What Have Two Decades of British Economic Reform Delivered in Terms of Productivity Growth?

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For much of the 19th and 20th centuries, the British economy, which pioneered the Industrial Revolution, had a disappointing growth record, falling markedly from the top ranks in the league economic tables. In 1979, the UK was 12th in per capita GDP among advanced OECD countries, well below Germany, France, and other EU economies.[1] In response to this weak economic performance, successive UK governments adopted policies designed to move the economy back to "premiere league" status. Beginning with Mrs. Thatcher and continuing under John Major and Tony Blair, these reforms sought to increase the efficacy of labour and product markets and limit government and institutional involvement in economic decision-making.[2]

Have two decades of economic reform significantly shifted the market orientation of the UK economy relative to other advanced OECD economies, or has the UK only kept pace with its peers? What have the reforms done for aggregate economic output and the average income of citizens? Have the reforms improved the position of the UK in the economic league tables?

This article examines these questions. We first document that during the 1980s and 1990s the UK arrested the relative declines in GDP per capita and labour productivity that had characterized earlier decades, and partially closed the gap in per capita income with France and Germany through relative gains in employment and hours. While the UK did not experience an American-style "New Economy" boom, it combined high employment-population rates with rising real wages for workers: an achievement that the US was unable to match until the late 1990s. We then examine the link between the reforms and outcomes. Since there is no ready counterfactual against which to compare the observed UK performance, our analysis is more judgmental. Based on macro-level analyses and the micro-level evidence available from several companion studies, however, we conclude that economic reforms contributed to halting the nearly century-long trend in relative economic decline of the UK relative to its historic competitors, Germany and France.

Evidence presented in the unabridged version of this article shows that UK governments have made considerable progress in reforming the economy in a pro-market direction over the past two decades. In the late 1970s, the UK was ranked near the middle of all advanced countries in terms of the market friendliness of its institutions, according to several well-known indexes of "freedom of markets" and competitiveness.

Table 1
Real Gross Domestic Product Per Capita
For Various Countries, 1960-1998

	In 1998 U.S. Dollars Using PPP Exchange Rates			Relative to U.S.=100 Based on PPP Exchange Rates		
	1960	1979	1998	1960	1979	1998
United Kingdom	**9,974**	**15,202**	**21,502**	**74**	**68**	**66**
Major Competitors:						
West Germany	9,842	17,769	24,868	73	80	77
France	8,546	17,064	22,255	64	77	69
United States	13,414	22,254	32,413	100	100	100
Other Countries:						
Italy	7,286	15,369	22,234	54	69	69
Austria	7,666	15,817	23,930	57	71	74
Belgium	8,069	16,016	24,239	60	72	75
Denmark	9,793	16,807	26,176	73	76	81
Netherlands	9,351	16,736	24,008	70	75	74
Norway	8,120	16,244	27,581	61	73	85
Sweden	9,894	16,765	21,218	74	75	65
Japan	4,672	14,812	24,170	35	67	75
Canada	10,503	19,099	25,496	78	86	79
UK Rank (out of 13)				**3rd**	**12th**	**12th**

Source: U.S. Bureau of Labor Statistics (2000).

Some indices put the UK even further down, reflecting such factors as the relatively high rate of government ownership, exchange rate controls, and high marginal tax rates. By the late 1990s, however, the UK stood at or near the top of the rankings — close to and in some cases even ahead of the US. To the extent that orthodox economic thinking is correct and a greater market orientation of policy and institutions means better functioning markets and superior economic outcomes, the UK should have benefited from these reforms by an improvement in its relative economic performance. What in fact happened?

Trends in GDP Per Capita Growth and its Components in the UK, 1960-1999

As a starting point, Table 1 presents data from the U.S. Bureau of Labor Statistics (BLS) on the level and rank of GDP per capita for 13 leading countries. Real GDP figures for each country have been converted to a common currency (1998 US dollars) using purchasing power parity (PPP) adjusted exchange rates. A comparison of 1960 and 1979 figures for the UK suggests that prior to 1980, UK relative economic performance was declining relative to the US (from 74 to 68 per cent of the US average) and relative to most other countries, including Germany and France. In 1960, UK output per capita was similar to the level in West Germany and 15 per cent higher than in France. By 1979, GDP per capita in Britain was 15 per cent lower than in West Germany, 12 per cent lower than in France, and a little lower than in Italy. Britain's position in the league table fell from 3rd to 12th. Over the 1980s and 1990s the UK did better. Relative to the US, per capita GDP in Britain fell slightly, from 68 to 66 per cent of the US average. Relative to Germany and France the UK gained slightly. Nevertheless, the UK remained 12th among the 13 countries in the Table.

Table 2
Decomposition of Relative Growth Rates of GDP per Capita Between the United Kingdom and Other Countries

	Difference In Growth Rate of GDP/Capita (1)	Decomposition 1 GDP/Worker (2)	Decomposition 1 Employment/ Capita (3)	Decomposition 2 GDP/Hour (4)	Decomposition 2 Hours/ Capita (5)
A. 1960-1979					
United Kingdom	-0.63	-1.17	0.54	-1.30	0.67
• West Germany	(0.13)	(0.11)	(0.10)	(0.09)	(0.12)
United Kingdom	-1.02	-1.16	0.14	-1.13	0.12
• France(0.13)	(0.11)	(0.08)	(0.10)	(0.12)	
United Kingdom	0.48	0.94	-0.46	1.38	-0.89
• United States	(0.16)	(0.12)	(0.08)	(0.11)	(0.11)
B. 1979-1999					
United Kingdom	0.84	0.21	0.62	-0.08	0.92
• West Germany	(0.13)	(0.10)	(0.10)	(0.09)	(0.12)
United Kingdom	0.76	0.00	0.76	0.08	0.68
• France(0.13)	(0.11)	(0.08)	(0.11)	(0.12)	
United Kingdom	0.05	0.27	-0.23	0.59	-0.54
• United States	(0.15)	(0.12)	(0.09)	(0.11)	(0.11)
C. Difference in Growth Rates: 1979-99 Compared to 1960-79					
United Kingdom	1.47	1.38	0.09	1.21	0.25
• West Germany	(0.18)	(0.14)	(0.14)	(0.13)	(0.17)
United Kingdom	1.78	1.16	0.61	1.21	0.56
• France(0.17)	(0.16)	(0.11)	(0.14)	(0.17)	
United Kingdom	-0.43	-0.66	0.24	-0.79	0.35
• United States	(0.21)	(0.16)	(0.13)	(0.15)	(0.16)

Notes: Entries in column 1 represent the difference in the estimated trend growth rate in GDP per capita between the UK and the comparison country. Decomposition 1 in columns 2 and 3 divides GDP per capita into GDP per employed worker and employment per capita. Decomposition 2 in columns 4 and 5 divides GDP per capita into GDP per hour worked, and hours per capita. Estimated standard errors in parentheses.

Table 2 summarizes decompositions of the changes in the relative rate of growth of GDP per working age adult (age 15-64 in most cases) between the UK and the key comparison countries. We analyze GDP per working age adult rather than GDP per capita to remove the variation in per capita GDP that is attributable to shifts in the fraction of children or elderly in the population, and is thus independent of economic reforms.

The first column of Table 2 shows the growth rate in GDP per working age adult in the UK relative to a particular comparison country. The second and third columns divide this difference into differences in the growth of GDP per worker and employment per working age adult, while the fourth and fifth columns divide the difference into relative growth of GDP per hour and hours per working age adult. Panel A decomposes relative growth rates in the "pre-reform" period (1960-79), Panel B decomposes growth rates in the "reform" period (1979-1999), and Panel C shows the decomposition of the relative change in growth rates between the two periods. For example, Panel A shows that in the 1960-79 period the UK had 0.63 per cent per year slower growth in GDP per working age adult than in West Germany, and 1.02 per cent per year slower growth than in France. This resulted from *slower* relative productivity growth in the UK dominat-

ing a more modest decline in the growth of labour inputs. Relative to the US, on the other hand, the UK had 0.48 per cent faster growth in GDP per working age adult in the 1960s and 1970s, due to relatively faster productivity growth dominating a relative decline in labour inputs.

Panel B shows that in the post-1980 reform era, UK productivity growth was roughly comparable to rates in Germany and France, but the UK had stable or rising labour inputs while Germany, France and most other European nations experienced continuing declines. Thus, the 0.8 per cent per year faster growth in UK GDP per working age adult relative to Germany or France in the 1980s and 1990s was attributable almost entirely to the growth in labour inputs. Again, the contrast with the US is different: relative to the US, the UK had somewhat faster growing productivity but slower growth in labour inputs.

Finally, Panel C shows that the UK accelerated its economic performance relative to West Germany and France in the post-reform period. Relative to Germany, the differential in GDP growth per working age adult shifted from -0.63 per cent per year in the pre-reform era to +0.84 per cent per year in the reform era, for a net relative gain of 1.47 per cent per year. Regardless of whether labour inputs are measured by employment or hours, most of this relative gain is attributable to the larger drop in productivity in Germany than in the UK. A fairly similar story emerges in the comparison to France, although in this case a larger fraction of the UK's relative improvement is attributable to a relative gain in labour inputs in the UK. Benchmarked to the US economy, however, the UK does not fare as well. In the 1960s and 1970s the UK had faster productivity growth than the US, but this was partially offset by relative declines in per capita labour inputs. After 1979, productivity growth slowed down everywhere, but more in the UK than in the US, though productivity growth rates were still faster in the UK. This was only partially offset by the bigger turnaround in the trend toward declining work activity in the UK.

The results in Table 2 show that the post-1979 reform era coincided with a reversal of the historical pattern of slower per capita income growth in the UK than in Germany and France, due mainly to the slower deceleration in productivity growth in the UK. They also show that after 1979 UK labour productivity grew at about the same rate as in Germany and France, but Britain had stable or slightly rising labour inputs per capita, while Germany and France had declining labour inputs. This relative rise in work effort led to higher growth rates in British GDP per capita after 1979. Finally, the comparisons show no apparent turnaround in UK performance relative to the US. Indeed, the comparison of the US to the UK has the same character as the comparison of the UK to Germany/France. The US had a smaller productivity slowdown than the UK and a bigger rise in the rate of growth of labour inputs, with the net result that GDP per capita rose faster in the US than the UK after 1979, whereas the opposite was true before 1979.

Explanations for Differential Trends in Labour Productivity Growth

Much of the improvement in UK economic performance relative to Germany and France is attributable to the closing of the gap in productivity growth rates. Similarly, the worsened performance of the UK compared to the US in the post-1979 period relative to earlier decades is due mainly to the narrowing of productivity growth rate differentials. In this section, we consider three explanations for the shifting trends in labour productivity growth: relative trends in the transition out of agriculture, relative trends in the rate of growth of capital per unit of labour input; and relative trends in the quality of labour.

The Shift Out of Agriculture

One widely recognized source of economic growth is the movement of labour from low productivity sectors such as agriculture to more highly productive sectors such as manufacturing and distribution (e.g. Feinstein, 1999). By 1960, only 5 per cent of workers in the UK were employed in agriculture. In West Germany and France, however, the fractions were 14 and 23 per cent, respectively. The fall in agricultural employment in these countries in the 1960s and 1970s can explain some of their rapid productivity growth in this period. To the extent that the movement out of agriculture was complete by the late 1970s, the slowdown in employment reallocation can also help explain the greater slowdown in productivity growth experienced by Germany and France than the UK or the US. Calculations reported in the unabridged version of this paper suggest that the declining share of agricultural employment can explain one-quarter to one-third of the faster productivity growth of Germany/France than the UK in the pre-1979 period. The slowdown in sectoral reallocation explains about the same fraction of the 1.2-1.4 percentage point greater slowdown in productivity growth in Germany/France than the UK after 1979. As these effects are presumably independent of the reform process in the UK, we will factor them out before attempting to evaluate the contribution of the UK reforms.

Changes in the Capital-labour Ratio

Standard growth accounting exercises decompose the growth rate of labour productivity into three components: changes in the amount of capital available per unit of labour input; changes in the "quality" of labour inputs; and technological change or other efficiency improvements.[3] Since different institutions and policies potentially affect the accumulation of physical and human capital, and the rate of growth of technological efficiency, we next decompose the shifts in the relative trends of UK labour productivity into these three components.

Chart 1
Trends in Capital per Worker

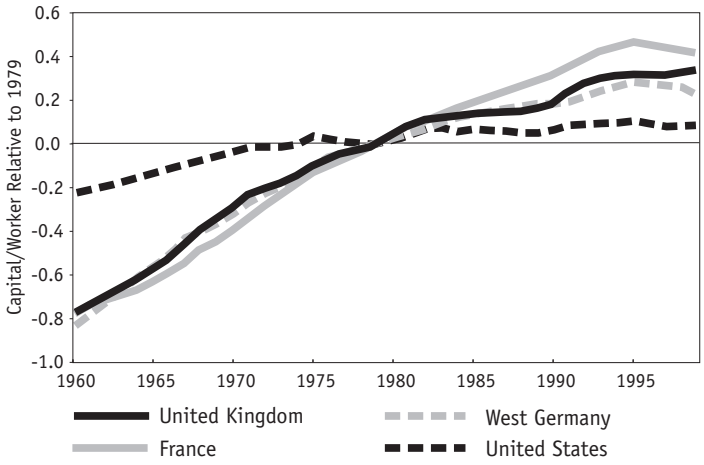

Chart 1 plots the trends in capital per worker for the UK, West Germany, France, and the US from 1960 to 1999, using data on real net physical capital stocks.[4] The growth rate in capital per worker was faster in all three European countries than in the US both before and after 1979. UK growth rates in capital per worker are very similar to those in West Germany, but slower than those in France in the 1980s and early 1990s.

As the growth rates in capital per unit of labour were similar in the UK, West Germany, and France in the pre-1979 period, the relatively slow rate of UK productivity growth in the pre-reform period does not reflect a shortfall in investment relative to employment growth. In all three countries the growth in capital per unit of labour input slowed dramatically after 1979. In the reform era capital per unit of labour input grew at about the same pace in the UK as in West Germany (especially when labour input is measured on an hours basis), and somewhat faster than in France. Based on these comparisons, we believe that investment is not the primary mechanism behind the gains in UK pro-

ductivity growth relative to its European competitors in the period of market reforms. For example, using an hours-based measure of labour inputs, the UK had a 1.21 per cent per year gain in the rate of growth of productivity relative to West Germany after 1979 (see Panel C of Table 2). After adjusting for the impact of changing trends in capital per hour, the relative gain was 1.10 (-0.15+1.25). Similarly, the gain relative to France in the growth of productivity per hour was 1.21 percentage points per year: after adjusting for shifting trends in capital per hour, the relative gain was slightly larger (1.43= -0.15+1.58).

But changing trends in capital growth per unit of labour input go a long way toward explaining the changing relative trends in productivity growth between the UK and the US. Capital accumulation per worker slowed less in the US than in the UK (or Germany/France), and after adjusting for this fact, the trend rates of growth of productivity are very similar in the UK and US. Using an hours-based measure of labour input, the trend growth rate in productivity in the UK net of capital was 1.57 per cent per year in 1960-79, compared to a rate of 1.41 per cent per year in the US. In 1979-99, the trend growth in UK productivity net of capital was 1.42 per cent per year compared to 1.40 per cent per year in the US. Thus, the changing relative trends in productivity growth between the two countries are well explained by the changing relative trends in capital per worker.

Changes in Labour Quality

A final source of growth in labour productivity is rising labour quality, driven by increases in educational attainment or shifts in other skill characteristics of the labour force. Available data suggests that the rise in formal education qualifications was bigger in the UK than in Germany (e.g., Broadberry and Wagner, 1996), although the disappearance of the apprenticeship system in the UK (Blanchflower and Lynch, 1994) suggests that Britain has fallen behind other European countries in one area of skill formation. The unabridged version of this paper evaluates the impact of changing labour quality on productivity by: 1) estimating a micro-level wage equation which relates individual earnings to observed characteristics such as education, vocational qualifications, gender, and age; and 2) by using the estimated coefficients in a base year to evaluate the changes in the relative quality of the labour force by calculating average predicted wages for workers in two different years, and forming the ratio of these averages (see Griliches, 1970).

The key conclusion is that labour force quality grew faster in the UK in the post-1979 reform era than in West Germany or the US. The differential relative to Germany is 0.66 percentage points per year. Assuming that labour's share is 65 per cent, this gap would be expected to lead to about 0.4 percentage points per year faster growth in labour productivity in the UK than in Germany. A similar calculation suggests that relative improvements in labour force quality contributed to a 0.3 percentage point per year difference in productivity growth relative to the US. Labour productivity adjusted for trends in capital grew at about the same rate in all three countries in the 1979-98 period, with the implication that UK productivity growth net of labour quality growth was slower than expected in the reform era, relative to Germany and the US. The absence of data on the characteristics of UK and German workers in the 1960s, preclude any definitive assessment of whether *shifts* in the trend growth in labour quality can account for the bigger slowdown in productivity growth in West Germany than Britain. Extrapolating from limited data for the late 1970s, it appears that the growth rate of labour force quality accelerated in the UK and declined in Germany after 1979/80.

Table 3
Summary of Contributions to Trends in Growth Rate of Labour Productivity per Hour Worked

	Productivity Growth Rate	Contributions of: Shift Out of Agric.	Capital per Hour	Labour Quality	Adjusted Productivity Growth Rate: Excluding Quality	Including Quality
A. 1960-79:						
United Kingdom	3.44	0.07	1.87	--	1.50	--
West Germany	4.74	0.38	1.96	--	2.40	--
France	4.57	0.52	1.86	--	2.19	--
United States	2.06	0.11	0.65	0.21	1.30	1.09
B. 1979-99:						
United Kingdom	2.10	0.02	0.68	0.57	1.40	0.83
West Germany	2.18	0.09	0.67	0.14	1.42	1.28
France	2.02	0.12	0.89	--	1.01	--
United States	1.51	0.01	0.11	0.25	1.39	1.14
C. Change from Pre- to Post-1979:						
United Kingdom	-1.34	-0.05	-1.19	--	-0.10	--
West Germany	-2.56	-0.29	-1.29	--	-0.98	--
France	-2.55	-0.40	-0.97	--	-1.18	--
United States	-0.55	-0.10	-0.54	0.04	0.09	0.05

Sources: Productivity growth rates from Table 9. Contributions of shift out of agriculture from Table 11. Contributions of growth in capital per hour estimated by multiplying trends in capital per hour in columns 4-5 of Table 12 by 0.35. Contributions of labour quality obtained by multiplying entries in Table 13 by 0.65. All tables are in the unabridged version of the paper.

These patterns are consistent with the relative changes in productivity growth rates.

Summary of Changing Trends in Productivity Growth

Table 3 summarizes our attempt to decompose productivity growth in the UK, West Germany, France, and the US into components attributable to the movement out of agriculture, the rise in capital per unit of labour input, and changing labour quality. For simplicity, we focus on trends in productivity per hour.[5] Sectoral shifts out of agriculture help explain some of the more rapid productivity growth of France and Germany relative to the UK (or US) prior to 1979. After 1979, most of the adjustment was complete, leading to a bigger productivity slowdown for France and Germany than the UK or US. Increasing capital per unit of labour is an important component of productivity growth in all countries. Trend rates of capital growth are quite similar in the UK, Germany, and France, however, suggesting that relative investment trends have not been a major source of differential productivity growth among these three countries. The slowdown in capital accumulation was smaller in the US, and an adjustment for capital brings the productivity trends in the US and the UK into close alignment.

Adjusting for sectoral shifts and capital trends, the productivity growth rate in the UK in the 1960-79 period was 1.5 per cent per year — 0.7 to 0.9 per cent per year lower than in West Germany or France, but 0.2 per cent per year higher than in the US. Given the limitations of the available data we are unable to estimate how much of the gap between the UK and its major European competitors was due to slower growth in labour quality: we suspect this may be a part of the story for the UK-Germany differential. After 1979, adjusted

UK productivity growth was 1.4 per cent per year — only slightly below the rate in the previous decades, and about equal to the rates in Germany, France, and the US. We estimate that the UK had somewhat faster growth in labour quality than Germany or the US in the 1980s and 1990s. The growth rate in productivity in the UK attributable to efficiency gains, technological change, and other unobserved factors was therefore slower than in West Germany or the US.

The bottom line is that while the various factors that we have examined explain some of the improved relative performance of the UK in the era of market reforms, there still remains an upswing in the growth of GDP per working age adult (and per capita) in the UK compared to its major EU competitors.

Relating Reforms to Productivity Performance

Did the economic reforms adopted in the UK in the 1980s and 1990s *cause* the changes in economic performance documented in the previous section? Given the complexity and overlapping nature of the reforms, and the difficulty of specifying what would have happened in the UK economy in the absence of reform, this is a difficult question. Rather than attempt to answer it, we address a more modest question: is there a plausible link between some of the major reforms and the economic changes we have identified, in particular productivity performance?

Pre-1979, UK productivity growth was about 1 per cent per year slower than in Germany or France (net of sectoral shifts). After 1979 the gap disappeared. None of the convergence is explained by trends in capital accumulation; some may be due to rising labour quality in the UK. After adjusting for trends in capital accumulation, trends in relative productivity growth in the UK and US were very similar before and after 1979. Potential explanations for the productivity results include reforms that lowered barriers to productivity growth in the UK, or that generated once-for-all increases in the productivity of UK businesses.

Many UK policy reforms could have contributed to rising labour productivity, including: laws that have weakened the coverage and power of trade unions, leading to changes in union policies; privatization of nationalized industries; and the creation of incentives for self employment and share ownership.

Some of the most prominent early reforms introduced by Mrs Thatcher were designed to reduce trade union power. The Employment Acts of 1980, 1982, and 1984 limited secondary picketing, abolished statutory union recognition procedures, weakened the closed shop, and mandated changes to internal union governance (including compulsory pre-strike balloting). In addition, other government actions, such as the privatization of highly unionized state-owned industries and the removal of contract requirements to pay union-negotiated wages, substantially weakened the government's indirect support for unionism and collective bargaining (Pencavel, 2002). Union membership rates, which had reached a peak of over 50 per cent in 1980, declined steadily in the subsequent decades, and, by 1999, stood at under 30 per cent of wage and salary workers. Strike activity plummeted in the 1980s (Pencavel, 2002). The presence of multiple unions in the same work place, which contributed to some of the worst excesses of British industrial relations in the pre-1980 period, also fell. The evidence shows that the relationship between productivity and collective bargaining shifted in this period. Using data from the Workplace Industrial Relations Survey (WIRS) conducted in 1998, Pencavel (2002) concludes that by the end of the 1990s unionized establishments were no less productive on average than their nonunion counterparts. By comparison, Pencavel's analysis of similar data from the 1990

WIRS, and studies by other researchers (e.g., Machin, Stewart, and van Reenan, 1993) suggest that unionized establishments suffered a significant productivity disadvantage in earlier years.

These findings suggest that reforms linked to reductions in trade union power had some impact on measured UK productivity. For example, if the 43 per cent of private sector employees in 1979 that were working in unionized establishments had 10 per cent lower productivity than other workers, then the elimination of the union productivity gap could contribute to a 4.3 percentage point gain in aggregate productivity between 1979 and 1999. Some analysts have argued that the changed industrial relations climate in the UK has led to a permanent shift in the productivity growth rate (Bean and Crafts, 1996). However, the empirical analysis on this is relatively limited (see Pencavel, 2002), and we regard the 4.3 percentage point gain over the entire period as a generous upper bound on the potential gains associated with elimination of the negative productivity effect of trade unions.[6]

What about the effect of privatization of industries on productivity? In 1979, 12 per cent of UK GDP was produced in publicly owned companies; in 1997, just 2 per cent of UK GDP was produced in publicly owned companies. While, as Green and Haskel (2002) show, productivity growth was not the primary impetus for privatization in the early Thatcher years, the widespread belief that private businesses operate more efficiently than state-run businesses suggests that privatization of this magnitude could have contributed to the improvement in relative productivity in the 1970s-1990s. Their industry evidence shows that privatization itself had no huge effect on productivity, improving in some industries and not in others, and that productivity increased most rapidly in the period before privatization as the government sought to improve operations in order to make the business attractive to the private sector. Labour productivity between 1980 and 1992 went up for plants that were public in 1980 and private in 1992, with the increase concentrated in the period immediately preceding privatization. They, and other analysts, have stressed that increased competition after privatization appears to be the key factor differentiating sectors where privatization was associated with improved productivity and sectors where it was associated with stagnation or declines in productivity relative to private firms or international benchmarks.

To obtain a rough estimate of how much this might have added to aggregate productivity growth, we assume, as they do, that the process of privatization accounts for this improvement. In the UK, 1.4 per cent of the workforce was employed in nationalized industries in 1995 compared to 7.3 per cent of the UK workforce in 1975, which indicates that privatization shifted nearly 6 per cent of the workforce from the public to private sector. While there is no single "best" estimate of the effect of privatization on productivity, a generous estimate based on Green and Haskel's plant data is that privatization induced a gain in labour productivity of nearly 20 per cent above the private sector increase. This would imply an increase in aggregate productivity of 1.1 per cent between 1979 and 1999. We regard this as a generous upper bound on the potential gains associated with privatization since it gives all of the privatized sectors the 19 per cent gain, whereas productivity did not in fact improve in some industries.

Another area where the UK has made major micro market-oriented changes is in the introduction of various "shared compensation" programs which give employees a stake in the firm performance, either through profit-sharing or share ownership. Evidence in Conyon and Freeman (2002) shows that productivity is higher in firms that have such programs compared to those that do not. Not all of the programs that the UK government has favoured with tax relief

have a positive impact on productivity, but the most important program — the approved profit sharing scheme introduced in the 1978 Finance Act, which the government replaced with an all-employee share plan in 2000 — has an estimated productivity effect in the area of 10 per cent (Canyon and Freeman, 2002 Exhibit 5c, based on stock market returns) to 18 per cent (Exhibit 4, based on production function estimates). Millward, Bryson, and Forth (2000) show that there was an increase in the proportion of industry and commerce establishments with 25 or more employees having profit-sharing plans from 19 per cent in 1984 to 46 per cent in 1998. Inland Revenue data also show a huge increase in the number of workers who received tax advantaged payments under government approved profit-related schemes. In 1979, approximately one quarter as many workers were likely to have been covered by plans. On the basis of the establishment surveys and Inland Revenue data, we estimate that the proportion of British workers covered by these plans increased by approximately 20 percentage points. This implies a productivity gain on the order of 2.0 per cent to as high as 3.8 per cent.[7]

The British reforms also encouraged workers to become self-employed. The proportion of the work force in the UK that was self-employed rose from 8.4 per cent in 1980 to 13.1 per cent in 1990, and then stabilized. Over the entire period, the proportion self-employed rose by 4.3 percentage points. In general, self-employed workers earn less than wage and salary workers, with about a 10 per cent differential between the two. Interpreting this differential as the result of differences in productivity, the implication is that this reform reduced productivity by 0.4 per cent. By contrast, the percentage of workers who were self-employed in Germany and the US fell over this period, with the decline in German self-employment due largely to the drop in agricultural employment.

Summing up the estimated effects on productivity of the change in the relation between unionism and productivity (4.3 per cent), privatization (1.1 per cent), profit and share ownership schemes (2.0 per cent) and self-employment (-0.4 per cent), we estimate the micro-evidence of the effect of particular reforms on productivity may have raised UK productivity on the order of 7 per cent or approximately 0.35 per cent per year. This is about one quarter of the difference in growth rates between the pre-reform 1960-79 and the 1979-99 reform period shown in part C of Table 2, and a potentially higher proportion of growth rates adjusted for the improved quality of the work force. These estimates are, to be sure, crude. They are based solely on changes in the UK rather than changes in the UK relative to other countries, though we have seen that the UK reforms were considerably greater than those in France, Germany, and the US. What we conclude is that the estimated effects of the micro-reforms cumulate to an order of magnitude that suggests that they explain part of the acceleration in UK productivity growth compared to Germany or France.[8]

Conclusion

This article has examined the market reforms that UK undertook in the 1980s and 1990s and the relative economic progress of the country compared to other advanced countries. The evidence shows that the UK made greater market reforms than most other advanced countries and that it arrested the nearly century-long trend in economic decline of the UK relative to its historic competitors, Germany and France. It is difficult to link the reforms to the improved economic performance relative to these other countries, but at the minimum our analysis has shown the change in the UK economy cannot be readily explained by standard macro-economic

changes in labour or capital. Absent a unequivocal counterfactual of what would have happened had the UK not proceeded with its reforms, we cannot definitively judge the market reforms, though weighing the diverse evidence, they do seem to have played a positive role in aggregate economic growth in general and productivity growth in particular.

Notes

* This is an abridged version of a longer paper entitled "What Have Two Decades of British Economic Reform Delivered" that is forthcoming in the volume *Seeking a Premier League Economy*, edited by Richard Blundell, David Card, and Richard B. Freeman to be published by the University of Chicago Press for the NBER. The unabridged version of this article is posted at www.csls.ca under the *International Productivity Monitor*. We are very grateful to Andrew Sharpe for his assistance in condensing the article. Email: card@econ.berkeley.edu

1 This refers to GDP per capita in purchasing power parity (PPP) units, as reported in Table 1, which includes 13 OECD countries. The precise position of the UK varies with the number of countries included in the analysis and particular PPP adjustments used.

2 The move toward more markets and less government is not unique to the UK. Many other advanced economies also responded to the economic challenges of the 1980s and 1990s by granting markets more leeway in the allocation of resources and the setting of prices. All the major economies eliminated restrictions on the flow of capital by the early 1980s. Most privatized state-run industries in the 1980s and 1990s. All lowered marginal tax rates for high-income earners. Most also made labour contracts more flexible and moved from national wage setting to more localized collective agreements in the 1990s. For its part, the EU Commission pushed competition policies and the reduction of subsidies to declining industries while seeking a uniform social charter to regulate labour market outcomes. Outside the EU, the other English-speaking economies — the US, Canada, Australia, and New Zealand — moved toward less state and institutional intervention in the economy.

3 See e.g. Griliches (1970). In this framework, sectoral shifts can be modeled as efficiency improvements.

4 The data were compiled by Mary O'Mahoney of the UK's National Institute. To maximize international comparability, O'Mahoney's series use a consistent set of geometric depreciation factors. Similarly, for consistency with the practices in other countries, the underlying investment series for computer related equipment in the US have been deflated by a traditional cost-based index, rather than by the hedonic price index developed by the US Bureau of Economic Analysis (BEA) (see O'Mahoney, 1996, pp. 174-176). Consequently, the growth rate of the US capital stock in the 1990s is somewhat slower than shown by official BEA data.

5 The calculations for trends in productivity per worker are similar.

6 One way in which unions might in theory have reduced labour productivity is by causing firms to invest less through "hold-up" effect: a unionized firm that invests in new equipment can expect to have to pay higher wages in the future, thereby reducing the effective return on capital (Grout 1984). Our evidence gives no indication that this occurred in the UK. Despite the decline in unionization rates in the UK, and the apparent shift toward more co-operative relations with employers, the rate of growth of capital per worker (or capital per hour) did not accelerate in the UK relative to West Germany or France. Either the under-investment effect was relatively small before the reforms of the 1980s and 1990s, or de-unionization and an improved industrial relations climate have had little effect on the investment calculus of British employers.

7 We base this estimate by multiplying the 10 per cent productivity effect by the 20 point increase in the proportion of workers covered by profit-sharing option plans.

8 The unabridged version of this paper discusses the effects of the reforms on incentives for work.

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