## Commentary

Martin Weale and Garry Young

EMU entry date

An analysis of interest rate differentials on long-term securities suggests that from 2003 onwards short-term interest rates in Britain are expected to be only ¼% above those in Germany, with the differential disappearing completely from 2005.

- This probably indicates that financial markets expect Britain to join EMU in about five years time

The differential in expected interest rates in the five years before Britain is expected to join can be used to calculate the rate at which Britain is expected to join. We make the assumption that sterling is expected to depreciate at a rate equal to the interest rate differential.

Markets expect £1=DM2.63

- Markets are expecting sterling to join EMU at £1=DM2.63

We can similarly use interest rate differentials to assess expected exchange rate movements against other countries and allow for differential inflation rates to project movements in real exchange rates.

A 5% overvaluation

- At the rate at which sterling is expected to be locked into EMU, the real exchange rate, measured in terms of relative unit labour costs, is likely to be just over 5% above its average for the period 1984-1996.
- The current high level of the exchange rate has so far had little effect on the economy. We think, however, that the effects have simply been delayed and we do not infer that it would be sensible to join EMU with an overvalued exchange rate.
- The government should aim for an entry rate of close to DM 2.50. If Britain experiences faster cost inflation than Germany in the mean time, then the entry rate should be reduced to offset this.

Fiscal fine-tuning needed

The government could indicate that it thought DM 2.50 a sensible entry rate by joining the ERM with DM 2.50 as a central rate. This might lead to an early fall in sterling of perhaps 2½% and as a response to the Monetary Policy Committee keeping interest rates ½% point higher than the markets are currently expecting for the next five years.

EMU membership is likely to lead to an inflation rate more volatile than the current arrangements should deliver.

- The Bank of England can set the interest needed to control inflation in the United Kingdom, while the European Central Bank has to set a single rate for the whole of the monetary union.

If inflation is to be controlled as well as at present, the government will have to replace monetary fine-tuning with fiscal fine-tuning.

## The UK Economy

Marie Sheldon and Garry Young

After nearly 3½% this year, the growth rate of the economy is expected to slow to 2% in 1998. Growth is likely to be restrained by a combination of

- Monetary tightness
- Fiscal stringency
- The continuing high value of sterling

In 1997 growth has been supported by

- Windfall payments, raising consumer spending by about ¾ %
- Unexpectedly buoyant exports of goods, which have grown by 5% more than sterling's strength would have suggested.

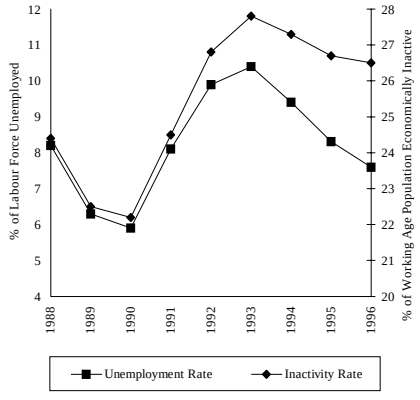
Our central assumption is that key asset prices, sterling, equity prices and the price of long-term government debt will remain close to current levels, even though they are all now substantially outside recent historical ranges. However, sharp changes in any of these could change the prospect for the economy substantially.

Modest pressure on costs

In real terms earnings have grown at less than 1 per cent per annum since 1990. With claimant unemployment now falling below 1.5 million we now expect more upward pressure on earnings. However, the fall in unemployment has not been matched by a fall in the number of economically inactive people of working age and, for this reason we do not expect the inflationary pressure to be very great. The upward pressure on costs has yet to appear in the GDP deflator which rose by 2.3% between 1996Q2 and 1997Q2.

Sharp rises in industrial production and retail sales in July and August as compared with April and May suggest that rapid growth has continued in the third quarter and we think it likely that the Monetary Policy Committee will raise interest rates again later this year. We anticipate a blip in retail price inflation early next year and have assumed that this will trigger a second increase taking the short-term interest rate to 7½% p.a. next year. However, neither increase is necessary in order to control inflation. If the interest rate stayed at 7% throughout 1998 RPIX inflation would still be under 2½% in two years time.

No need for further interest rate rises




The outlook for both the PSBR and the balance of payments current account is excellent. The PSBR is expected to fall to about £3billion in 1998/99, and the balance of payments is expected to show a small surplus this year followed by a small deficit next year.

Recession risk

Our forecast, like all forecasts is uncertain. There is a 1 in 8 chance that output will be lower in 1998 than it was in 1997. However, the quarterly growth profile in 1997 means that if output in 1998 did not increase over the level we expect to be reached in 1997 Q4, average output in 1998 would still be 1% higher than in 1997. The change of average growth falling below this we put at 25% and give this as the probability of a recession in 1998.

## Productivity, Machinery and Skills in the United States and Western Europe

Geoff Mason and David Finegold

Mass higher education helps economic performance

The development of a US-style mass higher education system in Britain could contribute substantially to British economic performance, according to a new comparison of American, British and Continental European manufacturing plants carried out by Geoff Mason (of the National Institute of Economic and Social Research) and David Finegold (based at the University of Southern California).

In general, US plants' access to a relatively large supply of technical graduates has both helped meet their increased demand for high-level skills and also provided a way of substituting for scarce intermediate-level (technician and supervisory) skills.

However, the study found many employers on both sides of the Atlantic who believe that their skill needs are best met by employing a **mix** of graduates from full-time educational courses and other people who have gained their skills through structured employment-based training (combined with part-time attendance on college courses).

This is now reflected in growing, albeit scattered efforts by employers in different parts of the US to develop co-operative apprentice-type training schemes. But the authors suggest that, in respect of employment-based training, Britain is arguably starting from a much better position than the US. Although apprenticeship training has declined sharply in Britain over the last 20 years, a substantial base still exists on which to rebuild this mode of skills development (as is now being attempted through the 'Modern Apprenticeship' programme).

American workers accept the importance of retraining

In the light of these new US–European comparisons, perhaps the most striking feature of the American education and training system is the willingness of a relatively large proportion of adult workers to invest their own time and money in retraining and in further and higher education (and also the willingness of many employers to provide assistance with tuition fees and other expenses while they are doing so).

A full investigation of the pattern of incentives motivating this pattern of adult part-time education and training in the US could provide ideas for new policies to encourage the growth of adult self-investment in education and training in Britain.

# Economic Growth in East Asia and Western Europe Since 1950: Implications for Living Standards

N.F.R. Crafts
(London School of Economics)

Comparisons of living standards analysed

This article examines conventional comparisons of living standards based on the level and rate of growth of real GDP/head and argues that they are frequently misleading, especially when used in comparisons between East Asian and Western European countries. The author, Nicholas Crafts is Professor of Economic History at the London School of Economics.

The problems arise partly because differences in trends in labour inputs per person are generally ignored but also reflect the fact that countries' relative performances on different components of well-being vary substantially. Alternative indices of well-being are described and considered including the Human Development Index and a Quality of Life Index devised by Dasgupta and Weale. A method of adjusting measures of economic growth to allow for changes in time spent in market work is proposed and implemented. Adjusted growth rates for 1950–73 and 1973–92 and various indices of well-being for 1992 are presented for 24 countries together with detailed comparisons of hours worked and output per hour worked.

Main findings are:

- Countries vary markedly in hours of market work per year relative both to total population and per person employed. Generally speaking, hours worked are much longer in East Asia than in Western Europe.
- Hong Kong, Singapore and Japan all lagged behind Britain in terms of real GDP/hour worked in 1992 despite having higher real GDP/head.
- Adjusting for different trends in market work time per person, recent economic growth in East Asia is revealed not to be miraculous but to be similar to that experienced by Western European countries like West Germany and Spain in their period of rapid catch-up growth in the 1950s and 1960s.

Disparities between world rankings in terms of quality of life and real GDP/person measurements

- Comparisons for 1992 of levels of real GDP/person with real GDP/hour worked, a variant of the Human Development index and a variant of the Dasgupta and Weale index show some marked variations in country rankings. For example, the USA was top on real GDP/person but only 10$^{th}$ equal on Quality of Life, Hong Kong was 5$^{th}$ on real GDP/person but only 13$^{th}$ on the Human Development Index, while the Netherlands was 13$^{th}$ on real GDP/person but 3$^{rd}$ on Quality of Life.
- Close examination of the Quality of Life index reveals that country rankings can be highly sensitive to the weightings chosen to aggregate the components into one overall index, a matter on which there is no consensus.
- Taken together, these last two points imply that the much-cited league tables of real GDP per person are not very reliable indicators for the comparison of living standards in Western Europe with those in East Asia.
- Nevertheless, the UK's rank order position in 1992 was fairly similar on all the measures reviewed (in the range 15$^{th}$ to 17$^{th}$) and not very sensitive to the weighting problem.

## There Is No Silver Bullet: Investment and Growth in the G7

Chrys Dougherty and Dale W. Jorgenson
(University of Texas and Harvard University)

Investment the main source of economic growth

Growth in economic output can be explained by growth in labour input and investment in capital, with the unexplained component called productivity growth. Early studies suggested that economic growth *per capita* was attributable mainly to productivity growth. However, more careful measurement of changes in labour and capital input suggests that the main source of economic growth is investment, either in physical capital or, through education, in improving the quality of labour supplied. This definition of productivity differs from that usually adopted and leads to rather different views about economic performance.

**Growth in output and input per capita and productivity —G7 countries, 1960–1989** *(Average percentage growth rates)*

| | US | Canada | UK | France | Germany | Italy | Japan |
|---|---|---|---|---|---|---|---|
| *Output per capita:* | | | | | | | |
| 1960–73 | 2.51 | 3.32 | 2.80 | 4.30 | 3.77 | 4.79 | 8.18 |
| 1973–89 | 1.72 | 2.61 | 1.62 | 2.01 | 2.20 | 2.89 | 3.12 |
| 1960–89 | 2.07 | 2.93 | 2.15 | 3.04 | 2.91 | 3.74 | 5.39 |
| *Input per capita:* | | | | | | | |
| 1960–73 | 1.70 | 2.23 | 0.88 | 1.98 | 1.20 | 0.81 | 2.43 |
| 1973–89 | 1.39 | 2.34 | 0.95 | 0.62 | 1.26 | 2.34 | 2.06 |
| 1960–89 | 1.53 | 2.29 | 0.92 | 1.23 | 1.23 | 1.65 | 2.23 |
| *Productivity:* | | | | | | | |
| 1960–73 | 0.81 | 1.09 | 1.92 | 2.32 | 2.57 | 3.97 | 5.75 |
| 1973–89 | 0.32 | 0.28 | 0.67 | 1.40 | 0.94 | 0.55 | 1.07 |
| 1960–89 | 0.54 | 0.64 | 1.23 | 1.81 | 1.67 | 2.09 | 3.16 |

- Between 1973 and 1979 the UK had the slowest rate of growth of output of the G7 countries
- UK productivity grew faster than the US, Canada and Italy
- However slow growth in capital and the quality of labour offset this.

In 1960 UK output per capita had been higher than that of France, Germany, Italy and Japan although only 2/3rds of that of the United States. By 1989 output per capita in the UK was the lowest of the G7 countries. However the gap relative to the US had not changed.

- Productivity levels in 1989 were slightly below those of the US and Canada, and above those in Germany and Japan
- The quality-adjusted capital stock in the UK was only about half of that in the United States
- In 1989 hours worked per capita were higher than in France and Italy, but about 10% lower than in the United States and 2/3rds of those worked in Japan. Labour quality was only about 5% lower than in the United States on average.

Thus the main causes of Britain's low level of output relative to the United States are the lower number of hours worked in Britain and the lower capital stock.

Numbers of hours worked remains stable

Looking at the G7 as a whole, it is found that the dispersion across the G7 countries of the capital stock per capita has declined since 1960, although there has been little fall since 1980. The variability in the number of hours worked has, by contrast showed no sign of falling. The output variability across the sample declines markedly between 1960 and 1973, but has not fallen since then. This suggests that, while the UK has not converged on US levels of output per capita, other countries did so until 1973, but have since not converged much further.

The general impression is that economies tend to converge to some extent but that some differences in per capita output are likely to persist.

# Industrial Productivity and Competitiveness: Introduction

**Nicholas Oulton**

The four articles which follow are all devoted to the theme of productivity. They should be seen as contributions to a long lasting and on-going debate first on how to measure productivity and second on how to explain its growth and the differences between countries in its level.

Dougherty and Jorgenson consider the growth of output and the role of investment in the G7 countries over the period 1960 to 1989. Their approach is characterised by a vast amount of detailed estimation and data processing in order to obtain the best possible estimates of the inputs, following the methodology which Jorgenson and his various collaborators have pioneered. Their paper also contains a detailed review of the history of productivity measurement and a discussion of many of the conceptual issues debated over the years.

They find many striking differences between these apparently similar countries. For example, hours worked per capita in France were only 75% of the US level in 1989; in Britain they were 89%. On the other hand hours worked per capita in Japan were 41% higher than in the US

The first major conclusion of their article is that differences between the levels of output per capita in the G7 are now largely explained by differences in the levels of the inputs. Differences in what they call simply "productivity", but which others refer to as "total factor productivity" or "multifactor productivity" or "the residual", have now largely disappeared. For example in the British case, output per capita was 66% of the US level in 1989, about the same percentage gap as in 1960. The 1989 gap can be partly explained by fewer hours worked in Britain and a somewhat less well educated labour force, but most of it is due to the fact that capital per head is only 47% of the US level.

In calculating the contribution of labour, Dougherty and Jorgenson make allowance for rising educational levels. Here their results are likely to be controversial since they find that what they call "labour quality", which largely reflects educational levels, in France was only 74% of that in Britain, which in turn was a little higher than in Germany. Since replication is how science progresses, it is to be hoped that others will be spurred to make their own contributions here.

Their second major conclusion is that investment in the broad sense, which includes additions to both human and physical capital, can account for the bulk of the growth in output per capita which the G7 countries have enjoyed over this period. The "silver bullet" of their title is a policy which can raise the growth rate without requiring the sacrifice of consumption and leisure. Their conclusion is that such a policy does not exist.

My own contribution arrives at a similar conclusion to this last one by a different route. I present estimates of the growth rates of output, labour and capital inputs for 53 countries, including 22 in the OECD and 5 in East Asia, over the period 1965 to 1990. These estimates use a more broad brush approach than those of Dougherty and Jorgenson, though the labour input measures make allowance for rising educational levels and the capital input measures distinguish five types of capital. Averaged over all 53 countries, the growth of total factor productivity was only 0.24 per cent per annum, compared with growth of output per worker of 2.04 per cent per annum. Total factor productivity growth was highest in East Asia, but so was output per worker growth, so here just as in the OECD most of output growth can be accounted for by input growth. I also discuss the interpretation of total factor productivity growth and the effect of various sorts of error in the data on the estimates.

Mason and Finegold employ a case study approach applied to two industries, biscuit manufacturing and precision engineering. Their article is in a long tradition of work at the Institute which seeks to illuminate and get behind statistical findings by analysis on the ground. In biscuits, based on plant visits they find US labour productivity levels to be 25-40% higher than Dutch, French and British ones. In precision engineering, US labour productivity was two thirds higher than in Britain and 25% above the Dutch level.

In the US, both industries benefit from the economies attendant on much longer production runs. This reflects the less integrated nature of the European market and in the case of biscuits probably a wider range of tastes. Compared to continental Europe, though not to Britain, the US shop floor workforce is low on intermediate skills. However, this deficiency is partially remedied by greater employment of graduate engineers in the US Mason and Finegold also find that part of the explanation for the US-UK labour productivity gap is that the US industries employ more capital per worker than the British ones. This is consistent with the Dougherty-Jorgenson finding of much higher capital per worker in the US at the whole economy level.

GDP per capita and living standards are not the same, as the article by Crafts reminds us. Leisure is also part of a person's standard of living. Crafts discusses how leisure might be valued and elects to measure it conservatively by the wage rate. He presents estimates of GDP corrected for changes in the amount of leisure for 24 countries, 19 from Europe and North America and 5 from East Asia. In recent years, hours worked per person have been falling in the OECD but rising in East Asia (except Japan). So the effect of his adjustments is to make OECD growth look better and East Asian growth less impressive.

Crafts also widens the debate by including other indicators of welfare in addition to labour productivity: unemployment, life expectancy at birth, infant mortality, the average level of schooling, and measures of political and civil rights. He discusses various ways in which these indicators can be weighted together to produce an overall measure. He finds that no country dominates on all measure, but that in general the East Asian countries do less well relative to Europe and North America when these broader indicators are allowed their say.

## The World Economy

Ray Barrell, Julian Morgan, Nigel Pain and Florence Hubert

The world economy can expect a period of strong growth with moderate inflation

The continental European economies have recovered from the recession of the early 1990s, although unemployment is expected only to fall from around 11% in 1997 to 9% early in the next century. We have seen strong growth in 1997, especially in the UK, Netherlands, Finland, Ireland, Portugal and Spain. Tighter fiscal policies designed to meet the Maastricht guidelines mean unemployment will fall slowly.

Unemployment in North America has probably reached a cyclical low point, and it is expected to rise as growth slows down from 4% this year to 2½% next year. Developments in East Asia are expected to reduce world trade growth by around 1½ per cent next year. The Japanese economy has slowed but not yet collapsed. Growth in Japan is projected to be just under 2½% next year, although there is a risk that export growth will be affected by the turbulence of East Asian exchange rates.

The prospects for Monetary Union are good

- Only Greece fails the inflation, debt and deficit tests.
- Sweden and Denmark may choose to stay outside, but they have fully converged, and their budget deficits are small or in surplus.
- The UK could also join, perhaps at a later date. It passes the inflation, debt and deficit tests, for entry.
- Spain and Portugal are now expected to join in the first wave, and their interest rates are similar to those in France and Germany.

- Ireland continues to grow at more than 6% a year, and some inflationary pressures are emerging, although the strong exchange rate is keeping them in check.
- Spain and the Netherlands are also growing strongly and are near to full capacity.
- Growth in Germany has picked up, and may rise from 2½% this year to 3.0% next year. Spare capacity in the economy will ensure inflation is subdued.
- Italy is held back by a strong exchange rate and tight monetary and fiscal policies. Growth is expected to pick up from 1% this year to 2¼% next

| | GDP Growth (per cent) | | | | | Inflation (per cent)[a] | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1997 | 1998 | 1999 | 2000 | | 1997 | 1998 | 1999 | 2000 |
| Austria | 1.7 | 2.6 | 2.2 | 2.3 | Austria | 2.1 | 2.5 | 2.5 | 2.4 |
| Belgium | 2.2 | 2.8 | 2.4 | 2.5 | Belgium | 1.6 | 1.8 | 2.5 | 2.7 |
| Denmark | 2.7 | 2.8 | 2.7 | 2.5 | Denmark | 2.1 | 2.8 | 2.7 | 2.6 |
| Finland | 4.5 | 3.8 | 3.7 | 3.1 | Finland | 0.8 | 1.8 | 2.2 | 2.3 |
| France | 2.2 | 2.8 | 2.6 | 2.4 | France | 1.5 | 1.7 | 1.6 | 1.7 |
| Germany | 2.4 | 2.8 | 2.4 | 2.4 | Germany | 1.7 | 1.9 | 1.8 | 2.2 |
| Greece | 3.0 | 3.2 | 3.1 | 3.0 | Greece | 6.0 | 5.4 | 5.4 | 5.4 |
| Ireland | 6.7 | 5.9 | 5.0 | 4.2 | Ireland | 1.7 | 3.0 | 2.1 | 2.1 |
| Italy | 1.1 | 2.3 | 2.5 | 2.7 | Italy | 2.4 | 2.9 | 2.8 | 3.1 |
| Netherlands | 3.0 | 3.4 | 2.3 | 2.3 | Netherlands | 2.3 | 2.5 | 2.5 | 2.3 |
| Portugal | 3.2 | 3.5 | 3.0 | 2.6 | Portugal | 2.6 | 2.0 | 2.2 | 2.2 |
| Spain | 3.1 | 3.4 | 3.4 | 2.9 | Spain | 2.3 | 2.3 | 2.8 | 2.8 |
| Sweden | 2.3 | 2.8 | 2.4 | 2.7 | Sweden | 0.9 | 1.9 | 2.2 | 2.3 |
| UK | 3.5 | 2.1 | 1.8 | 2.5 | UK | 2.2 | 2.6 | 2.2 | 2.3 |
| | Fiscal Deficit (% of GDP)[b] | | | | | Debt Stock (% of GDP)[c] | | | |
| | 1997 | 1998 | 1999 | 2000 | | 1997 | 1998 | 1999 | 2000 |
| Austria | -3.0 | -2.6 | -1.7 | -1.3 | Austria | 70.1 | 69.1 | 67.6 | 65.7 |
| Belgium | -2.8 | -2.5 | -2.2 | -2.0 | Belgium | 125.0 | 121.8 | 118.2 | 114.2 |
| Denmark | 0.4 | 0.7 | 0.6 | 0.5 | Denmark | 66.4 | 62.0 | 58.1 | 54.6 |
| Finland | -1.9 | -1.1 | -1.1 | -0.9 | Finland | 57.5 | 55.4 | 53.2 | 51.3 |
| France | -3.1 | -3.0 | -2.7 | -2.6 | France | 57.1 | 57.5 | 57.7 | 57.8 |
| Germany | -3.0 | -2.5 | -2.3 | -1.8 | Germany | 61.0 | 59.6 | 58.7 | 57.3 |
| Greece | -5.0 | -3.6 | -3.4 | -2.8 | Greece | 107.2 | 102.1 | 97.2 | 92.2 |
| Ireland | -0.3 | 0.3 | 0.6 | 0.5 | Ireland | 67.4 | 61.3 | 56.4 | 52.4 |
| Italy | -3.4 | -3.2 | -2.8 | -2.3 | Italy | 122.5 | 118.8 | 114.7 | 109.8 |
| Netherlands | -1.9 | -1.7 | -1.6 | -1.5 | Netherlands | 75.8 | 73.1 | 71.2 | 69.4 |
| Portugal | -2.9 | -2.5 | -2.0 | -1.8 | Portugal | 63.7 | 60.0 | 58.8 | 57.8 |
| Spain | -2.9 | -2.3 | -2.2 | -2.0 | Spain | 68.8 | 66.2 | 64.2 | 62.3 |
| Sweden | -2.0 | -1.2 | -0.6 | -0.9 | Sweden | 77.1 | 74.7 | 71.8 | 69.1 |
| UK | -2.3 | -0.7 | -0.6 | -1.0 | UK | 52.7 | 50.7 | 49.0 | 47.4 |

Notes: (a) Consumers' expenditure deflator. (b) General government financial deficit, calendar year. (c) Maastricht definition, end of year. (d) Growth in GDP at market prices. UK growth in GDP at factor cost is 3.4% in 1997 and 2.0% in 1998. The forecasts for 1999 and 2000 are unchanged.

# Total Factor Productivity Growth And The Role Of Externalities

Nicholas Oulton

Economic growth can be explained by the accumulation of human capital

This article argues that, in recent times and all over the world, the greater part of economic growth can be accounted for by the accumulation of human and physical capital. And this accumulation is by and large rewarded by the market. It follows that the role of externalities is relatively small. In other words, the social rate of return to investment is about equal to the private rate. A simple policy prescription then follows: to raise the growth rate, we need to increase saving and investment.

The contrary view, often expressed by proponents of the "New Growth Theory", is that externalities, particularly positive ones, are very important for growth. Thus research in universities or education or investment in machinery have all been thought to confer economic benefits greatly in excess of their costs. If this view were correct, the role of the government (or the European Commission) would be to identify the important externalities and then intervene in a detailed way to correct them by means of subsidies and taxes.

Economists employ a tool known as growth accounting for measuring the contribution of different inputs to the growth process. What is left after the contribution of all measurable inputs has been accounted for is known as total factor productivity growth (TFPG). If TFPG is large in relation to the amount of growth to be explained, then externalities must be very important.

Using the largest database currently available, the Penn World Table, TFPG is estimated in 53 countries over the period 1965 to 1990. Five types of physical capital are distinguished and seven levels of educational attainment. Averaged over all 53 countries, TFPG was only 0.24% per annum over this period, while the growth of GDP per worker was 2.04%. For 22 OECD countries, TFPG was 0.46% while GDP per worker grew at 2.45%. TFPG was fastest in 5 East Asian countries, 1.60%, but GDP per worker was fastest there too at 4.63%. In other words, even in the fastest growing economies, TFPG and hence the role of externalities is small in relation to growth. Most growth is explained by the accumulation of human and physical capital.

Problems of cross-country comparisons analysed

It is true that there are many problems in measuring outputs and inputs and in making cross-country comparisons, which the article discusses. But there are reasons for thinking that improvements in measurement would if anything reduce the role of TFPG still further, thus strengthening the argument.

If raising saving and investment is the key to raising the growth rate, what sort of payoff can be expected? If as argued externalities are small, then the private and social rates of return are about equal. In advanced countries, the private rate of return to physical investment is fairly low. The cost of capital is around 5–7% per annum and while the actual rate of return may sometimes exceed this, the difference is not likely to be enormous. The private rate of return to human capital may be somewhat higher than the return to physical, at around 7–12% As long as the rate of return exceeds the cost, investment is worthwhile. But these rates of return imply that the payoff to raising either the physical or the human investment rate is not that great. Put another way, increasing the growth rate by a significant amount requires sacrificing much consumption and leisure.