has employed offshore in four years, from 150 in 2003 to 2700 in 2006.

Source: Compiled by the authors.

This is consistent with findings from our international study of global corporate strategy and the future of skills, which revealed how multinational corporations (MNCs) are establishing high-skilled operations in emerging economies.[31] As one leading engineering corporation told us, there are some highly specialised products that they can only make in the US and Germany, but there has been a significant narrowing in the performance of operations and factories around the world: 'those in emerging countries are catching up fast and this is making it more difficult for plants in the West. It's really a bit of a rat race.' Research in China also revealed that many enterprises had already adopted the latest high-performance management practices, which flourish in the context of a highly educated labour force, enabling them to produce high value-added goods at much lower costs (Venter et al., 2002). In view of this it is not surprising that a survey of the offshoring activities of American and European companies by Couto, et al. (2006) found that although companies are primarily driven by the potential for cost reductions, there has been a significant increase in the importance of offshoring as a way of gaining access to skilled labour (see Figure 10).

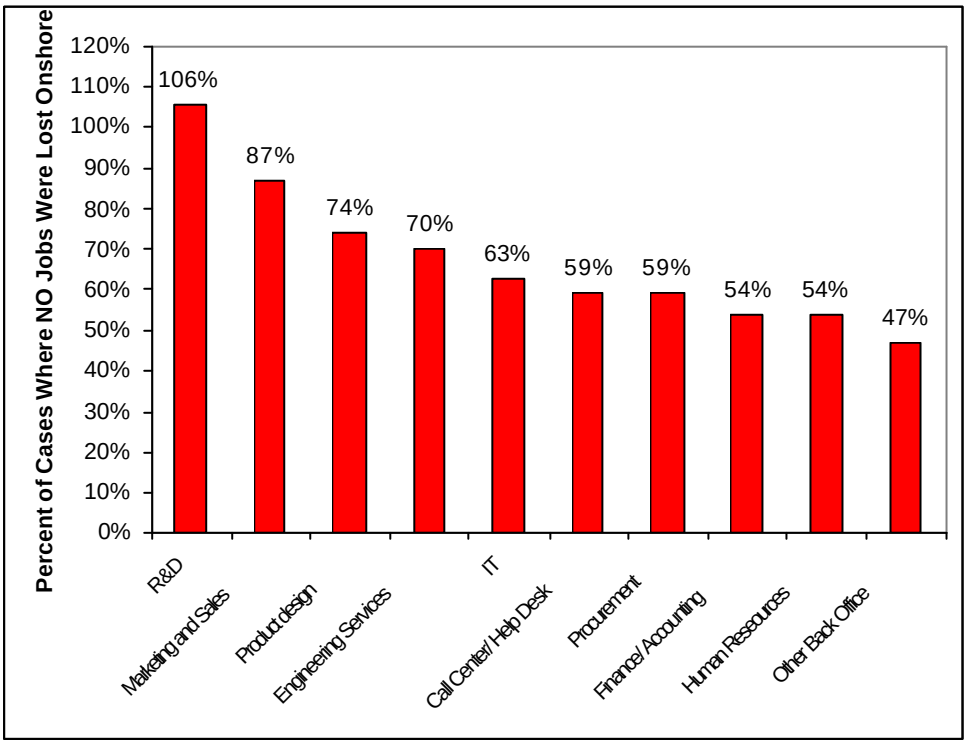
The survey by Couto, et al. also challenges the claim that offshoring will lead to job losses in the developed economies. On the bases of research evidence from 537 public and private sector organisations they suggest that companies that outsourced R&D activities from the United States or Europe also increased the numbers of R&D jobs in their 'home' countries (see Figure 11). However, although they argue that offshoring does not necessarily lead to job losses, Figure 11 also shows that many other areas of skilled activity does lead to job losses in IT (37%), Finance/Accounting (46%) and Human Resources (46%).

Figure 10: The key reasons offshoring has evolved beyond cost reduction (2004-2006)



Source: Vinay Couto, Madhadeva Mani, Arle Y. Lewin and Carine Peeters, *The Globalization of White-collar Work; The Facts and Fallout of Next-Generation Offshoring*, Offshoring Research Network, Duke University for Booz, Allen, Hamilton, 2006. p.3

Figure 11: Offshoring implementations that did NOT lead to job losses by function

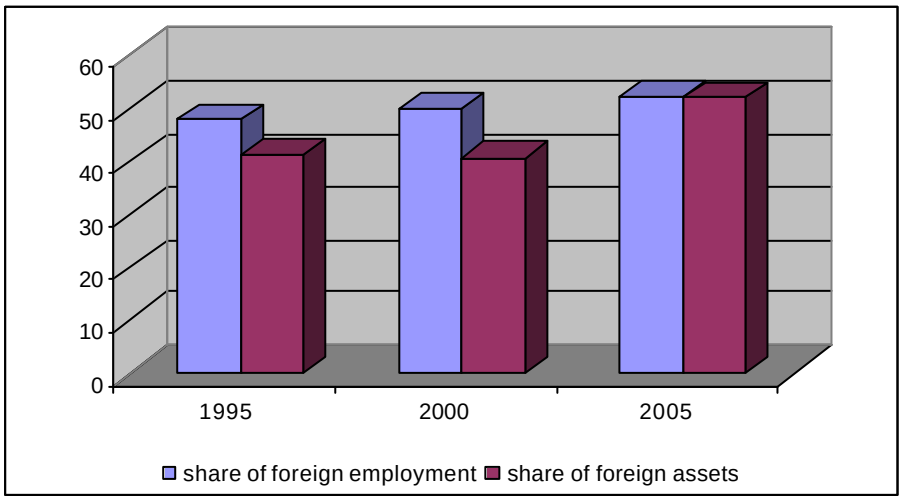


Source: Vinay Couto, Madhadeva Mani, Arle Y. Lewin and Carine Peeters, *The Globalization of White-collar Work; The Facts and Fallout of Next-Generation Offshoring*, Offshoring Research Network, Duke University for Booz, Allen, Hamilton, 2006. p.4

The impact of offshoring on employment will continue to be highly contested given a lack of consistent data, and there is no doubt that its impact will be more concentrated in certain sectors such as IT, financial services or automotive. It is also claimed the IBM now has more researchers in India than it has in the United States.[32] While it is important to gain an accurate picture of the nature and scale of offshoring, to date the focus has been on the transfer of jobs from Western multinationals to low cost locations, but this ignores the fact that there are new companies and new jobs being created in countries including China and India, directly competing for high value work in the developed economies. It also ignores the fact that leading companies from developing economies will also offshore to Western economies to gain access to domestic markets and new technologies.

Our analysis of the 100 largest transnational companies based on assets (excluding transnationals in the finance sector) shows that over half (52.1%) of their 15.1 million employees were 'foreign' workers in 2005 (See Figure 12). This represents a 4.2 percentage point rise from 1995 when 47.9 percent were 'foreign' employees. One of the problems with these data is that only forty companies consistently ranked in the top 100 between 1995 and 2005. When data for these forty companies were analysed separately we found that the proportion of foreign workers increased from 47.6 to 57.6 over the decade (see Appendix 1). Figure 12 also shows a significant increase in foreign assets controlled by leading transnational companies, increasing from 41.4 percent to 52.1 percent during the same time period.

Figure 12: Share of foreign employment and assets of top 100 non-financial MNCs for 1995, 2000 and 2005 (in percentage)



Note: for 1995: only 93 companies (7 missing data) for assets

Source: UNCTAD World Investment Report, 1997, pp29-31; 2002, pp.86-88; 2007, pp.229-231.

Table 8: Assets and employment for 21 transnational corporations from developing economies (millions of dollars, number of employees)

	Foreign assets	Total assets	Share foreign assets of total assets (%)	Foreign employment	Total employment	Share foreign employment of total employment (%)
2000	113 582	373 317	30.4	157 084	558 685	28.1
2005	260 949	734 763	35.5	453 865	1 019 874	44.5
Growth 2000-2005 (%)	229.7	196.8		288.9	182.5	

Source: UNCTAD World Investment Report, 2002, pp.100-101; 2007, pp.232-233.

When we turn to transnational companies from developing economies we also find significant evidence of globalisation. In five years between 2000-2005, the proportion of 'foreign' employees increased from 28.1 percent to 44.5 percent, based on a sample of 21 companies who where consistently in the top 50 companies domiciled in 'developing' economies (See Table 8; Appendix 1). If this trend is maintained it suggests that companies from countries including China, India, Russia, and Brazil will increase their use of offshoring over the coming decade or so. The form this will take is an issue that requires urgent investigation. However, evidence from our global skills project shows how companies from developing economies with global ambitions are constructing a high value, low cost model in their attempt to compete for global market share. These cost pressures will not be limited to the indigenous workforce and are likely to be reflected across their global operations (Ashton, et al. forthcoming). This is an important issue as the globalisation of high skilled work is not only a question of how far offshoring will lead to a decline in demand for middle class managers and professionals in the West, but it is also likely to have an impact on job quality, including compensation packages. As differences in productivity narrow between operations in different parts of the world, the cost and working conditions of Western employees are no longer the global benchmark. The benchmark will gravitate towards high-skilled but lower-waged economies rather than those in Western Europe and North America.

Indeed, this is not simply a matter of 'following the business', there is a deliberate strategy by leading companies to establish leading-edge operations in parallel to those in the developed economies. This gives them global flexibility and

continuity if there are industrial relations problems/underperformance in a specific regional centre, but it also enables companies to point to their lower-cost operations in the emerging economies when negotiating with employees in the West. Perhaps these companies have little alternative if they are to remain competitive, but the implications for Western workers are becoming clear, as a senior executive in a German multinational told us:

> We have to drive innovation, we have to be at the leading edge at reasonable cost… That's it. And this can be transferred to the labour market. We have, most of all, to try to get higher skills at reasonable cost and high flexibility.

Although the global high-skilled, low-waged workforce will be concentrated in emerging economies it may become a prominent feature of the occupational structures of developed economies. Managers and professional workers in Western economies are losing their economic shelters that protected them from foreign competition. Again, we were told that global labour standards will 'tend to converge' and as differences in operational performance between developed and emerging economies continue to narrow 'we can anticipate a narrowing of income inequalities between countries but at the same time individual wage differentials will increase'.

It is important to understand that this is not a uniform process affecting workers in the West in the same way. Rather, those in senior executive positions or who can succeed at selling their knowledge, insights or patents to global businesses will continue to be generously rewarded, even if many others with similar expertise find their wages and benefits under pressure. Therefore, rather than a win-win scenario, we anticipate increasing differentiation in the incomes and wealth of 'knowledge' workers in Britain and the US, which will be discussed below. This poses a challenge to those that assert that human capital is at a premium in the knowledge-driven global economy. While some 'knowledge' workers are likely to prosper, many other managers and professional will not.[33]

The early experiences of outsourcing and offshoring have led some companies to the conclusion that the development of global webs of competence requires a 360-degree re-evaluation of business processes and corporate human resources. Sourcing for global competitiveness is based on a detailed documentation of what the company does, that require the codification of tacit knowledge, linked to a shift towards global standardisation or alignment within companies.

If the twentieth century brought what can be described as *mechanical Taylorism* characterised by the Fordist production line, where the knowledge of craft workers was captured, codified and re-engineered in the shape of the moving assembly line by management, the twenty-first century is the age of *digital Taylorism*. This involves translating *knowledge work* into *working knowledge* through the extraction, codification and digitalisation of knowledge into software prescripts and packages that can be transmitted and manipulated by others regardless of location (Brown, Lauder and Ashton, 2008; forthcoming). It raises the intriguing question of the extent to which 'knowledge' work can be standardised and its potential impact on the demand for knowledge workers.

The globalisation of research and development (R&D)

The implications for the above analysis for public policy will be reserved until the concluding section, but recent trends in the internationalisation of R&D suggest that transnational companies are also increasingly experimenting with advanced R&D facilities in a number of developing economies. The United Nations Conference on Trade and Development (UNCTAD) suggests that:

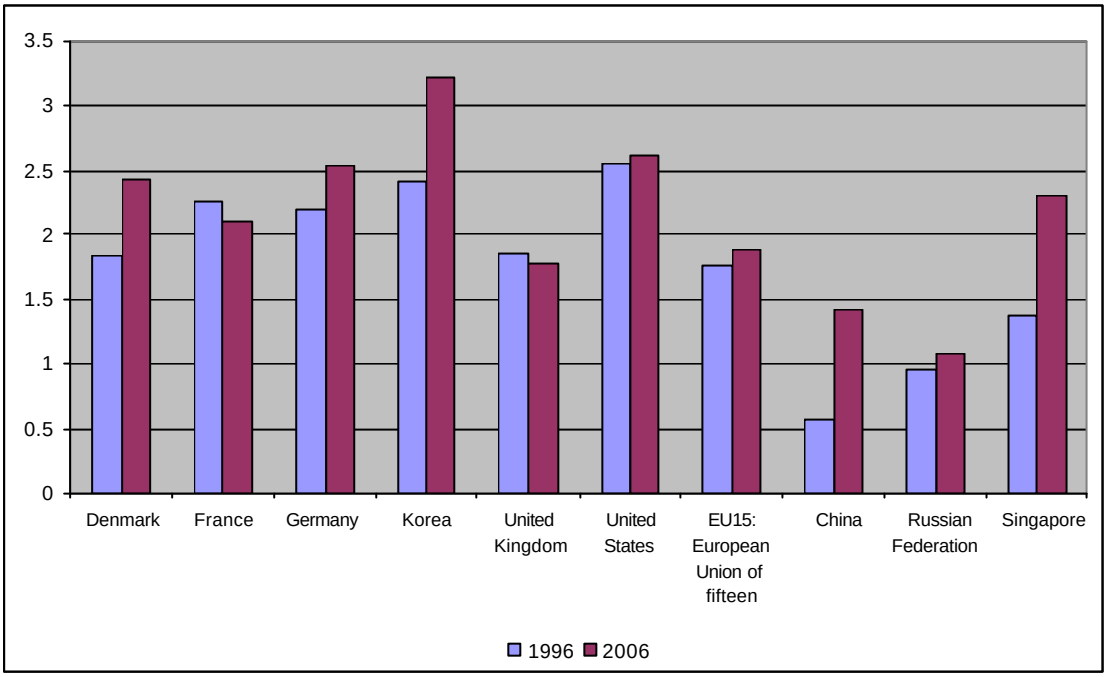
> Until the 1970s the vast majority of developed-country FDI [foreign direct investment] abroad was resource- or market-seeking in nature. In the 1980s and 1990s, developed-country firms increasingly sought to take advantage of cost differences in different production locations by building up global production networks to produce for regional and world markets (efficiency-seeking FDI). In recent years, another kind of trend in FDI from developed countries has emerged as companies also engage in R&D activities abroad.[34]

Most of this foreign investment was in other developed economies, 'but lately, developing countries like China and India are becoming increasingly important as hosts for R&D activities by developed-country TNCs [transnational corporations]' (UNCTAD, 2005:89). In UNCTAD's survey of leading TNCs, China was identified as the most attractive prospective R&D location 2005-2009, followed by the US, India, Japan, United Kingdom and the Russian Federation (2005: 153).

Motorola has invested around US$3.8bn since it entered the Chinese market in 1987, including US$1 billion in R&D. The company has over 10,000 employees, with over 3,000 in R&D in the country.[35] The number of foreign-affiliate R&D centres in China totalled 700 by the end of 2004, including companies such as Microsoft, Nokia, GE, IBM, Siemens, Dupont, General Motors, Philips and Toshiba.[36] In addition to the

spend of foreign MNCs the Chinese government is also increasing its spend on R&D. Figure 13 shows that China, Singapore and Korea have all significantly increased the share of gross domestic expenditure on R&D between 1996 and 2006.

Figure 13: R&D spending as share of Gross Domestic Expenditure (GERD) for selected countries, 1996, and 2006 (percentages).



Source: OECD, Main Science and Technology Indicators (MSTI): 2008/1 edition.

This shift in the global distribution of R&D is presented in Table 9. It shows the share of key countries and regions in the total R&D spend between 2006 and 2008. This Table reveals a decline in the share of the U.S. from 32.7 percent to 30.1 percent, a similar decline in Europe's percentage share and an increase in China's share from 13.5 percent to 17.9 percent. Table 9 also shows a major difference between China and India, as the latter has remained static with a global share of 3.7 percent.

Table 9: Share of total global R&D spend, 2006-2008 (percentage)

	2006	2007	2008
US	32.7	31.4	30.1
Asia	36.9	38.8	40.8
China	13.5	15.6	17.9
Japan	13.0	12.8	12.4
India	3.7	3.7	3.7
Europe	25.2	24.6	23.9

Source: 2008 R&D report, R&D magazine, September 2007 p. G3
http://www.rdmag.com/pdf/RD79GlobalReport.pdf

Attracting high-skilled jobs or high-skilled workers?

The above discussion does little to support the idea that investments in the nation's talent will be enough to attract international companies offering large numbers of high-skilled, high-waged jobs. Yet there does appear to be a different kind of magnetic effect, whereby qualified workers in emerging economies are attracted to work in the developed economies. In the European context, the most visible evidence of this trend is the change from 15 to 27 member states within the European Union that has enabled workers from the relatively low-waged economies of the former Soviet Union to compete for jobs in Britain, Germany, France and the Netherlands. Research by Deutsche Bank predicts that EU enlargement will lead to around three million people moving to Western Europe from Central and Eastern Europe by 2015.[37]

The magnetic polarities of skills and jobs may operate in the opposite direction to that assumed in the win-win scenario: rather than attract high-skilled jobs, it may attract high-skilled workers. Indeed, many OECD countries have bought into the rhetoric of a global war for talent. Florida is typical of this line of argument when he asserts that:

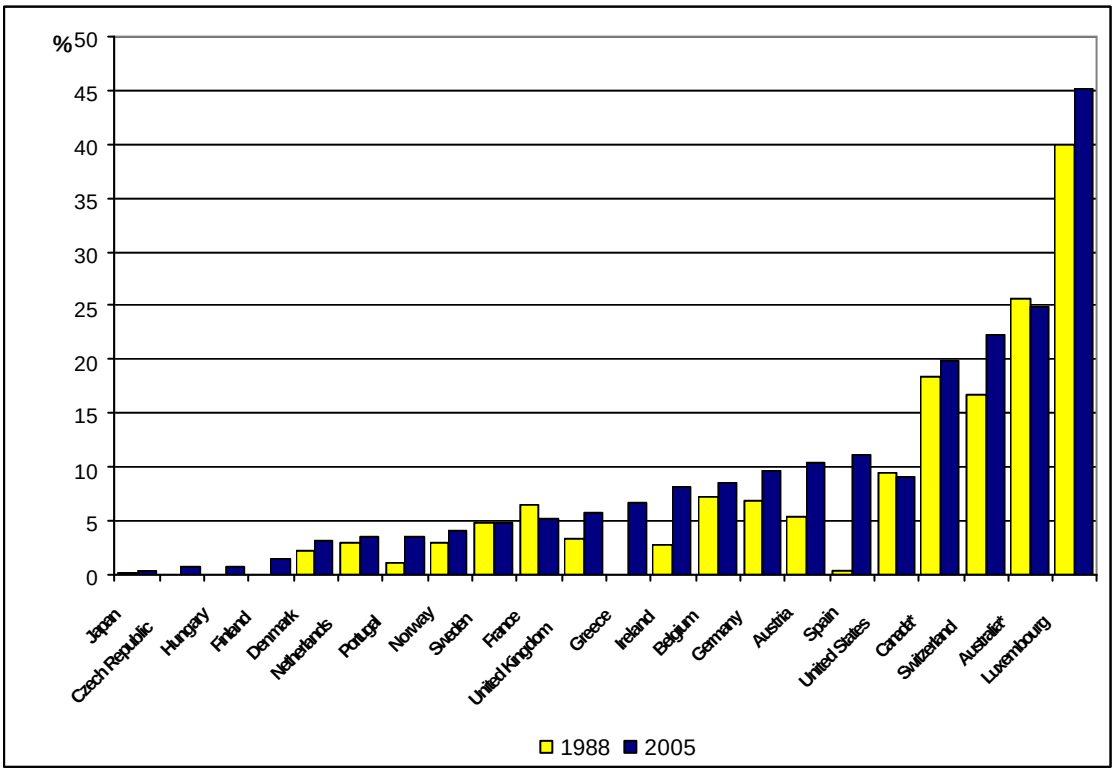
> The United States of America is now facing its greatest challenge since the dawn of the Industrial Revolution…. The core of this challenge is…the *new global competition for talent*, a phenomenon that promises to radically reshape the world in the coming decades. No longer will economic might amass in countries according to their natural resources, manufacturing excellence, military dominance, or even scientific and technological prowess. Today, the terms of competition revolve around a central axis: a nation's ability to mobilize, attract, and retain human creative talent. Every key dimension of international economic leadership, from manufacturing excellence to scientific and technological advancement, will depend on this ability. (Florida, 2005:3)

Such ideas have led the United Kingdom to introduce an Australian and Canadian style, points system, aimed at attracting high skilled worker at the same time as reducing the numbers of less skilled workers from outside of the EU. Such moves are often justified on grounds of an aging workforce; skilled shortages in key areas such as engineering and science; and the need to recruit the 'best of the best' to drive the British economy (Brown and Tannock, forthcoming; Rudiger, 2008).

One of the problems with importing skilled workers it that it may reduce the incentive for companies to invest in the training of indigenous workers and may encourage employers to reduce the cost of indigenous knowledge workers, given that

migrants, irrespective of skill level, typically do the same jobs for fewer rewards and inferior contracts of employment. Even in areas where there is increased demand for high-skilled workers, there is a growing propensity to import qualified labour rather than invest in the skills of the less qualified and socially disadvantaged. This has led to political pressure to reduce the numbers of H-1B and L1 visas issued to foreign workers in the US, and political pressure could also build in the UK as unemployment rises. The Lords Select Committee on Economic Affairs, recently concluded that 'we have found no evidence for the argument, made by the Government, business and many others, that net immigration – immigration minus emigration – generates significant economic benefits for the existing UK population' (House of Lords, 2008:5). The Report goes on to state, 'we do not support the general claims that net immigration is indispensable to fill labour and skills shortages' (ibid:5)

Figure 14: Share of foreign labour force of total labour force, for selected OECD countries, 1988[a] and 2005 (in percentage)



[a]1989 for Belgium, 1990 for the United States, 1991 for Italy, Australia and Canada 1992 for Japan

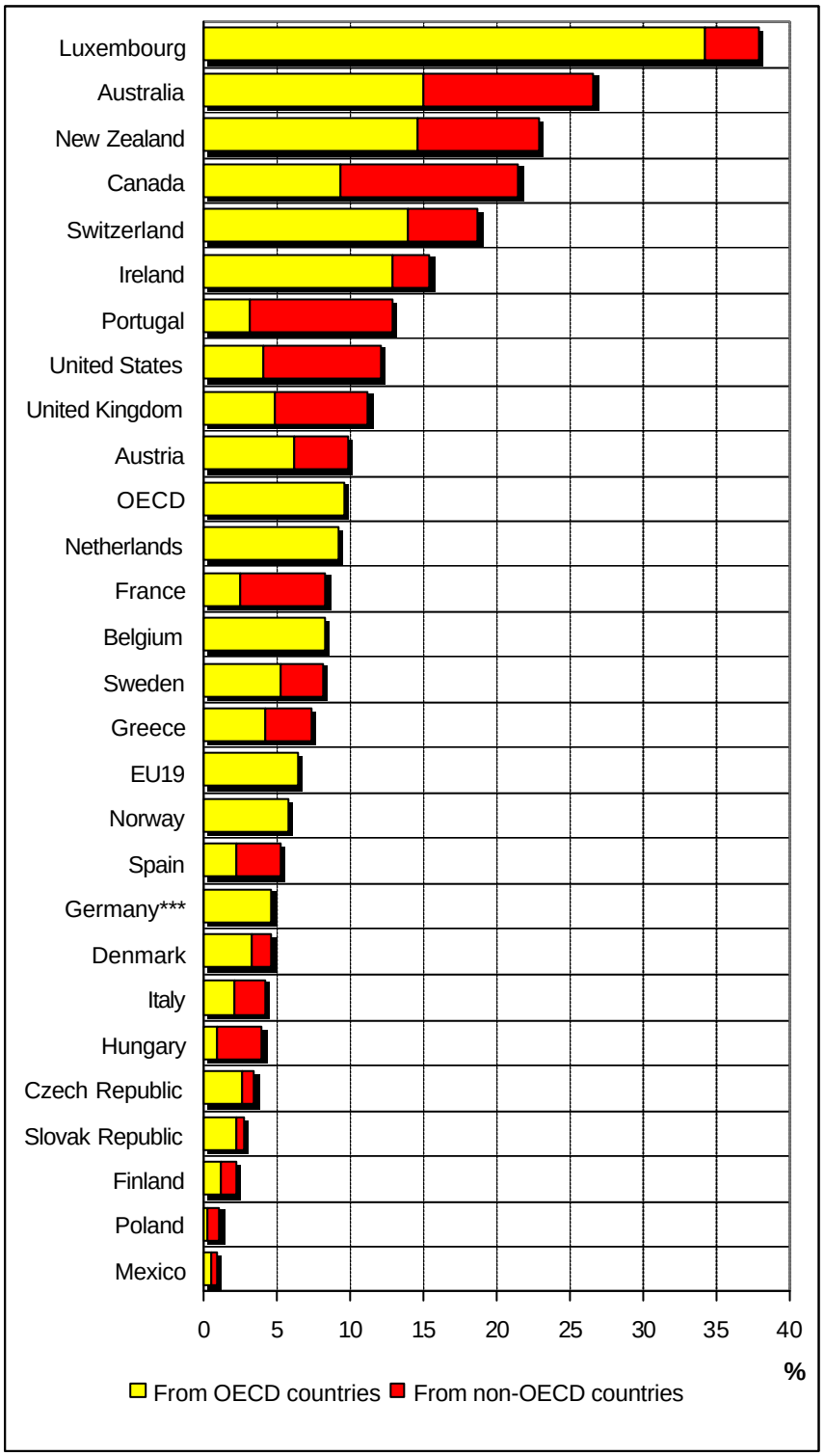
*Foreign-born

Sources: OECD, SOPEMI, International Migration Outlook, 2007 edition p.63,OECD, SOPEMI, *Trends in International Migration*, 2000 p.41 (See OECD for country details).

Figure 14 shows the inflows of foreign workers into selected countries between 1988 and 2005. This reveals that the United States, Canada, Switzerland, Australia and Luxembourg, all have over 15 percent of 'foreign' workers, with Luxembourg having close to half its workforce within this category. There has also been an increase in the UK during this period, but this does not capture the recent acceleration in the numbers of foreign workers entering Britain since 2005. Immigrants comprised 12 percent of total UK workforce in 2008, with over half of net immigration concentrated in London (House of Lords, 2008: 15). These figures take no account of the number of foreign workers illegally entering countries including the US, Germany or the UK. However, the scale of this trend should not be exaggerated when compared to the 36 million people who left Europe in search of a better life between 1871 and 1915 (James, 2002: 11).

It is also difficult to obtain recent data on immigration and skills, though the proportion of skilled immigrants across OECD countries is rising. Figure 15 shows the proportion of professional and technical migrants from both inside and outside the OECD. As it relies on national census data, it fails to capture recent trends but it does offer an indication of national variations and the extent to which countries depend on 'foreign' highly skilled workers. What these figures do not show is how high skilled migrants are often concentrated in specific occupational sectors such IT, education or medicine.

Figure 15: Employed professional and technical migrants* from OECD and non-OECD economies, by OECD country of residence, 2000 or 2001 (As a percentage of total employed professionals and technicians in the country of residence)**



Notes[38]

Source: OECD Science, Technology and Industry Scoreboard 2007
http://ocde.p4.siteinternet.com/publications/doifiles/922007081P1G15.xls [accessed 8 July 2008].

The 'brain drain' of skilled workers from emerging countries, such as doctors, nurses, teachers and IT workers, can also have negative consequences for the countries they are leaving behind. This is far from a 'win-win scenario' for many developing economies, although in the medium term, there may be some advantages, if they receive advanced professional training and return to their 'home' countries to work (Saxenian, 2006). But for many emerging economies, the negative consequences of the human trafficking of skilled workers are clearly evident. There was a 1,000 shortfall in the number of nurses needed in South Africa in 2004, but it was losing 300 nurses a month. Meanwhile, in a three year period (2000-2003), 40,000 overseas nurses registered in the UK – mostly from the Philippines, South Africa, Australia and India. The US has projected a million nursing vacancies by 2010. This has led Thembeka Gwagwa, chief officer of the South African Nurses' Association, to conclude that the overseas recruiters know they are going too far, but are ultimately driven by profit: 'as long as they make money they don't care what they are doing to the health care of our nation' (Carvel, 2004).

This brain drain of high skilled workers can therefore leave developing economies with a lack of the critical skills required to attract foreign inward investment. At least 40 percent of Filipinos are living on less than $2 a day and unemployment has risen to 22.7 percent in 2007 (Andriano, 2008).[39] Remittance accounts for around 13 percent of the Philippines GDP but it tends to encourage consumer spending rather than create the conditions for export-driven growth. The brain drain to the developed economies, at least in part, accounts for the lack of skilled workers in health, aviation, mining, shipping and port operations. The problems in the health sector are stark as 85 percent of the country's trained nurses are OFW (overseas Filipino workers). David Llorito observes that 'what really alarms health policy makers is the new trend of doctors becoming nurses – the so-called "nursing medics" phenomenon – so they can more easily leave the country and work abroad'.[40]

The knowledge dividend: winners and losers

It is often suggested that human capital has increased in economic significance to the point where it has become as important to contemporary society as land was to feudal society and financial capital to the industrial revolution (Drucker, 1993; Neef, 1998). Robert Reich, noted that in 1920 more than 85 percent of the cost of a car went to pay

routine labourers and investors, by 1990 these two groups received less than 60 percent. Similarly, of the cost of a computer chip, 15 percent is divided between the owners of the raw material, equipment, production facilities and routine labour, the other 85 percent goes to educated labour including designers, engineers and patent attorneys.[41] This conforms closely to the win-win scenario as it harbours an evolutionary model of economic development in which the value of knowledge work will continue to rise at the expense of the low skilled and the owners of capital as profits come to depend more on brainpower.

However, the protagonists of the win-win scenario have failed to understand the realities of knowledge capitalism (Brown, Lauder and Ashton, 2008). Amongst other things they ignore the fact that the globalisation of corporate skill webs can be used to play-off different groups of knowledge professionals scattered around the globe whether within the same (or different) organisations.[42] In the same way that they play off different groups of skilled production workers and their unions to reduce the price of labour, so too they have been able to play off knowledge professionals to reduce their labour costs.

What this means is that in spite of all the talk of the increasing power of the knowledge worker, employers have in fact gained the 'upper hand' in the relationship between capital and labour. This has been well established through the work of researchers at the IMF and others such as those at the global consultancy Morgan Stanley. Commenting on their research into the consequences of globalisation, Stephen Roach, Chief Economist at Morgan Stanley, remarked that the win-win scenario for globalisation was not working. While many workers in the developing world were seen to benefit from economic globalisation, he argued that in the developed economies it's a different story as benefits:

> have accrued primarily to the owners of capital at the expense of the providers of labor. At work is a powerful asymmetry in the impacts of globalization and global competition on the world's major industrial economies - namely, record highs in the returns accruing to capital and record lows in the rewards going to labor… The global labor arbitrage has put unrelenting pressure on employment and real wages in the high-cost developed world - resulting in a compression of the labor income share down to a record low of 53.7% of the industrial national income in mid-2006. With labor costs easily accounting for the largest portion of business expenses, this has proved to be a veritable bonanza for the return to capital - pushing the profits share of national income in the major countries of the industrial world to historical highs of 15.6% in 2006.[43]

Figure 16: Labour income shares for advanced economies* (weighted) , 1980-2005 (percentage)

*Advanced economies include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, the United Kingdom, and the United States; weighted using series on GDP in U.S. dollars from the World Economic Outlook database.

Source: IMF, World Economic Outlook: Spillovers and Cycles in the Global Economy, April 2007, http://www.imf.org/external/pubs/ft/weo/2007/01/c5/Fig5_7_1.csv

The same trend was found by researchers at the International Monetary Fund (IMF) whose work revealed a steady decline in the proportion of the gross national product that goes to labour as opposed to capital. As Figure 16 illustrates labours' share has seen a steady decline since the early 1980s. This has been more pronounced in Europe and Japan (about 10 percentage points) than in Anglo-Saxon countries (about 3-4 percentage points) (IMF 2007:168) but the trend is the same across all the industrial countries. Of course, the fact that global economic growth has created a larger economic pie means that many workers have seen real increases in their living standards over this period, but this does not detract from the fact that capital has been able to use its enhanced global capabilities to increase its share of the wealth created by the global economy.

There are a number of factors at work to produce this squeezing of labours' share. For example, technological change introduced by employers is generally seen as important in reducing unskilled work and therefore the proportion of income going to unskilled workers. In the case of skilled workers however, analysis by the IMF

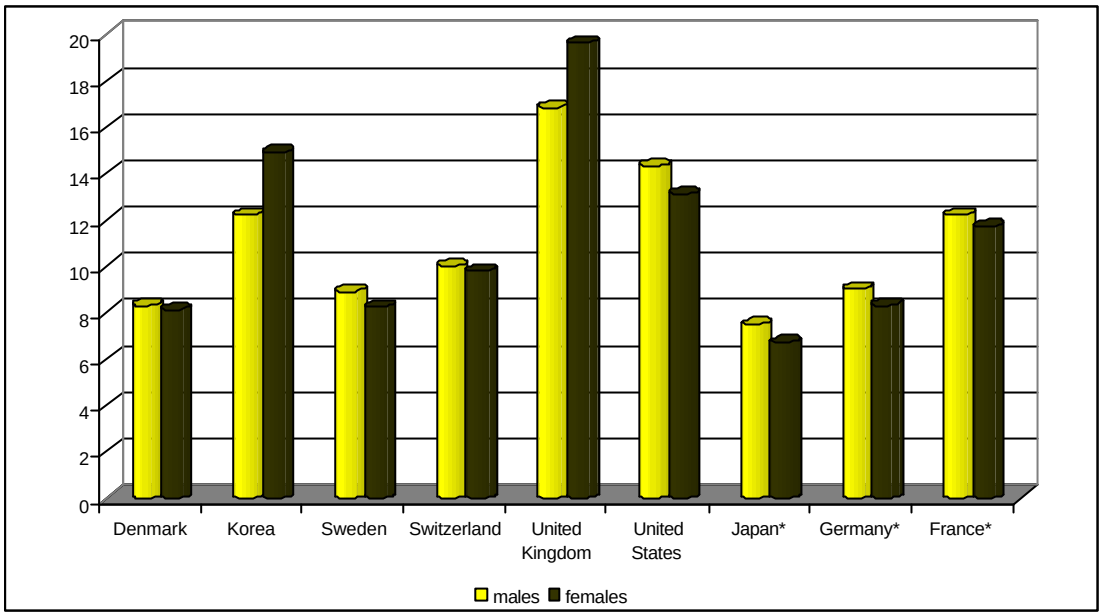
team revealed that offshoring by employers was responsible for reducing their share, while government labour market policies have had some impact in mitigating the overall amount of the fall experienced by labour (IMF, 2007:178). However, they also argue that much of the drop in the income share is explained by the declining fortunes of unskilled workers. Again, the evidence is far from conclusive and more research is required to tease out differences in industrial sectors as well as differences within occupational groups.

Given existing trends there seems little doubt that the forces, which have enabled employers to increase their share of wealth, are likely to be sustained in the near future. As we have seen both China and India have massive reserves of labour, both skilled and unskilled which have yet to be utilised by employers, while other countries in Asia and Africa have yet to be incorporated into the global economy and labour force. As wages and costs rise in specific regions and countries within the developing economies we will observe the same trends experienced by the developed economies, namely the progressive movement of production to areas where labour costs are lower.

The death of human capital (as least as policy-makers have come to understand it)

The win-win scenario ultimately rests on the premise that investing in high skills is the route to prosperity for all. Official education and economic policy documents make frequent reference to the relationship between education and income inequalities. These inequalities are not only seen to reflect the new realities of the global labour market – which rewards those with scarce skills, knowledge and talent and penalises those with few marketable skills – but also a failure to improve the employability of a large proportion of the workforce, given that if the employability of the workforce were to improve, it would result in a rapid narrowing of income inequalities. Here the analysis of the problem of wage inequalities is closely related to its remedy: if many workers are in low-skilled, low-waged jobs or unemployed, it is because they lack marketable skills; therefore the solution is to give them incentives and opportunities to become more employable through education and training initiatives, such as those designed to increase entrepreneurial skills, improve adult literacy or improve education provision for children from disadvantaged backgrounds.

Figure 17: International returns to education: private real rates of return, university-level education (ICED 5+6) , 2003 [44]



*1999/2000

Source: OECD, *Education at a Glance*, 2003, 2007

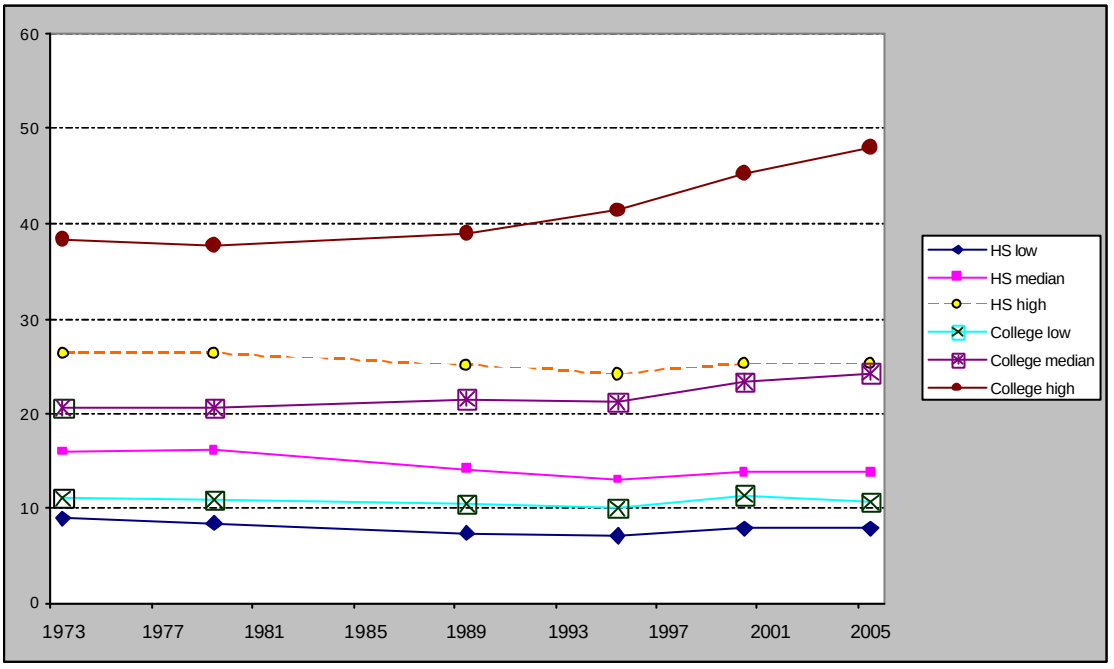
The view of education as the route to economic prosperity is typically supported by evidence of a graduate premium for those with a university education. Figure 17 shows the latest OECD figures for the rates of returns to education for individuals with university level education in selected countries. It shows that the value of the graduate premium is subject to significant variation between countries. The returns of both men and women in Britain were much higher than in countries such as Denmark and Sweden. Such differences pose a problem for the assumed relationship between learning and earning, as income inequalities are taken to reflect the value of skills in the global labour market, we would expect all the leading economies to exhibit the same basic pattern (see below). The figures for Britain and the US may not reflect the higher value attached to 'knowledge' but the inferior quality of the job opportunities for non-graduates compared to those available in Denmark and Sweden.

But the political arithmetic of 'high skills = high wages' leaves the protagonists of the win-win scenario with a serious 'adding up' problem. Fred Hirsch observed, 'what each of us can achieve, all cannot' (Hirsch, 1977; Brown, 2006). Just because 'on average' those with higher qualifications get higher wages does not mean that all those with higher qualifications will get higher wage, because people are not

paid for their credentials but for their employment. Therefore, unless there are more jobs offering higher wages, the 'average' income of graduates will decline.

The value of credentials depends on their scarcity value. The more illustrious the university, the better the grade, the fewer people that have a degree, the greater the market value of the credential. Therefore, past returns are no guarantee of future performance as market conditions change – not only as more people gain access to graduate qualification but for the reasons discussed above. Moreover, headline figures of the returns to education, such as the widely touted figure in the UK of a £400,000 dividend in lifetime earnings for those with a university degree (Brown and Hesketh, 2004), assumed the 'average' graduate, but the realities are that there are significant 'within' group differences in the ability of graduates to cash in on their 'human' capital.

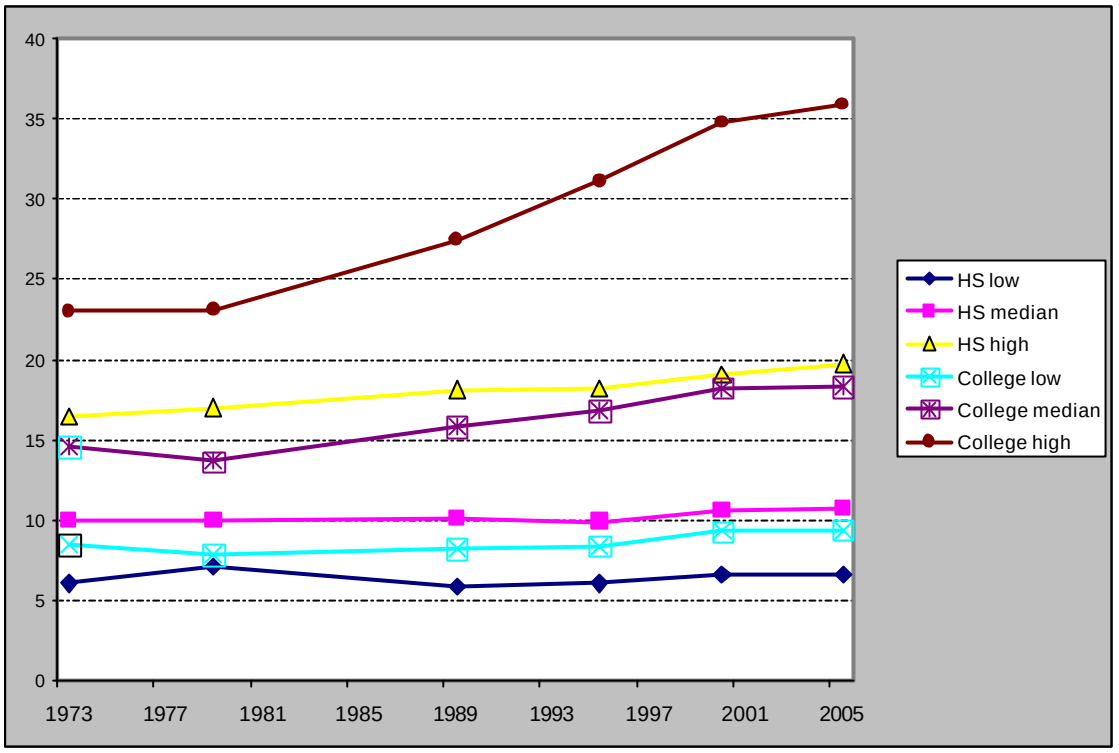
Figure 18: US male hourly wages by decile within educated groups, 1973-2005 (2005 dollars)



Note: low, median and high earners refer to, respectively the 10th, 50th and 90th percentile wage.

Source: Lawrence Mishel, Jared Bernstein, Sylvia Allegretto , *The State of Working America 2006/2007*, Economic Policy Institute, Ithaca, NY: ILR Press, an imprint of Cornell University Press, 2007, p.160.

Figure 19: US female hourly wages by decile within educated groups, 1973-2005 (2005 dollars)



Note: low, median and high earners refer to, respectively the 10th, 50th and 90th percentile wage.

Source: Lawrence Mishel, Jared Bernstein, Sylvia Allegretto , *The State of Working America 2006/2007*, Economic Policy Institute, Ithaca, NY: ILR Press, an imprint of Cornell University Press, 2007. p.160.

Based on evidence from the US, Figures 18 and 19 give a very different picture to the mantra of 'learning is earning'. Indeed, if the idea of a graduate premium were calculated on the economic value of a college degree in 1973 as opposed to its current market value, the 'headline' story would look very different. They show that it is only male and female college graduates in the 'higher earner' category (90th percentile) that enjoyed any significant growth in real income since 1973. In other words, the vast majority of college graduates have received little additional 'premium' on their investments in their human capital compared to college graduates in the 1970s, although they continue to earn more than those without a college education.

But even here the picture is complex, as the high-earning category among those who left high school before going to college was better paid than the median income for college graduates (although the differential has narrowed in recent years). Female college graduates continue to earn less in each of the earning categories than males, but perhaps the most striking difference is the way male and female top earners

have raced away from the rest. They now earn around twice as much as the median college graduate of the same sex. This underlines the need to avoid talking about the 'average' college or university graduate – for when it comes to rewards within the job market, some are far more equal than others.[45]

The evidence in the UK is more difficult to evaluate due to a lack of suitable data, but the results from two highly respected national surveys cast doubt on current assumptions about the financial benefits of higher education. These surveys enable us to identify trends and calculate net income for those in their early thirties, precisely at the time when many will be thinking of buying a house and raising a family, although this data is now dated and fresh analyses are required. Table 10 shows the net income per hour of low-, median- and high-income graduates and non-graduates. By looking at per hour income, we can take into account those who are working part-time. This is important because it offers a better understanding of the financial circumstances of all graduates, rather than only those in full-time employment. There are several striking conclusions to be drawn from this analysis (Lauder, et al., 2005).

The median earnings for both male and female graduates have experienced a slight decline in real earnings and in terms of the graduate premium, the lifetime difference between the median graduate and non-graduate was £166,000 (net income). In 2000, the median graduate earned 36 percent more, rather than the 50 percent premium reported in *The Future of Higher Education* (DfES, 2003:59). However, this represents a 17 percent decline, from a premium of £200,000 in 1991 (a drop from 44 percent to 36 percent) in the differential between the median graduate and non-graduate.

Table 10 also shows that high-earning non-graduates achieved a 17 percent advantage over the median graduates (a lifetime difference of £108,000) and 80 percent more than low-earning graduates.[46] This analysis clearly demonstrates the problem of basing our understanding of graduate incomes on the 'typical' graduate, a problem further highlighted when we examine differences in earnings within the graduate population.

The same data set also shows that the differences in earnings within the category of 'graduates' was twice as large as those found between graduates and non-graduates. This amounts to a £374,000 lifetime difference between median- and high-earning graduates, which equates to a 60 percent difference. Since 1991, there has

been an increase in graduate income differentials, although this was slightly larger for males when the earnings of median and high-earning graduates are compared.

A review of the evidence on graduate earnings in the UK by Green et al. (1999) also found that the variance of graduate pay has increased since the mid-1980s (Green, et al., 1999). In a later analysis of graduate pay using longitudinal data Green and Zhu (2007:3) found that 'the dispersion of returns substantially increased for both man and women over the period 1994-2006. While the benefits of graduate education at the top end of the residual wage distribution have increased a little, at the bottom end they have sharply decreased.' What they also found was that there had been an increase in graduate over-qualification during the current decade, which was associated with a sharp increase in the financial costs of being overqualified. Those graduates who were in jobs for which a degree was not required on entry were being paid less than those in jobs for which degrees were required.

Table 10: UK graduates and non-graduates: net hourly pay (employees full-time and part-time), 30-year-olds

		All	All	Women		Men	
		1991	2000	1991	2000	1991	2000
Below degree	**Low**	3.6	3.7	3.4	3.6	4.0	3.9
	Median	5.4	5.5	4.7	5.2	6.0	5.7
	High	8.8	8.8	7.7	8.2	9.4	9.4
Degree or higher	**Low**	5.1	4.9	5.0	4.6	5.4	5.3
	Median	7.8	7.5	7.7	7.0	8.1	7.9
	High	12.0	12.0	11.3	10.8	12.5	13.0

*Low =10th percentile, High = 90th percentile. Adjusted for age.

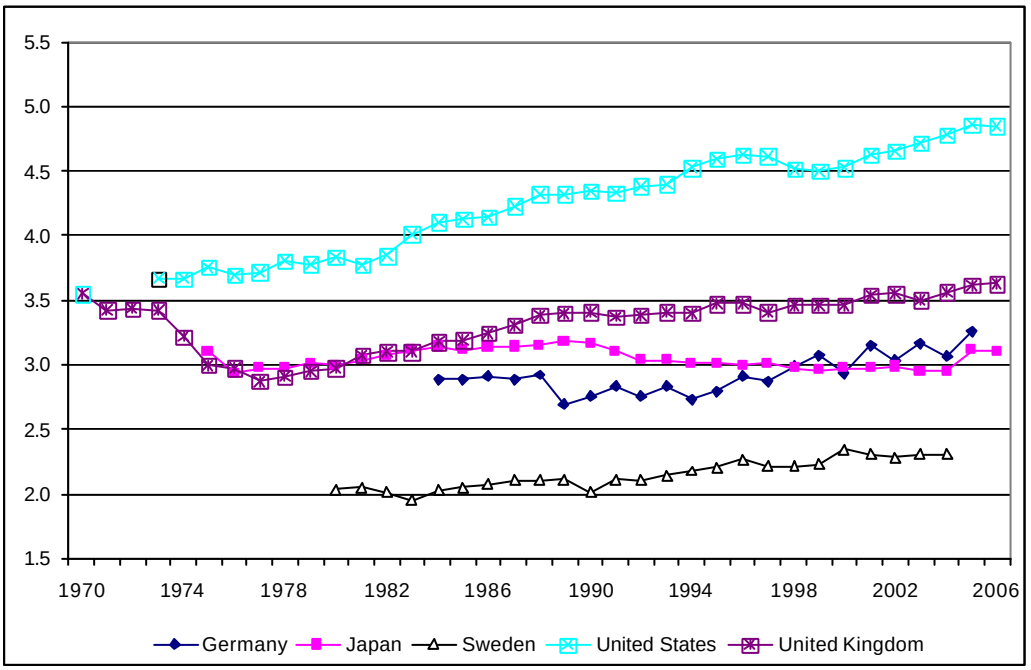
Source: Lauder, et al., (2005), based on 1991 National Child Development Study and 2000 British Cohort Study, 1991 Wages indexed to April 2000 prices. Sample does not include the self-employed.

This evidence also supports other research that has found enduring gender inequalities in the rates of returns to higher education. In Purcell's analysis of equal opportunities and earnings among graduates in the UK, she found that the differential between women and men increased in line with occupational status from 12.5 percent among manual and routine operatives to 16.5 percent among managers and administrators (Purcell, 2002:17). Research in the United States also demonstrates

huge variations in incomes, depending on gender and race. White men with a bachelor's degree earn around $12,000 a year more than black or Hispanic men with the same qualification. The difference between white men and Hispanic females widens to over $20,000.[47]

Overall, the evidence suggests that income inequalities in Britain and the United States cannot be explained simply in terms of shifts in global returns to knowledge, skills and insights. If wage inequalities are a reflection of the returns to skill in an increasingly global labour market, we would expect to find a similar pattern in all OECD countries. Figure 20 shows that at the same time that the US – and to a lesser extent the UK – experienced a race to inequalities, some countries, including France and Japan, experienced a narrowing of differentials and in other countries there was little discernible change during this period. It is of course possible that these differences reflect a time lag and other countries will witness a similar increase in wage inequalities in the future (Lauder, et al., 2008). Figure 20 offers initial support for this view in the case of Germany, as there has been a recent and significant increase in income inequalities. Nevertheless, significant societal differences remain in the way labour markets and employment are organised and incomes distributed.

Figure 20: Trends in earnings dispersion in selected OECD countries*



* 90-10 percentile ratios for the gross earnings of full-time workers, male and female combined.

Source: Authors' calculations based on OECD Labour Market Statistics

What this discussion also underlines is the danger of being seduced by fashionable or mono-causal explanations. Whatever the reasons for the lack of real-term growth in median college incomes in the US and in the UK or national differences in income inequalities, they cannot be explained in terms of globalisation or offshoring of skilled employment in any straightforward way. But what is worrying about the trends identified here is that they are likely to put increasing downward pressure on the incomes of many 'knowledge' workers. Moreover, the impact of globalisation will not be evenly spread throughout the workforce. If the brunt of international competition and technological innovation in the manufacturing sectors was borne by blue-collar workers, the next phase will not spare the middle classes. But the economic pain will not be evenly administered as the top 10 to 20 percent may continue to enjoy rising wages as the rest are forced to run even faster to do little more than stand still.

Discussion

This monograph has focussed on global trends in education, employment and income. It has also focused on Britain and the United States as both countries have offered a neo-liberal agenda of free trade and flexible labour markets. Within what we have called the 'win-win' scenario, the source of competitive advantage is through investment in human capital. Gary Becker (2002) believes that we have now entered the 'age of human capital':

> Human capital refers to the knowledge, information, ideas, skills, and health of individuals. This is the 'age of human capital' in the sense that human capital is by far the most important form of capital in modern economies. The economic successes of individuals, and also of whole economies, depend on how extensively and effectively people invest in themselves.

These investments are assumed to give everyone an opportunity to improve their job, career and income prospects, as the developed economies compete for high-skilled, high-waged jobs while low-skilled employment is concentrated in emerging economies.

Our analysis comes to a different conclusion. The policy framework based on human capital assumptions is fundamentally flawed. The available evidence suggests that relying on employability and supply-side policies is unlikely to deliver the high-skills, high-wage vision of Britain or the United States. This is not to suggest that the

knowledge, skills and capabilities of the workforce are unimportant. As a senior British policy adviser observed, the focus on innovation and research was inevitable, because 'what else could we do?' However, the problem is that these high-level skills are becoming widely available across the globe.

Human capital is itself subject to the laws of diminishing returns. It is losing its capacity as a source of competitive advantage, because the 'positional' advantage of those with higher education and skills is not only declining domestically (as higher education is expanded) but also globally (Brown, Lauder and Ashton, 2008). Governments in the developed economies are beginning to grasp the ways in which countries such as China and India are expanding their educational systems to compete for high-skilled work within key sectors of the global economy, along with trends towards the 'offshoring' of skilled, as well as semi-skilled and unskilled, jobs. Yet they are reluctant to recognise its full policy implications.

Much current thinking about the relationship between education, jobs and rewards is based on an evolutionary model of skills upgrading and the rising value of investments in human capital. But the relationship between education and the labour market today looks more like a 'transitional' case, as access to tertiary education becomes more widespread both within and across countries. This global expansion of tertiary education has outstripped the demand for high-skilled workers, creating downward pressure on the incomes of skilled workers in the developed economies, along with some upward pressure on those in emerging economies. At the same time, there are trends towards 'winner-takes-all' markets, which reveal that people with similar qualifications in the same occupations, organisations and countries are experiencing increasing polarisation in future career prospects (Frank and Cook, 1995).

Our current research involving leading global corporations also suggests that the trends in corporate restructuring in the 1980s and 1990s have entered a new phase, based on the search for new sources of productive efficiency through leveraging the global economy, facilitated through advances in new information and process technologies. Such trends are captured in a PricewaterhouseCoopers (2005:2) report on offshoring in the financial services industry that concludes:

> Many in the industry believe that the distinction between offshoring and the sourcing of expertise and talent internationally will become increasingly blurred. As firms consider shifting higher value-added activities that require specific knowledge or head offshore to address skill

> shortages in home markets, those that place greater emphasis on people and expertise will do better than those that are simply out to cut their costs.

The paradox of human capital is that at a time when human knowledge is being taught, certified and applied on a scale never witnessed previously in human history, the overall value of human capital is likely to decline, apart from in the case of leading-edge knowledge that has clear market application. For the few, investments of effort, time and money will continue to be handsomely rewarded. But for most, it will take the form of defensive expenditure: it is a necessary investment to have any chance of getting a decent job (Brown, 2006).

An unintended consequence of the application of human capital ideas to public and economic policy is that it is creating increasing problems in the management of expectations. The developed economies are in danger of creating a heady cocktail of discontent: students and their parents may find that a degree fails to deliver the standard of living they have been led to expect and employers will have too many over-qualified and disgruntled employees (Reich, 2003). The market situation for many non-graduates is dire, as opportunities for occupational mobility that were previously associated with working class careers are now in decline (Keep, 2004; Blanden, et al., 2005).

Some remain hopeful that the increasing supply of higher-educated employees will generate its own demand as employees seek to exploit this surplus of 'talent'. The research evidence finds only modest support for such a view and it will do little to overcome the problem of over-qualification. Mason (2002:454) found that in the UK 'the scope for new job upgrading of a permanent kind in service industries now appears to be limited. Large numbers of jobs filled by non-mainstream graduates have not been modified in response to the greater availability of graduates'.

Ultimately, the logic to global capitalism extends far beyond headline figures about offshoring or economic migrants. Competitive advantage cannot be achieved solely by raising educational standards or by sending more and more people to university. The problem confronting Western workers and governments is that the knowledge economy is not characterised by the rising value of knowledge as companies are not only attempting to *do more with less* but also to *know more for less*. While elites will continue to make spectacular returns on their personal investments, many so-called knowledge workers will be feeling the pinch. This is not limited to

their pay cheques, but also the wider benefit packages associated with managerial and professional employment – in the shape of healthcare, pensions, working hours, job security and career opportunities. What the developed economies are being forced to grapple with, even if they remain in a current state of denial, is that economic competition is based on quality *and* price.

We require a new political economy that recognises that while economic globalisation places limits on the role of the state to shape market competition in the national interest, there is more room for manoeuvre than is commonly supposed in neo-liberal theory. The deregulation of global markets does not mean the inevitable deregulation of domestic institutions, including those relevant to education, work, welfare and the labour market. Varieties of 'national' capitalism continue to play a crucial part in shaping the relationship between education, jobs and rewards (Hall and Soskice, 2001), although some aspects of this relationship have been called into question in our recent research (Lauder, et al., 2008).

Our research on globalisation and the future of skills raises new questions that challenge much of the existing literature on the social foundations of economic performance, including our own theoretical work on national skill formation (Ashton and Green,1996; Brown, Green and Lauder, 2001), along with theories associated with the 'varieties of capitalism' approach. This literature has assumed that the production of quality goods and services depend on particular 'regimes of production' such as the dual system of workplace and college training in Germany or high trust relations in the 'third Italy', that are difficult if not impossible to duplicate. But what companies have discovered as they experiment with higher end activities in lower cost countries, is that quality may not be impaired and may even be improved, although there were companies who retreated because they struggled to achieve the standards they required or due to fears about intellectual property rights.

The view that it will take decades for developing economies to compete in the global market for high skilled jobs has also underestimated the speed of educational reform and business innovation. Our studies show that the assumption that hi-tech depends on social sophistication in the form of democratic politics, welfare provision and high GDP per capita, fails to capture the extreme forms of uneven development where the pre-industrial and the post-industrial share the same postcode. Sociological theories have typically assumed a close correspondence between societal and economic development, but business organisation is being turned 'inside out'. While

companies need a decent infrastructure (roads, communications), and supply of well-educated and motivated workers, they are able to set up 'oasis operations', high-tech factories, offices and research facilities in low-spec locations (Brown, Lauder and Ashton, 2008). Here, our argument is not that varieties of capitalism have given way to a universal or convergence model, but rather that national 'varieties' explains less than is typically claimed. A key question is how companies achieve common quality standards within the 'varieties' of capitalism.

This does not negate the importance of societal differences in the way education, jobs and rewards are institutionally organised in, say, Britain as opposed to Germany, Singapore or China. Differences remain in the way policy-makers understand economic globalisation and its policy implications. In Germany, for instance, globalisation may be seen as a threat to its model of social partnership, especially in terms of the dual system of training, whereas in Britain it is seen as consistent with a commitment to a flexible labour market. It highlights how national responses to globalisation take place within very different political and institutional contexts. Indeed, even at the global level, the political regulations that structure world trade, such as those negotiated through the World Trade Organisation, still exclude substantial national markets (for example, the domestic agricultural markets protected by the US and EU) from effective international trade.

It is estimated that European dairy farmers received US$2.20 per day for each cow, therefore 'the average cow in a rich country now receives more income per day than half the world's population'.[48] In addition, many of the least developed countries of the world, especially those in sub-Saharan Africa, remain outside world markets.[49] All this serves to remind us that the protagonists of economic globalisation and 'free trade' have a long way to go to create viable trading conditions that would allow many developing countries to raise productivity and sell on world markets.

At the national level, fears of job losses and economic recession have led to calls to limit the offshoring of 'American' jobs, although 60 percent of goods exported from China come from the US and other foreign-owned multinationals that offshored their manufacturing activities to reduce costs (Stewart, 2005). Several US states passed laws prohibiting the export of such public-sector jobs.[50] In January 2004, the US Senate passed an amendment that prevented private-sector companies from using offshore workers in order to compete against government workers on some contracts. While this only applied to the US Treasury and the Department of

Transportation, it highlights the US government's attempt to limit the political damage caused by the accusation that the federal state is not protecting the economic interests of America workers, especially the middle classes. In August 2007, Barack Obama announced the Patriot Employers Act, aimed at rewarding companies that give priority to American workers. Obama states that 'instead of providing incentives for employers to outsource and move their headquarters overseas, we should encourage corporations to be patriot employers that create good jobs with good benefits for American workers… Patriot employers help maintain American competitiveness in the global marketplace, while keeping our workforce and our middle class strong.[51] In the UK the offshoring of jobs is yet to become a major political issue, but this is likely to change as Britain enters a period of economic recession.

Other commentators will continue to argue that by increasing competition and lowering the prices of inputs, international trade can generate higher productivity. In the IT sector, for example, Mann argues that the application of cheaper foreign skills in this area will reduce the price of software, making it more widely available to smaller employers in the US and thereby drive up their skill and service levels. Some jobs will disappear in the software industry, but the broader diffusion of IT throughout the economy will generate higher levels of economic activity: the same process that we have observed in the past in manufacturing (Mann, 2003).

Willem Buiter and Anne Sibert (2008) view policies such as the Patriot Employers Act as misguided protectionism as it, 'seeks to transfer wealth from the truly downtrodden of the world to a limited number of favoured US workers: mainly those in once dominant manufacturing industries that have lost their global competitive edge. It is breathtaking hypocrisy to object to the often appalling conditions of work and employment in developing countries and emerging markets, including sweatshops and child labour, while at the same time trying to prevent the operation of the normal and effective mechanisms for remedying these deplorable circumstances: foreign direct investment, outsourcing, off-shoring and all other manifestations of free trade.'[52]

Whatever the outcome of these debates and subsequent political actions, these new global conditions do have important implications for the parameters of political debate. Our analysis shows that the dominant neo-liberal discourse based on the 'win-win' scenario is in many respects based on a set of assumptions that are no longer valid. There is also nothing inevitable about the path to further global economic

integration. The politics of free trade are as important as the economics of free trade. When its political price is perceived to outweigh its economic benefits, historical precedent suggests that powerful nations will seek to protect their markets, companies and workers from international competition. A survey for the United Nations World Investment Report (2005) found that leading transnational companies considered protectionism and slow growth in the developed economies as the biggest threat to future foreign direct investment (UNCTAD, 2005).[53]

Harold James also reminds us that we have been here before even if new political institutions, such as the World Bank, World Trade Organisation and the International Labour Office, have emerged to meet changing political conditions. James notes that 'there has already been highly developed and highly integrated international communities that dissolve under the pressure of unexpected events. But in every case the momentum was lost; the pendulum swung back' (James, 2002:1). He points to the collapse of the Renaissance and the international economy of the late 19th century following the Great Depression of the 1920s.

The economic nationalism that characterised Western countries after the Second World War was designed to spread the benefits of economic growth to the majority rather than the few by introducing fiscal controls and trade restrictions at the national level. The more the middle classes view the current experiment in globalisation as a threat rather than an opportunity, the greater the likelihood of domestic political reaction. Indeed, it seems inevitable that the political opposition to further economic globalisation will grow unless ways can be found to distribute the fruits of economic prosperity more widely (Brown and Lauder, 2006). This is now being widely recognised as Lawrence Summers, the former US Treasury Secretary argues in his defence of globalisation, 'the domestic component of a strategy to promote healthy globalisation must rely on strengthening efforts to reduce inequality and insecurity. The international component must focus on the interests of working people in all countries, in addition to the current emphasis on the priorities of global corporations.' [54]

Conclusion

This monograph points to a future situation in which the competition for the 'best' jobs is likely to intensify and the returns to skill for many will fall. The rapid increase in the domestic and global supply of university graduates is changing the terms of

trade in the production of higher value-added goods and services. It suggests that the distinction between competition based on quality *or* price is increasingly redundant. As the supply of high-skilled work expands, the new competition is based on quality *and* price. This poses major problems for individuals and families in the developed economies and for national governments that have embraced the political arithmetic of high skills = high wages.

In view of this, it is important that we start to change the terms of the political debate to embrace this likely scenario and think about how public policy can help create a competitive economy and tackle labour market (who does what) and distributional (who gets what) problems. The question is how people are individually and collectively engaged in innovative and enterprising activities that cannot be easily performed elsewhere. It is the societal, regional or local 'capacity' for high-skill utilisation that counts, rather than merely increasing the supply of employable graduates.[55]

However, the great doubling in the global workforce identified by Richard Freeman, and the great doubling in global university enrolments discussed here, present policy analysts with a great reckoning. Investment in high skills will not create the high skilled, high waged economy of the future. We need a different policy framework that begins with the question of how to achieve prosperity and social justice after the death of human capital as we have come to understand it. The political debate must, therefore, move on to consider the types of policies required to sustain economic growth, social justice and a cohesive society, when having large numbers of highly educated workers is no longer enough. We are not saying that skills are irrelevant, that is nonsense, but it is the role of skills (and education) in our understanding of productivity, prosperity and competitive advantage that is being transformed. How should developed economies respond to the competitive challenge now poses by the global supply of high skilled, low cost workers in developing economies?

Whatever answer we eventually present will need to connect questions of both wealth generation and wealth distribution, as these cannot be resolved through national or global labour markets mechanisms. It is also going to be virtually impossible to focus solely on maintaining the prosperity of developed economies without account of the hopes, ambitions and prosperity of workers around the world. This will be forced upon us given the sheer weight of economic numbers emerging

from China and India, but also Brazil, Russia, Vietnam, etc. Now China has pursued a Western-style growth model, but on a mind-boggling scale, it will be difficult to constrain both domestically and internationally. While we worry about individual prosperity and its relationship to national prosperity, we will also need to pay attention to human capability on a global scale and how it can be deployed to achieve sustainable global prosperity and used to create a shared prosperity across all nations. The scale of these issues is difficult to exaggerate. Recent figures compiled by the ILO (2008) show that 'there are 486.7 million workers in the world who do not earn enough to lift themselves and their families above the US$1 a day poverty line and 1.3 billion workers do not earn enough to lift themselves and their family above the US$2 a day line. In other words, despite working, more than four out of ten workers are poor' (2008:10).

Finally, this monograph highlights a great deal of uncertainty and warns against jumping to conclusions. The consequences of increasing global economic integration are uneven, raising doubts about the claims of protagonists on either side of the globalisation debate. The main purpose here is to get a better grasp of the issues, based on the available comparative data.

The imminent prospect of a high-skilled, low-waged workforce being extended to developed economies should not be exaggerated. But our analysis should serve as a wake-up call. To date, there is little evidence of a significant decline in the 'average' incomes for those in managerial and professional jobs, although there has been a small decline in the starting salaries for British graduates. Yet most of us live as 'fugitives from the law of averages', as many of those with the same level of education and training have vastly different jobs, rewards and career prospects. Around a third of British university graduates report being over-qualified for the jobs they are doing, with its knock-on effects on earnings and life chances. The pressure on wages is also disguised by longer working hours for the same pay, in increasingly results-driven jobs, offering little occupational security and intense competition for promotion, and with an erosion of occupational pensions.

There is an urgent need to evaluate the future of high skills from a global perspective. The implicit notion that Britain or America will become 'magnet' economies for high-skilled, high-waged work seems overly optimistic in light of this review. Without a detailed risk assessment, it is difficult to identify trends or know how to respond. World events do not wait for researchers, policy-makers or

politicians, to deliver answers. In the meantime, it is crucial that we use our existing knowledge to rethink the parameters of the political debate to start exploring more effective responses to the new reality of the global market for skills.

While it is difficult to predict the future, the trends identified in this paper appear to mark the beginning of a profound economic transformation. Before leaving office, Tony Blair gave a speech on the impact of globalisation and economic change, in which he stated:

> The character of this changing world is indifferent to tradition. Unforgiving to frailty. No respecter of past reputations. It has no custom and practice. It is replete with opportunities, but only go to those swift to adapt, slow to complain, open, willing and able to change. Unless we 'own' the future, unless our values are matched by a completely honest understanding of the reality now upon us and the next about to hit us, we will fail.[56]

The issues we confront are not about honesty but about empirical realities. What is undoubtedly correct is that unless we have a better understanding of socio-economic change beyond our national borders, our policy prescriptions *will* fail.

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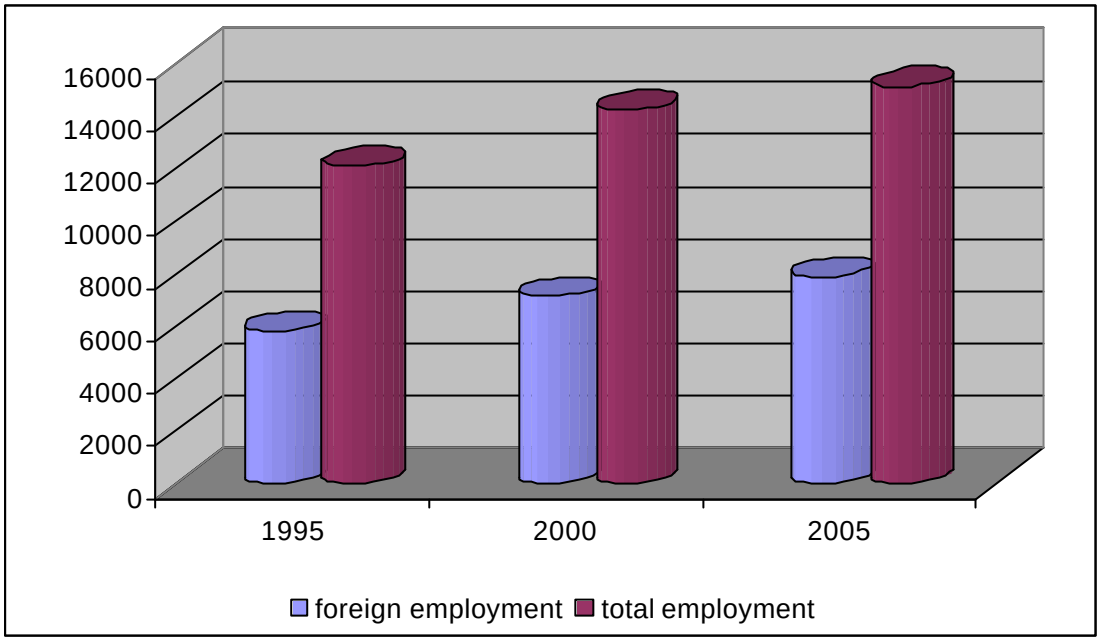
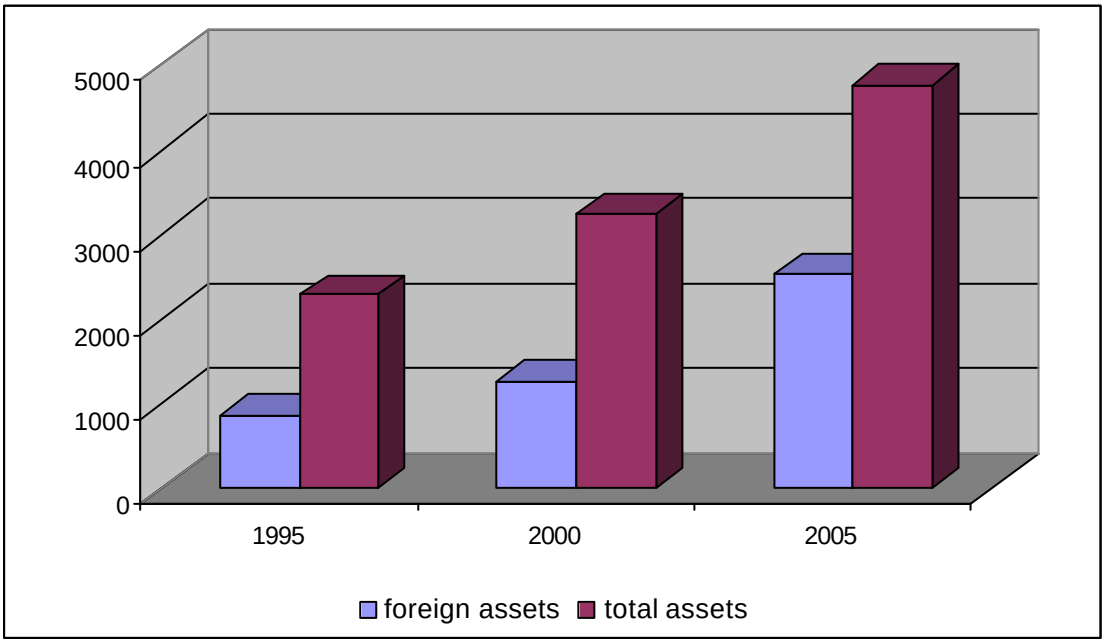
Appendix 1

Figure A1: Foreign and total employment of top 100 non-financial MNCs for 1995, 2000 and 2005 (thousands)



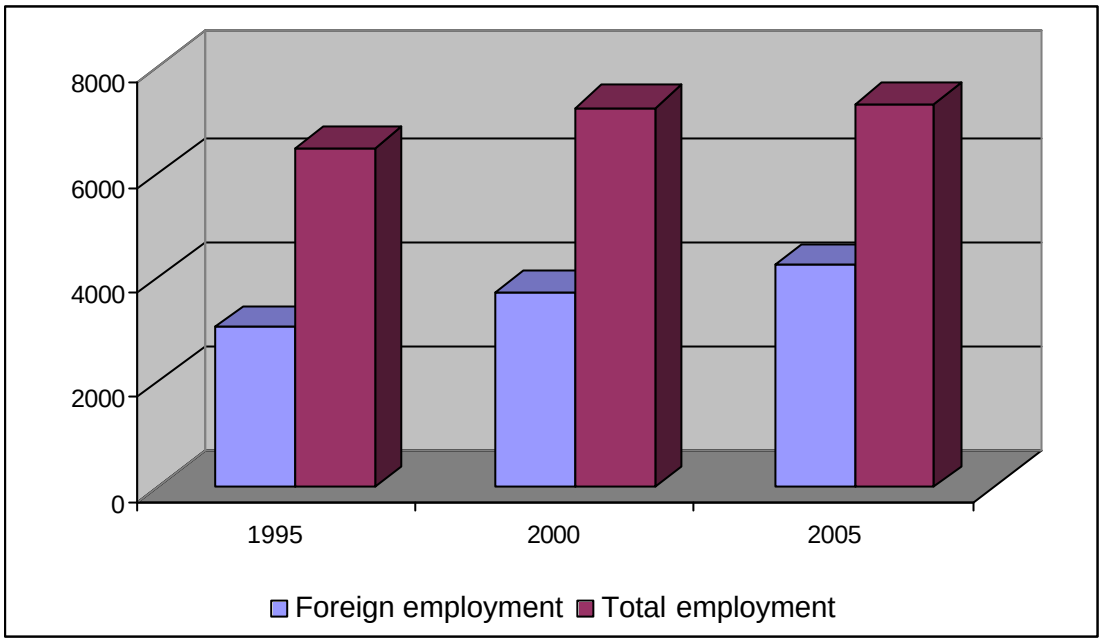
Source: UNCTAD World Investment Report, 1997, pp29-31; 2002, pp.86-88; 2007, pp.229-231

Figure A2: Foreign and total assets of 40 MNCs for 1995, 2002 and 2005 (in thousands)



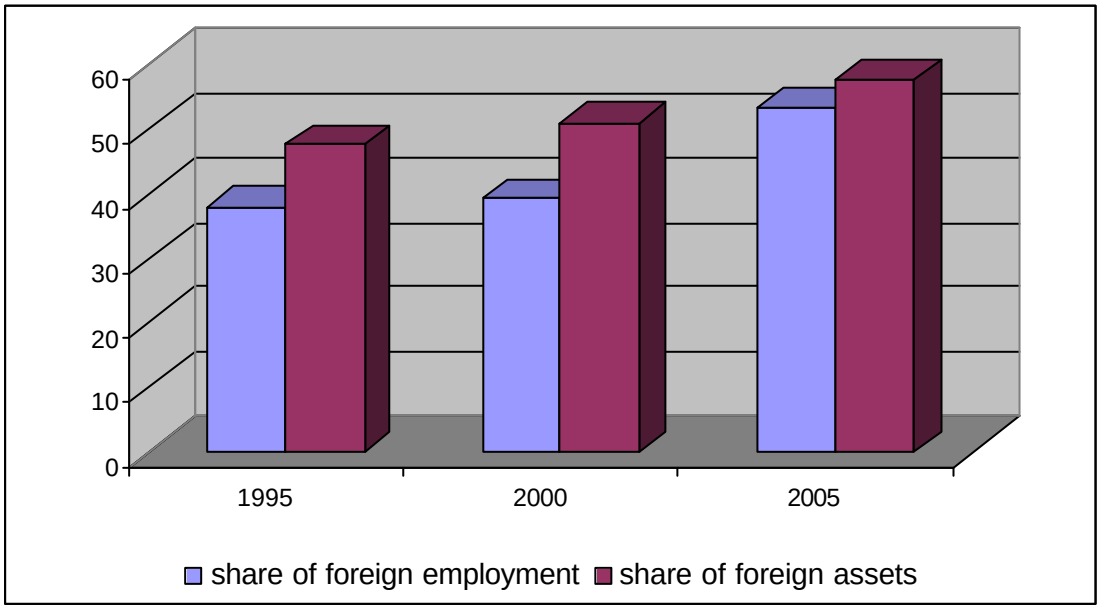
Source: UNCTAD World Investment Report, 1997, pp29-31; 2002, pp.86-88; 2007, pp.229-231

Figure A3: Foreign and total employment of 40 MNCs for 1995, 2002 and 2005 (in thousands)



Source: UNCTAD World Investment Report, 1997, pp29-31; 2002, pp.86-88; 2007, pp.229-231

Figure A4: Share of foreign employment and share of foreign assets of 40 MNCs for 1995, 2000 and 2005 (in percent)



Source: UNCTAD World Investment Report, 1997, pp29-31; 2002, pp.86-88; 2007, pp.229-231

Table A1: List of 41 companies from developed economies, consistently in the top 100 between 1995 and 2005

1	BASF	Germany	Chemicals
2	Bayer	Germany	Pharmaceuticals
3	BMW	Germany	Motor vehicles
4	Carrefour	France	Retail
5	ChevronTexaco	United States	Petroleum expl./ref./distr.
6	Coca-Cola Company	United States	Food & beverages
7	DaimlerChrysler	Germany/United States	Motor vehicles
8	Dow Chemical Company	United States	Chemicals
9	Eni Group	Italy	Petroleum expl./ref./distr.
10	Exxon Mobil Corporation	United States	Petroleum expl./ref./distr.
11	Fiat Spa	Italy	Motor vehicles
12	Ford Motor Company	United States	Motor vehicles
13	General Electric	United States	Electrical & electronic equipment
14	General Motors	United States	Motor vehicles
15	Glaxosmithkline	United Kingdom	Pharmaceuticals
16	Hewlett-Packard	United States	Electrical & electronic equipment
17	Hitachi	Japan	Electrical & electronic equipment
18	Honda Motor Company	Japan	Motor vehicles
19	IBM	United States	Electrical & electronic equipment
20	Johnson & Johnson	United States	Pharmaceuticals
21	Marubeni Corporation	Japan	Wholesale trade
22	Matsushita Electric Industrial Company	Japan	Electrical & electronic equipment
23	McDonald's Corporation	United States	Retail/Restaurants
24	Mitsubishi Motors Corporation	Japan	Motor vehicles
25	Mitsui & Company	Japan	Wholesale trade
27	Nestlé	Switzerland	Food & beverages
28	Nissan Motor Company	Japan	Motor vehicles
29	Philips Electronics	Netherlands	Electrical & electronic equipment
30	Procter & Gamble	United States	Diversified
31	Renault	France	Motor vehicles
32	Roche Group	Switzerland	Pharmaceuticals
33	Royal Dutch/Shell Group	United Kingdom/ Netherlands	Petroleum expl./ref./distr.
34	Siemens	Germany	Electrical & electronic equipment
35	Sony Corporation	Japan	Electrical & electronic equipment
36	Thomson Corporation	Canada	Media
37	Total Fina Elf	France	Petroleum expl./ref./distr.
38	Toyota Motor Corporation	Japan	Motor vehicles
39	Unilever	United Kingdom/ Netherlands	Diversified
40	Volkswagen Group	Germany	Motor vehicles
41	Volvo	Sweden	Motor vehicles

Table A2: The 21 transnational corporations in the top fifty from developing economies

1	Hutchison Whampoa	Hong Kong, China	Diversified
2	Cemex	Mexico	Non-metallic mineral products
3	LG Electronics	Korea, Republic of	Electrical & electronic equipment
4	Petróleos de Venezuela	Venezuela	Petroleum expl./ref./distr.
5	Petronas	Malaysia	Petroleum expl./ref./distr.
6	New World Development Co.	Hong Kong, China	Diversified
7	Citic Pacific	Hong Kong, China	Construction
8	Samsung Electronics Co.	Korea, Republic of	Electrical & electronic equipment
9	Sappi Limited	South Africa	Paper
10	Guangdong Investment Limited	Hong Kong, China	Diversified
11	Hyundai Motor Company	Korea, Republic of	Motor vehicles
12	Keppel Corporation Limited	Singapore	Diversified
13	Orient Overseas International	Hong Kong, China	Transport and storage
14	Singtel	Singapore	Telecommunications
15	Petroleo Brasileiro - Petrobras	Brazil	Petroleum expl./ref./distr.
16	Singapore Airlines Limited	Singapore	Transport and storage
17	Fraser & Neave Limited	Singapore	Food & beverages
18	Metalurgica Gerdau	Brazil	Metal and metal products
19	CLP Holdings - China Light & Power Company Limited	Hong Kong, China	Electricity, gas and water
20	Acer Inc	Taiwan, Province of China	Electrical & electronic equipment
21	Companhia Vale Do Rio Doce	Brazil	Mining & quarrying

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[1] See for example, European Competitiveness Report 2004, http://europa.eu.int/comm/enterprise/enterprise_policy/competitiveness/

[2] Reich, R. (1983) *The Next American Frontier*, Penguin, p. 127, taken from Coates, D., (2000) *Models of Capitalism, Growth and Stagnation in the Modern Era*, Polity Press.

[3] Tertiary education consists of tertiary-type A education (ISCED 5A) and tertiary-type B education (ISCED 5B). ISCED 5 - first stage of tertiary education (not leading directly to an advanced research qualification). This level consists of tertiary programmes having an educational content more advanced than those offered at levels 3 and 4 Entry to these programmes normally requires the successful completion of ISCED level 3A or 3B or a similar qualification at ISCED level 4A. They do not lead to the award of an advanced research qualification (ISCED 6). These programmes must have a cumulative duration of at least two years. ISCED 5A: programmes that are largely theoretically based and are intended to provide sufficient qualifications for gaining entry into advanced research programmes and professions with high skills requirements. ISCED 5B: Programmes that are practically oriented/ occupationally specific and are mainly designed for participants to acquire the practical skills and know-how needed for employment in a particular occupation or trade or class of occupations or trades, the successful completion of which usually provides the participants with a labour-market relevant qualification. Definitions taken from: Eurostat See http://europa.eu.int/estatref/info/sdds/en/strind/edu_train_sm.htm

[4] http://www.sedb.com/edb/sg/en_uk/index/why_singapore/singapore_rankings.html

[5] See Jack Cheng, 2008 'Update in Chinese Higher Education Developments, presentation to Asia-Pacific Association for International Education (APAIE), Waseda University, Japan. http://www.apaie.org/hoge2008piyo/final_ppt/1-2-1_Jack_CHENG.pdf

[6] Government White Paper, China's Employment Situation and Policies, Section VI. Employment Prospects for the Early Part of the 21st Century, People's Republic of China, Beijing, April 2004. See http://www.china.org.cn/e-white/20040426/6.htm

[7] 'Eleventh Plan to focus on education: PM', 28 December 2007. http://www.domainb.com/economy/general/20071228_eleventh_plan.html

[8] 'Eleventh Plan to Focus on Education, Syed Amin Jafri', 3 January 2008. http://in.rediff.com/money/2008/jan/03education.htm

[9] 'Eleventh plan will be the education plan: PM', 11 January 2008, http://www.siliconindia.com/shownews/38448

[10] See *Tapping America's Potential: The Education for Innovation Initiative* (2005) at http://www.businessroundtable.org/publications/publication.aspx?qs=2AF6BF807822B0F1AD1478E

[11] Research Insight (2008) A Study on the IT Labour Market in the UK, Report Commissioned by The Council of Professors and Heads of Computing (CPHC), http://www.cphc.ac.uk/publications.php

[12] This interview was conducted as part of a three-year project funded by the UK's Economic and Social Research Council (ESRC). It examined corporate global strategies and the future of skills. The principal researchers are Phillip Brown, Hugh Lauder and David Ashton. The project ran from 2004-7 and a follow-up study will be undertaken in 2009, funded by the ESRC under the auspices of the Centre for Skills, Knowledge and Organisational Performance (SKOPE). http://www.cardiff.ac.uk/socsi/contactsandpeople/phillipbrown/index.html

[13] See the Higher Education Statistic Agency's website http://www.hesa.org.uk

[14] See *Tapping America's Potential: The Education for Innovation Initiative* (2005) at http://www.businessroundtable.org/publications/publication.aspx?qs=2AF6BF807822B0F1AD1478E

[15] See ILO (2005) *Global Employment Trends for Youth*, http://www.ilo.org/public/english/employment/strat/download/gety06en.pdf

[16] Post-secondary awards:

First professional degree. Completion of the degree usually requires at least three years of full-time academic study beyond a bachelor's degree.

Doctoral degree. Completion of a PhD or other doctoral degree usually requires at least three years of full-time study beyond a bachelor's degree.

Master's degree. Completion of the degree usually requires one or two years of full-time academic study beyond a bachelor's degree.

Bachelor's or higher degree, plus work experience. Most occupations in this category are management occupations. All require experience in a related non-management position for which a bachelor's or higher degree is usually required.

Bachelor's degree. Completion of the degree generally requires at least four years, but not more than five years, of full-time academic study.

Associate degree. Completion of the degree usually requires at least two years of full-time academic study.

Post-secondary vocational award. Some programs last only a few weeks, while others may last more than a year. Programs lead to a certificate or other award not a degree.

Work-related training. Work experience in a related occupation. Many occupations requiring work experience are first-line supervisor/managers of service, sales and related production; or are management occupations.

Long-term on-the-job training. More than 12 months of on-the-job training or combined work experience and formal classroom instruction are needed for workers to develop the skills necessary to be fully qualified. This category includes formal and informal apprenticeships that may last up to five years. It also includes intensive occupation-specific, employer-sponsored programs that workers must successfully complete.

Moderate-term on-the-job training. Skills needed to be fully qualified can be acquired during one to 12 months of combined on-the-job experience and in-formal training.

Short-term on-the-job training. Skills needed to be fully qualified can be acquired during a short demonstration of job duties or during one month or less of on-the-job experience or instruction.

[17] Also see Brown, P. and Hesketh, A. (2004) *The Mismanagement of Talent*, Oxford: Oxford University Press.

[18] Level 4+ = masters or PhD degree, university or CNAA degree, other professional (e.g. law, medicine) teaching, nursing (e.g. SCM, RGN, SRN, SEN), NVQ level 4 (or SNVQ4) or HNC/HNC (or SHNC/SHNC); Level 3 = GCE 'A' level or GNVQ advanced, SCE higher or SLC/SUPE higher, certificate of 6th year studies university certificate/diploma (not degree), SCOTVEC national certificate, SCOTBEC/SCOTBEC certificate, completion of trade apprenticeship, NVQ level 3 (or SNVQ 3) or ONC/OND (or SNC/SND); Level 2 = GCSE A*-C or GNVQ intermediate or GCE 'O' level or CSE grade 1 or school certificate of matriculation, SCE standard (1-3)/ordinary (A-C) or SLC/SUPE lower, clerical/commercial (e.g. typing or bookkeeping), professional qualification without sitting exam, NVQ level 2 (or SNVQ 2); Level 1 = GCSE D-G or CSE (other than grade 1) or GNVQ foundation, other, NVQ level 1 (or SNVQ 1); No qualifications = none reported.

Source: Alan Felstead, Duncan Gallie, Francis Green and Ying Zhou, *Skills at Work, 1986 to 2006*, ESRC Centre on Skills, Knowledge and Organisational Performance based at the Universities of Oxford and Cardiff, 2007.
http://www.skope.ox.ac.uk/WorkingPapers/2006SkillsSurvey.FinalDraft4.pdf p.38

[19]See Hesketh, A. (2005) *The Knowledge-Based Economy in Wales: A Comparative Analysis*, National Assembly of Wales, See also Brown, P and Smetherham, C. (2005) *The Changing Graduate Labour Market: A Review of the Evidence*, National Assembly of Wales.

[20] This classification still depends on the occupational categories defined in the SOC 2000, which may over-estimate the demand for university trained 'knowledge' workers. This is why we need to combine both occupational and income data in order to examine both within as well as between group differences. Our argument is that social class remains of central importance but our understanding of employment relations ('market' as well as 'work' situation) need to take account of the fundamental changes taking place in today's domestic and global economies.

[21] Much of the evidence on outsourcing and offshoring is from commercial consultancy companies that often have a vested interest in creating a 'head of steam' in the business community. Their message is blunt: 'start to offshore or lose your competitive advantage'.

[22] Calculations made by the Economic Policy Institute point out that in the period between 2000 and 2004, 102,000 Indian software jobs (producing exports to the US) have been created while the US faced a decrease of 154,000 software jobs in between 2000 and 2002. See EPI (2004) *Offshoring Issue Guide* at http://www.epinet.org/

[23] See also Arora, A. (2000) 'Software Development in Non-Member Countries: The Indian Case', OECD *Information Technology Outlook*, Paris: OECD, p.140.

[24] A T Kearney Consultants http://www.atkearney.com/main.taf?p=1,5,1,130

[25] McKinsey Global Institute, *The Emerging Global Labour Market*, June 2005.

[26] OECD 2006, *Information Technology Outlook, 2006*, Paris: OECD.

[27] A. Blinder 2007, How Many U.S. Jobs Might be Offshorable? CEPS Working Paper No.142, March. http://econpapers.repec.org/paper/pricepsud/60.htm

[28] ibid. A. Blinder, 2007, p.1.

[29] ibid OECD, 2007:7. *Offshoring and Employment: Trends and Impacts*,
http://www.oecd.org/document/22/0,3343,en_2649_33927_38743126_1_1_1_1,00.html

[30] 'The missing statistic: U.S. Jobs Gone Abroad' *The International Herald Tribune*, October 6 2003, original source: The New York Times.

However, right-wing economists in the US and Britain suggest that there are substantial gains to the US economy through outsourcing, namely that it will reduce the price of software making it available to SMEs in the US for whom it has hitherto been prohibitively expensive. This is turn will lead US companies to move up the value chain and increase the skills demanded of their employees. See Mann, C. L. (2003) *Globalization of IT Services and White Collar Jobs: The Next Wave of Productivity Growth*, Institute for International Economics, International Economic Policy Briefs, No. PB03-11, December, www.iie.com; McKinsey & Company (2004), *Offshoring: Is It a Win-Win Game?* www.mckinsey.com/knowledge/mgi/offshore/; Martin Wolf (2004) *Why Globalization Works*, London: Yale University Press.

[31] Our interviews to date clearly suggest that some emerging economies have entered the competition for high-skilled work. These interviews are part of a three-year project funded by the UK's ESRC. See Footnote 12 above.

[32] See 'Global R&D Report, 2008, *R&D Magazine*, September 2007. http://www.rdmag.com/pdf/RD79GlobalReport.pdf

[33] Michaels, et al. (2001) argue that this reflects increasing differences in the talents and market value of managers. In other words the global marketplace increasingly exposes the strength and weaknesses of individual employees, which are reflected in their incomes and other benefits.

[34] See United Nations Conference on Trade and Development (UNCTAD) World Investment Report 2005: Transnational Corporations and the Internationalization of R&D, pp.88-9, www.unctad.org/wir

[35] See 'Motorola eyes research China 3G market', http://www.cn-c114.net/577/a318213.html (accessed 30/6/2008). See also http://www.motorola.com.cn/en/about/inchina/default.asp

[36] http://www.unctad.org/Templates/Webflyer.asp?docID=6337&intItemID=2068&lang=1

[37] 'E.U. Enlargement to Open Way for Up to 3 Million Migrants from East', *Deutsche Press-Agentur*, 4 August 2003. http://web.lexis-nexis.com/executive/

[38] Notes for Figure 15.

[*]This category of workers corresponds to professionals, technicians as defined in the International Standard Classification of Occupations (ISCO-88).

Professionals (ISCO group 2) include physical, mathematical and engineering science professionals (physicists, chemists, mathematicians, statisticians, computing professionals, architects, engineers), life science and health professionals (biologists, agronomists, doctors, dentists, veterinarians, pharmacists, nursing), teaching professionals, and other professionals (business, legal, information, social science, creative, religious, public service administrative).

Technicians and associate professionals (ISCO group 3) includes: Physical and engineering science associate professionals, life science and health associate professionals, teaching associate professionals, other associate professionals (finance, sales, business services, trade brokers, administrative, government, police inspectors, social work, artistic entertainment and sport, religious).

[**]Data are not available for Iceland, Japan, Korea and Turkey, which are excluded from the OECD total.

[***]Country of origin is unknown for a significant number of employees who have been excluded from the calculation.

[39] Joel D. Adriano (2008) 'Politics of Poverty in the Philippines' *Asia Times Online*, March 21.

[40] David L. Llorito (2006) 'Brain drain saps the Philippines economy' *Asian Times Online*, June 20.

[41] See Robert Reich, *The Work of Nations*, New York: Simon and Schuster, 1991.

[42] Ohmae, 2000 *The Invisible Continent*, p.64 London: Nicholas Brealey.

[43] Stephen Roach, 'From Globalization to Localization' in Morgan Stanley, Perspectives, January 07 2007.

[44] The rates of return to tertiary education are calculated by comparing the benefits and costs with those of upper-secondary education. In Sweden, the theoretical length of standard tertiary courses is used in the calculations rather than the average theoretical length of different programmes.

[45] The within-group inequality in earnings for college graduates is not only far greater than that of the lower skilled, it has also been growing more rapidly, whereas non-graduates experienced a slow or no growth in within-group variance in earnings. See Lemieux, T., (2003) Residual Wage Inequality: A re-examination, University of British Columbia, CLEER Working Paper 2, http://www.econ.ubc.ca/cleer/papers/cleer002.pdf

[46]All lifetime earnings are calculated on a 40-hour week, 52-week year, over 40 years.

[47] See US Census Bureau, Current Population Survey (2005) http://www.census.gov/population/www/socdemo/education/cps2004.html

[48] See 'Cows are better off than half the world' at http://www.guardian.co.uk/environment/2002/aug/22/worldsummit2002.earth4 and Oxfam's 'People Before Cows: Setting the Standards for Cancun' at http://www.oxfam.org.uk/what_we_do/issues/trade/downloads/people_before_cows.pdf

[49] ILO report 'A fair globalisation…', Feb 2004, makes the point that many countries, especially in sub-Saharan Africa remain outside this global market, therefore in many respects we are only talking about a partial globalisation which is important to remember when one discusses changes in world employment levels.

[50] Legislative action began with the Jobs for America Act introduced in the Senate by Thomas Daschle and other leading Democrats. The United States Workers Protection Act, presented in Senate by Christopher Dodd of Connecticut, seeks to prevent taxpayers' money from being used to outsource or offshore jobs formerly done in the US Mr Dodd suggests that 'workers in Connecticut and across the nation are first rate. It simply does not make sense to export their jobs and futures halfway around the world to save a few pennies. This administration needs to get its priorities straight and use taxpayers' dollars to invest in America - American workers and small business owners. This legislation is a step towards stopping the needless export of American workplaces.' See Sridhar Krishnaswami (2004) 'New Bill in U.S. Against Outsourcing', *Today*, 20 February.
http://www.hindu.com/2004/02/20/stories/2004022005480100.htm

[51] http://obama.senate.gov/press/070802-senators_durbin/

[52] Willem Buiter and Anne Sibert (2008) 'The dangerous protectionism of Barack Obama',
http://www.voxeu.org/index.php?q=node/953

[53] See Box 1.3 FDI Prospects, p.35, 2005, www.unctad.org/wir

[54] Lawrence Summers, 'A strategy to promote healthy globalisation', *Financial Times*, 5 May 2008.
http://www.ft.com/cms/s/0/999160e6-1a03-11dd-ba02-0000779fd2ac.html

[55] These ideas are developed in Brown, P., Green, A. and Lauder, H. (2001) *High Skills: Globalization, Competitiveness and Skill Formation*, Oxford: Oxford University Press; Ashton, D., Green, F., James, D. and Sung, J. (1999) *Education and Training for Development: The Political Economy of Skill Formation in East Asian Newly Industrialised Economies*, London: Routledge.

[56] Extracted from Tony Blair's keynote speech to the Labour Party's 2005 Conference in Brighton, UK.
http://newsvote.bbc.co.uk/mpapps/pagetools/print/news.bbc.co.uk/1/hi/uk_politics/4287370.stm