1 Long-run growth

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Contents

INTRODUCTION

This chapter reviews UK economic growth performance from mid-Victorian times to the end of the interwar period. It aims to place this experience in the context both of initial British pre-eminence and subsequent relative economic decline and of new ideas in growth economics. A growth accounting framework is used to establish the proximate sources of growth and to compare UK experience with that of Germany and the United States. Against this background, special attention is given to two controversies, namely, whether the British economy 'failed' in the late Victorian and Edwardian period and whether the interwar period and, especially the 1930s, saw a successful regeneration of the economy's growth potential. Finally, in so far as the UK underperformed during these years, it is important to examine the incentive structures which informed decisions to invest and to innovate and the roles played by market and/or government failure.

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AN OVERVIEW OF GROWTH

Britain was the first industrial nation but by the end of the twentieth century had become just another OECD[1] economy with an income level below that of North America, most of western Europe and parts of East Asia. This relative economic decline is sometimes regarded as a continuous process that started around 1870 and had already alarmed contemporaries in the late nineteenth century as Germany and the United States emerged as powerful economic rivals. Its dimensions are, however, not well understood by many commentators. This section sets out a basic quantitative framework within which debates about UK growth performance can be placed.

Table 1.1 reports estimates of income levels and growth rates of real GDP per person for western European economies and for Japan and the United States in the period 1870–1938. The units of measurement are 'purchasing power adjusted' dollars of 1990 so that account has been taken of differences in internal price levels in the assessment of the relative standing of different countries. While these estimates are subject to a number of health warnings in terms of both the imperfect nature of the underlying economic data and the difficulties of solving the 'index number problems' of tracking real output through time, the broad picture in Table 1.1 is reliable enough to make the following points. First, the UK was a clear leader in terms of income per head in 1870 but was overtaken by the USA around the start of the twentieth century and by Switzerland in the interwar period. Nevertheless, the UK continued through to the end of the 1930s to have an income level well ahead of that of both France and Germany – overtaking by these continental European rivals took place during the 'golden age' of European growth after the Second World War. Second, over the whole period 1870–1938 several European countries were catching up through faster growth that enabled them to reduce the income gap with the UK; these included Denmark, Germany and Sweden, while the majority of European countries had faster growth rates than did the UK. Third, in general, growth rates in these years were modest relative to the achievements of the 'golden age' of the 1950s and 1960s when growth of per capita income between 3 and 6 per cent per year was the rule and they were also somewhat below the late twentieth-century experience of these countries (Maddison 2001).

Table 1.2 reports on productivity rather than real income per person. Here the data are more problematic and the table is restricted to comparisons with Germany and the United States where the data are relatively good. The table reports both labour productivity and total factor productivity (TFP). The former is defined as output per worker whereas the

[1] The Organisation for Economic Co-operation and Development, a group of leading developed nations.

Table 1.1 Levels and rates of growth of real GDP/person, 1870, 1913 and 1938 (measured in $1990 international and % per year)

1870		1913		1938	
UK	3,191	UK	4,921	Switzerland	6,390
Netherlands	2,753	Switzerland	4,266	UK	5,851
Belgium	2,697	Belgium	4,220	Denmark	5,762
Switzerland	2,202	Netherlands	4,049	Netherlands	5,250
Denmark	2,003	Denmark	3,912	Germany	5,126
Germany	1,913	Germany	3,833	Belgium	4,833
France	1,876	France	3,485	Sweden	4,725
Austria	1,863	Austria	3,465	France	4,466
Ireland	1,775	Sweden	3,096	Norway	4,337
Sweden	1,664	Ireland	2,736	Finland	3,590
Italy	1,499	Italy	2,564	Austria	3,559
Norway	1,432	Norway	2,501	Italy	3,318
Spain	1,376	Spain	2,255	Ireland	3,119
Finland	1,140	Finland	2,111	Greece	2,678
Portugal	997	Greece	1,592	Spain	2,022
Greece	913	Portugal	1,244	Portugal	1,568
Japan	737	Japan	1,385	Japan	2,449
USA	2,445	USA	5,301	USA	6,126
1870–1913		1913–38			
UK	1.0	UK	0.7		
Netherlands	0.9	Switzerland	1.6		
Belgium	1.0	Belgium	0.6		
Switzerland	1.6	Netherlands	1.0		
Denmark	1.6	Denmark	1.6		
Germany	1.6	Germany	1.2		
France	1.4	France	1.0		
Austria	1.4	Austria	0.1		
Ireland	1.0	Sweden	1.7		
Sweden	1.5	Ireland	0.5		
Italy	1.3	Italy	1.0		
Norway	1.3	Norway	2.2		
Spain	1.2	Spain	−0.4		
Finland	1.4	Finland	2.1		
Portugal	0.5	Greece	2.1		
Greece	1.3	Portugal	0.9		
Japan	1.5	Japan	2.3		
USA	1.8	USA	0.6		

Sources: Maddison 1995, 2001.

Table 1.2 Structural change and relative productivity levels, 1871–1973

	Employment shares			Labour productivity		TFP	
	UK	Germany	USA	Germany/UK	US/UK	Germany/UK	US/UK
1871							
Agriculture	22.2	49.5	50.0	55.7	86.9	58.3	98.4
Industry	42.4	29.1	24.8	86.2	153.6	86.0	153.8
Services	35.4	21.4	25.2	66.1	85.8	69.7	86.3
GDP	100.0	100.0	100.0	59.5	89.8	61.6	95.1
1911							
Agriculture	11.8	34.5	32.0	67.3	103.2	71.4	117.8
Industry	44.1	37.9	31.8	122.0	193.5	102.6	151.1
Services	44.1	27.6	36.2	81.3	107.3	83.2	71.7
GDP	100.0	100.0	100.0	75.5	117.7	75.3	90.5
1937							
Agriculture	6.2	29.9	17.9	57.2	103.3	59.7	118.8
Industry	44.5	38.2	31.6	99.1	190.6	97.1	161.1
Services	49.3	31.9	50.5	85.7	120.0	89.6	89.1
GDP	100.0	100.0	100.0	75.7	132.6	78.3	105.9
1950							
Agriculture	5.1	24.3	11.0	41.2	126.0	44.6	132.5
Industry	46.5	42.1	32.9	95.8	243.9	93.3	218.0
Services	48.4	33.6	56.1	83.1	140.8	89.2	110.2
GDP	100.0	100.0	100.0	74.4	166.9	76.2	138.1
1973							
Agriculture	2.9	7.2	3.7	50.8	131.2	48.1	127.2
Industry	41.8	47.3	28.9	128.9	215.1	112.4	202.4
Services	55.3	45.5	67.4	111.0	137.3	118.0	120.6
GDP	100.0	100.0	100.0	114.0	152.3	108.2	137.5

Note: Employment shares are in percentages. For the productivity levels comparisons in each year the UK level is normalised to 100. For Germany/UK comparison the year is 1935 not 1937.

Source: Broadberry 2003.

latter is a weighted average of output per worker and output per unit of capital and, if well measured, will reflect differences in technology and in the efficiency with which labour and capital were used. TFP estimates are a very important way of benchmarking a country's productivity performance. Unfortunately, in this period they are not altogether reliable, especially for Germany. The economy-wide comparisons of labour productivity in Table 1.2 are not too surprising given the estimates reported in Table 1.1. The United States took the lead before the First World War, had a sizeable lead in 1937 when its labour productivity exceeded that of the UK by almost a third and extended this to two-thirds by 1950. Germany narrowed the gap appreciably between 1871 and 1911 but remained distinctly behind the UK in 1937 and did not overtake the UK until the 1960s.

At the whole economy level, the level of TFP in Germany relative to the UK followed a broadly similar path to that of labour productivity. With regard to the United States, things were a little different as the UK retained its lead until after the First World War and there was only a small American lead in 1937. After the Second World War, however, a large TFP gap was apparent but even so this was appreciably lower than that in labour productivity. Throughout the twentieth century the American economy operated at a much greater level of capital intensity than the UK.

At the sectoral level, the picture is more complex. The USA already had a substantial lead over the UK in labour productivity in industry in 1871; this had grown substantially by 1950 but then the UK caught up a bit. In agriculture and services, American labour productivity was below that in the UK in 1870 but by 1911 this deficit had been turned into a small lead which was also sustained through 1937 and then extended after the Second World War, although productivity gaps in these sectors were always much lower than in industry. Interestingly, the United States did not extend its TFP lead in industry between 1871 and 1911 and the subsequent gains made relative to the UK before 1929 were not sustained during the 1930s but by 1950 the gap was much wider than in 1871. In services the UK TFP level was not overtaken by the United States until the 1940s.

Turning to Germany, where TFP and labour productivity comparisons are fairly similar, the most notable feature is the contrast between agriculture and industry. In industry, Germany overtook the UK in the early twentieth century and had established a lead of over 20 per cent by 1911 which was not, however, maintained between the wars but was re-established during the golden age after the Second World War. In agriculture, however, Germany persistently lagged far behind British levels of labour productivity. In services, Germany reduced Britain's lead during the early part of the period but did not surpass British productivity levels until the 1960s.

Table 1.2 also displays estimates of the sectoral composition of employment. Here the striking feature is that in 1871 the UK had a much smaller agricultural and a good deal larger industrial sector than either of the other two countries. Indeed, the UK was a major outlier in nineteenth-century Europe with regard to the small size of its agricultural sector which derived both from an early embrace of capitalist farming and from free-trade policies. Over time, these discrepancies in economic structure were considerably reduced, as Table 1.2 shows.

Two important points follow from this, as Broadberry (1998) has stressed. First, American overtaking of Britain was based to a considerable extent on relative trends in productivity in services combined with a large shift of labour into that sector rather than simply resulting from the development of higher labour productivity in industry. Second, the

Table 1.3 Aspects of economic growth in the long run, 1780–1973

	1780	1820	1870	1913	1937	1973
GDP/person ($1990 int.)	1,806	2,121	3,191	4,921	5,806	12,022
GDP growth (% p.a.)	1.0	1.9	2.4	1.4	2.2	2.8
TFP growth (% p.a.)	0.05	0.40	0.75	0.45	0.60	2.20
Life expectancy (e_0)	34.7	39.2	41.3	53.4	58.5	72.0
Adult literacy (%)	50	54	76	96	99	99
Primary enrolment (%)		36	76	100	100	100
Secondary enrolment (%)			1.7	5.5	9.9	73
R&D/GDP (%)				0.02	0.5	2.2
Non-residential investment/GDP (%)	4.8	5.3	7.4	7.4	6.0	14.6
Agricultural employment (%)	45	35	22.7	11.8	6.2	2.9

Note: Growth and investment rates are period averages.

Source: Updated from Crafts 1998.

explanation for Germany's relatively weak performance in real gross domestic product (GDP) per person and overall labour productivity (notwithstanding its industrial challenge to Britain) is seen to have resulted largely from a relatively large and low-productivity agriculture. Protectionist German trade policies are seen to have been costly in these terms.

Table 1.3 puts growth after 1870 in the context of experience during the earlier industrial revolution period. The feature that stands out in this table is that Britain was *never* a fast-growing economy prior to the Second World War. Indeed, from today's vantage point, the economy of the industrial revolution period can be seen as having relatively limited growth potential. This assessment is informed by several aspects reported in Table 1.3. Industrial revolution Britain was an economy which had very modest levels of investment in human and physical capital. Despite famous breakthroughs in textiles technology and more generally in the use of steam power, TFP growth in the classical period of the industrial revolution was unimpressive by post-First World War standards; the economy was characterised by weak technological capabilities and by substantial disincentives to innovative activity judged by later rather than contemporary standards (Crafts 1995). To sustain its early lead into and through the twentieth century, Britain would have had to progress very considerably beyond its industrial revolution capabilities. In fact, by the late nineteenth/early twentieth century considerable strides had been made in this direction (see chapters 3 and 4 below). A higher proportion of GDP was devoted to capital accumulation while rapid expansion of educational provision represented a big step forward in investment in people (Sanderson 1999) and the first industrial research and development laboratories were set up (Edgerton and Horrocks 1994). It should be noted, however, that all of these growth-promoting efforts were distinctly modest relative to what would come along after the Second World War and

that, as we shall see, they did not entirely match the progress made in other countries.

In every respect, the 'golden age' economy after 1945 had a much higher growth potential than had been the case either during the industrial revolution or in the early twentieth century. Many more resources were devoted to physical investment, human capital formation and research and development (R&D) while TFP growth was far in excess of earlier times. The third quarter of the twentieth century was undoubtedly the period when economic decline relative to other European economies was at its most pronounced (Crafts 2002). Table 1.3 reminds us that this was not because absolute growth performance in the UK had diminished but rather because other countries had adapted better to the enhanced opportunities after the Second World War.

KEY IDEAS FROM GROWTH ECONOMICS

For many years the traditional neoclassical economic growth model ruled the roost. This viewed the sources of economic growth as being growth in the physical capital stock and the labour force and improvements in technology which raised the productivity of these factor inputs. This model has two key assumptions. First, capital accumulation is subject to diminishing returns. Second, technological progress is exogenous and universally available – in a famous phrase it is 'manna from heaven'. These assumptions are fundamental to two well-known long-run predictions of the neoclassical model, namely, that policy and institutions do not influence the rate of steady-state growth and that all countries converge to the same income level with initially poorer countries growing faster as they eliminate initial shortfalls of capital per worker. A variant on the neoclassical model is the so-called Augmented-Solow model which embodies a broader concept of capital including both physical and human capital but comes to the same conclusions albeit with less severely diminishing returns to investment.

Although some insights from this model found favour and an empirical technique derived from it, growth accounting, has been widely used in economic history, it is probably fair to say that the pure neoclassical model has generally been regarded by economic historians as unhelpful in most circumstances. In particular, the notions of universal technology and long-run income convergence have probably seemed farfetched to historians accustomed to thinking in terms of, say, the new institutional economic history with its emphasis on the importance of institutions and political economy considerations to growth outcomes. Moreover, this model cannot really cope with the leading economy being overtaken and, after all, this is at the heart of Britain's relative economic decline.

Recent developments in growth economics offer more attractive features. These include the acceptance that institutions and policy can promote divergence in growth outcomes and, associated with this, the recognition that catch-up is not automatic. The central ideas concern the microeconomic foundations of growth and the concept of endogenous growth. These have come together most fruitfully in models that analyse the role of endogenous innovation in the growth process, i.e., that consider the rate of technological advance to be influenced by economic incentives. In effect, these models drop the assumption that technology, and the efficiency with which it is used, are universal. Carefully deployed, these ideas can inform a reappraisal of controversies surrounding British growth performance.

Endogenous growth occurs when long-run growth outcomes are determined by economic forces. This requires either that a mechanism is found to eliminate diminishing returns to capital accumulation or that the rate of technological progress is responsive to additional innovative effort without being undermined by diminishing returns to R&D. In such cases, good (bad) policy can permanently raise (lower) the growth rate of income per head, in the former case by leading to a higher investment rate and in the latter case by encouraging more resources into innovative activity.

The hypothesis of endogenous growth is highly controversial. The evidence does not support the claim that there are non-diminishing returns to investment in either narrow or broad capital. Second, the jury is still out on the claim that the steady-state growth rate of the leading economy can be increased by more R&D, but the experience of the late twentieth century is not very encouraging. For this reason, models that embody endogenous innovation do not all have this property (Jones 1995, 1999). Evidence of the impact of incentive structures on the rate of innovation is plentiful; for example, it is clear that the ability to appropriate returns, market size and demand growth all influence innovative effort (Jaffe 1988) and there is strong evidence for post-war Britain that intensification of competitive pressures on firms stimulates innovation (Aghion *et al.* 2002). The theoretical investigation of endogenous innovation has the potential to yield important insights into failures to exploit technological opportunities to the full and thus into long-run divergence of income levels and growth rates.

Broadly speaking, new growth economics suggests that there are two important aspects of the incentive structures that influence decisions to innovate and invest which matter for growth outcomes, namely their impact on expected returns and on agency problems (Aghion and Howitt 1998). Thus, institutions and policies that reduce the supply price of capital or research inputs or reduce fears of expropriation can increase innovative effort, speed up technology transfer and enhance the chances of rapid catch-up growth. Since effective and timely adoption of new

technologies tends to be costly to managers of firms in terms of the effort required, it is also important that they are incentivised to work hard on behalf of the owners – when this is not the case we speak of performance being jeopardised by principal-agent problems. Unless there are large external shareholders who can internalise the benefits of effective monitoring of management, strong (though less than perfect) product market competition tends to be important in underpinning productivity performance (Nickell 1996).

Finally, these ideas resonate with economic historians' discussions of the international diffusion of technology. In particular, there is an obvious connection with the idea of 'social capability' used by Abramovitz and David (1996 and see below). But it should also be noted that in another departure from the assumption that technology is universal these authors stress the importance also of 'technological congruence' in catching up or falling behind. Here the point is that the cost-effectiveness of a technology may vary across countries where market size or cost conditions or availability of complementary factors of production are not the same and thus decisions whether or not to adopt it based on profit-maximisation can differ.

A GROWTH ACCOUNTING PERSPECTIVE

Growth accounting is a useful technique, much employed by economic historians, with which to examine long-run growth. It is well explained and put in the context of modern growth theory in Barro (1999). Despite problems that are discussed below, it provides a method of benchmarking growth performance and the estimates of TFP that result from its use are an important diagnostic in international comparisons. Growth accounting was central to the highly influential interpretation of the long-run development of the British economy by Matthews *et al.* (1982).

Growth accounting seeks to attribute growth to its proximate sources in terms of factor inputs and TFP. TFP is the weighted average of the growth of productivity of the individual factor inputs. The basic formula used in growth accounting is the following:

$$\Delta Y/Y = \alpha \Delta K/K + \beta \Delta L/L + \Delta A/A$$

where the growth rate ($\Delta Y/Y$) of output (Y) is accounted for in terms of the contribution of the capital stock ($\Delta K/K$) times the elasticity of output with respect to capital (α), the contribution of the labour force ($\Delta L/L$) times the elasticity of output with respect to labour (β) and the growth of TFP ($\Delta A/A$).

In practice, α and β are approximated by the shares of profits and wages, respectively, in national income, and TFP is found as a residual when estimates of all the other components have been entered into

the formula. Capital stocks are estimated using the perpetual inventory method of adding up past investment flows and assuming a lifetime for capital assets, while labour inputs are usually measured in hours worked adjusted for the educational composition of the labour force. This formula would be exactly right if, as in traditional neoclassical growth theory, the economy could be thought of as an aggregate Cobb–Douglas production function, $Y = AK^{\alpha}L^{\beta}$ operating under conditions of perfect competition and constant returns to scale. The parameter A would reflect the state of technology and TFP growth would measure exogenous technological change ('manna from heaven').

Caution is required, however, before assuming that residual TFP growth really measures the contribution of technological change to economic growth. Technological change may be less than TFP growth if there are scale economies or improvements in the efficiency with which resources are used, or if improvements in the quality of factors of production are underestimated, for example owing to unmeasured human capital accumulation (Abramovitz 1993). By contrast, if the elasticity of substitution between factors of production is less than 1 and technological progress has a (Hicksian) labour-saving bias, as many analysts think is often the case, then conventional TFP growth underestimates the contribution of technological change and the mismeasurement increases with the growth in the capital to labour ratio, the degree of labour-saving bias, and the inelasticity of substitution (Rodrik 1997).

Since faster technological change raises the steady-state rate of growth of the capital stock in a traditional neoclassical growth model, part of its impact on growth compared with the counterfactual of no technological change shows up in capital's measured contribution. The advent of endogenous growth theory strengthens this kind of reason to believe that the contribution of technological change exceeds TFP growth. Thus, in models which envisage endogenous innovation driving growth through expanding varieties of capital inputs, a fraction of the contribution of the growth in varieties of capital facilitated by R&D accrues to capital and is not measured by TFP. The undermeasurement will be greater the larger is the endogenous component in technological progress (Barro 1999).

Table 1.4 reports a growth accounting decomposition of the sources of growth for the British economy from the onset of the industrial revolution to the end of the interwar period. These estimates are quite crude in that labour quality is not accounted for in labour's contribution but is part of the TFP residual (although an indication is given of the possible contribution of education) and prior to 1873 labour input is measured by numbers of workers rather than hours worked. The overall picture is one of accelerating growth from the mid-eighteenth to the mid-nineteenth century based on increased contributions from all three sources of growth. After 1873 growth was slower and all three sources of growth, notably including TFP growth, show decreased contributions. In

Table 1.4 Growth accounting estimates, 1760–1973 (% per year)

	Output growth	Capital contribution	Labour contribution	TFP growth	Education
1760–80	0.6	0.25	0.35	0.00	0.0
1780–1831	1.7	0.60	0.80	0.30	0.0
1831–73	2.4	0.90	0.75	0.75	0.3
1873–1913	1.8	0.80	0.55	0.45	0.3
1924–37	2.2	0.55	1.05	0.60	0.3
1951–73	2.8	0.95	−0.35	2.20	0.3

Note: A conventional growth accounting equation is used such that TFP growth $= \Delta Y/Y - \alpha\Delta K/K - \beta\Delta L/L$ where $\alpha = 0.4$ and $\beta = 0.6$ before 1913 and $\alpha = 0.3$ and $\beta = 0.7$ after 1913. Contributions are rounded to nearest 0.05. A crude estimate of the contribution of education which would be added to labour inputs and deducted from TFP if inputs are quality-adjusted is obtained by assuming in line with modern evidence that earnings represent a good estimate of the contribution of schooling to labour quality (Krueger and Lindahl 2000) and that a year's extras schooling raises earnings by 8 per cent (Cohen and Soto 2001). Schooling estimates based on Matthews *et al.* 1982; Maddison 1996; and Mitch 1999.

Sources: Crafts 1995 and Matthews *et al.* 1982.

the interwar period capital's contribution was relatively weak while after the Second World War hours worked per member of the labour force fell sharply and growth was based especially on much stronger TFP growth. Indeed, perhaps the most striking feature of Table 1.4 is how much greater was the contribution of TFP growth after the Second World War than in the industrial revolution or at any time in the nineteenth century. This contrast probably does reflect real changes in the contribution of technological change to growth, but may well exaggerate the magnitude. It seems likely that the bias of nineteenth-century technological change was more labour saving than that in the twentieth century and together with much faster growth in the capital to labour ratio in the latter period this may well mean that the conventional (Cobb–Douglas) assumptions imposed in growth accounting understate technological change before as opposed to after post-Second World War (Abramovitz 1993). The slowdown in TFP growth in the later nineteenth and early twentieth centuries deserves a closer look (see below).

DID VICTORIAN BRITAIN FAIL?

The heading of this section is also the title of a famous article written by McCloskey. In it he claimed that in the pre-First World War period the British economy was 'growing as rapidly as permitted by the growth of its resources and the effective exploitation of the available technology' (1970: 451). This conclusion was based on three very neoclassical arguments. First, using the insights of a traditional growth model, it was argued that devoting more resources to home investment would have run into diminishing returns. Second, it was claimed that the technical choices made by British firms were efficient and that the highly competitive

market environment ensured that there would be no serious and persistent errors at the industry level while the capital market operated to equalise returns to different types of investment at the margin. Third, it was maintained that British productivity growth could not have been any higher which in effect rules out the possibility that the UK could have anticipated the American move to faster technological change.

This assessment has, of course, proved highly controversial and allegations that a number of serious failures inhibited economic growth continue. One of the most celebrated of these claims has been 'entrepreneurial failure', perhaps the best-known proponent being Landes (1969) who recently reasserted his view as follows: 'one is inclined to define the British disease as a case of hard tardiness; entrepreneurial constipation' (Landes 1998: 455). Another well-known hypothesis is that the capital market unduly favoured foreign investment and had institutional failures that undermined the flotation of new businesses and slowed down structural change in the economy (Kennedy 1987). Yet another criticism is that the British education system exhibited a number of weaknesses and that technical training was lacking both on the shop floor and in the boardroom with adverse effects on technological progress (Sanderson 1988). Finally, overreliance on 'self-regulating' markets and a regrettable lack of state intervention aimed at modernisation of the economy was the charge levelled by Elbaum and Lazonick (1986).

These arguments are re-examined below (and in more detail in chapter 4) in the light both of the subsequent accumulation of evidence and of new ideas from growth economics. Before this, however, it is necessary to confront the suggestion that there was a climacteric in British growth prior to the First World War. The notion of a climacteric is of a sharp reduction in trend growth and, as proposed by Feinstein *et al.* (1982), a cessation of TFP growth between 1899 and 1913. It is this hypothesis that will be addressed here rather than the earlier literature on an alleged climacteric in the 1870s, a survey of which can be found in Saul (1985).

It should be accepted that the existence or otherwise of a climacteric is not decisive with regard to the growth failure hypothesis. For example, if it is argued that technological revolutions come along at discrete intervals then a growth slowdown accompanied by a hiatus in TFP growth in between the first (steam and steel) and second (electricity and cars) 'industrial revolutions' may be quite understandable and not indicative of underperformance (Phelps-Brown and Handfield-Jones 1952). On the other hand, a constant trend growth rate could represent a failure if opportunities for faster technological change were taken up more vigorously in other countries whose growth consequently accelerated as was noted by Crafts *et al.* (1989). Nevertheless, on balance, establishing that there was a climacteric in TFP growth would strengthen the hand of those arguing for a growth failure. So was there a late Victorian/Edwardian climacteric?

Table 1.5 Growth of GDP and TFP: alternative estimates, 1856–1913 (% per year)

	Output	Income	Expenditure	Compromise	Balanced
GDP					
1856–73	2.0	2.3		2.2	
1873–82	1.8	1.7	2.3	1.9	1.7
1882–9	1.9	2.7	2.0	2.2	1.6
1889–99	1.9	2.3	2.3	2.2	2.2
1899–1907	1.7	1.2	0.9	1.2	1.4
1907–13	1.7	1.4	1.8	1.6	1.7
1924–9	2.3	3.1	2.3	2.6	2.4
1929–37	2.2	1.9	1.7	2.0	2.0
TFP					
1856–73	0.6	0.9		0.8	
1873–82	0.5	0.4	1.0	0.6	0.4
1882–9	0.6	1.4	0.7	0.9	0.2
1889–99	0.5	0.9	0.9	0.8	0.8
1899–1907	0.2	−0.3	−0.6	−0.3	−0.1
1907–13	0.5	0.2	0.6	0.4	0.5
1924–9	0.9	1.7	0.9	1.2	1.0
1929–37	0.8	0.5	0.3	0.6	0.6

Sources: 1856–1913: from Feinstein *et al.* 1982 except final column from Solomou and Weale 1991 where the periods are 1874–83 and 1883–9 rather than 1873–82 and 1882–9. The Feinstein *et al.* income estimates have been adjusted slightly to accommodate the revisions suggested in Feinstein 1990d. 1924–37: from Matthews *et al.* 1982 except final column from Sefton and Weale 1995.

Table 1.5 displays the statistical evidence from which a post-1899 climacteric was inferred. Feinstein *et al.* emphasised the so-called compromise measure of GDP which is a geometric mean of the expenditure, income and output measures. Using this estimate, real GDP growth fell from 2.1 per cent per year in 1873–99 to 1.4 per cent per year in 1899–1913 while TFP growth fell from 0.7 per cent per year to 0.0 per cent (1983: 175). If this were interpreted as a change in trend, then suggestions that the economy experienced a growth failure in the years before the First World War would attain greater credibility. However, Table 1.5 reveals that there are difficulties with the climacteric hypothesis. First, it is apparent that there are problems with the data since if these were perfect there should be no discrepancy between the expenditure, income and output measures of GDP. The reduction in TFP growth after 1899 is much less in the output than the income series. Solomou and Weale (1991) argued in favour of weighting the variants according to reliability rather than equally as in the compromise series and their results, also shown in Table 1.5, reduce the impact of the post-1899 slowdown. Second, the 1899–1907 business cycle stands out as a period of relatively weak TFP growth in all columns of Table 1.5 with the years following 1907 showing a bounce back. Almost all the differences are statistically insignificant – the only exception is that growth in the cycle of the 1890s is found to have been

unusually strong – and the 1899–1913 growth is not unusually weak relative to the period as a whole (Crafts *et al.*, 1989). A more sophisticated statistical model estimated by the same authors resulted in a decline in trend growth after 1899 but only of about 0.1 percentage points per year.[2]

The claim that the UK suffered a serious climacteric in its economic growth in the period 1899–1913 seems highly doubtful. This does not, of course, dispose of arguments that the UK experienced a growth failure in the sense that growth could have been higher and, in particular, that the UK should not have fallen so far behind the United States in the early twentieth century.

McCloskey's argument that British growth could not have been any faster is best understood in the framework of a traditional neoclassical growth model. In this case the steady-state growth rate is exogenous and with a Cobb–Douglas production function equals

$$\Delta Y/Y = \Delta L/L + (\Delta A/A)/(1 - \alpha)$$

that is the growth rate is determined by the growth of the labour force and of TFP. In this model, McCloskey's assertion was that these could not have been increased.

The plausibility of this claim would be enhanced if the UK could be shown to have levels of TFP and human capital per worker at least as great as those in other leading economies. This seems to have been the case at the level of the economy as a whole as is shown in Table 1.2 and in chapter 3 below. Faster TFP growth in Germany in the period 1871–1911 could be seen as catching up from initial backwardness rather than British failure. And Thomas (1988) noted that there was little opportunity to increase output by reallocating resources across sectors since the structure of factor endowments, especially skilled labour, was a binding constraint.

Quantitative research at the microeconomic level has generally supported the suggestion that when British managers did not adopt American methods their decisions were rational in British conditions in which labour was less expensive, natural resources were more expensive and demand was less standardised than in the United States. As Pollard concluded: 'British industry was an open, highly competitive world. Entrepreneurial failure would imply the simultaneous failure of thousands of individuals . . . plus the failures of thousands more who were eagerly awaiting to take their places if they failed. Such a development

[2] Readers who are well versed in time-series econometrics will realise that this discussion is only valid if the GDP series does not contain a unit root but is (segmented) trend stationary. This does in fact seem to be the case and the basic conception of the economy as one where shocks cause the economy briefly to depart from but then revert to a pre-existing trend which underlies the Feinstein *et al.* (1982) methodology is probably acceptable (Crafts and Mills 1996a), although some caution on this point is urged by Greasley and Oxley (1995).

would surely strain credulity beyond reason' (1994: 79; see also chapter 9 below). Similarly, the use of a high proportion of British savings to finance foreign investment has been shown to have been economically justified in terms of rates of return while the ex post rate of return on the allegedly unjustly neglected new industries did not match that on traditional activities (Edelstein 1976, and chapter 8 below).

To this extent, McCloskey's position has been vindicated. Yet, it relies fundamentally on the proposition that TFP growth was exogenous. The advent of new growth models in which TFP growth is endogenous means that assessment of the possibility that there was a growth failure in late Victorian/Edwardian Britain has become more complicated than hitherto. And the failure of the Anglo-American wage gap to narrow between 1870 and 1913 despite mass transatlantic migration and a steep fall in transport costs (O'Rourke 1996; see also chapter 2 below) provides a strong indication that the simple neoclassical approach is inadequate. Moreover, in the 1910s and 1920s the United States moved well ahead of Britain so that in 1929 before the difficulties of the depression, TFP levels in the whole economy, industry and manufacturing were, respectively, 12.7, 87.8 and 127 per cent above those in the UK (Broadberry 1998, 2003).

The suggestion that TFP growth should be treated as endogenous has in fact been implicit in a 'Schumpeterian' reaction to claims that there was no entrepreneurial failure in late Victorian Britain. In this view, the role of the entrepreneur is not simply to maximise profits subject to constraints but to innovate constraints away (Payne 1990). The review of UK performance in invention and innovation provided in chapter 4 below is much less favourable to the British entrepreneur in highlighting the relative decline of British patenting and in concluding that 'Britain was not at the forefront of the new wave of technologies breaking at the end of the nineteenth century'. It is clear that by the interwar period levels of R&D spending in the United States were much higher than those in Britain and Germany (Edgerton and Horrocks 1994).

Accepting the notion of endogenous innovation therefore has ambiguous implications for the evaluation of British growth performance. In an era when technology was relatively hard to transfer between countries and networks of cumulative technological learning were primarily national an economic environment that encouraged a greater volume of innovative activity could also underpin divergence in economic growth (Nelson and Wright 1992). On the one hand, this may be a route to additional ways to rebut the suggestion that the American overtaking of the early twentieth century was avoidable. On the other hand, the possibility is opened up that successful policy interventions might have raised the long-run rate of growth.

In the early twentieth century the United States had several obvious features that new growth theorists might suppose were conducive to greater innovative activity than in the UK. These include a much greater

domestic market which would allow the fixed costs of R&D to be spread across higher expected sales volumes and a greater availability of engineers and science/technology graduates (Crafts 1998). More subtly, the opportunity to exploit much larger standardised markets gave American employers in many industries much greater economic incentives to undermine trade unionism and craft control of the shop floor (Haydu 1988). The implication was that by the early twentieth century UK employers had less control of levels of work effort than their American counterparts and were more exposed to 'hold-up' problems that impeded technical change that involved high sunk cost investments. Accordingly, in industries like motor vehicles where the sunk cost technology of the assembly line proved important, the British could not readily emulate Henry Ford and potential economies of scale were not achieved (Lewchuk 1987).

Other aspects of the American economy outside the compass of the neoclassical model contributed to higher TFP in industry in particular but do not connote British failure. These include the localised technological learning triggered off by American factor endowments, notably including cheap energy and industrial raw materials, which was identified by David (1975) in his rehabilitation of the Habakkuk (1962) hypothesis. Unlike the endogenous innovation processes envisaged by new growth theory, the factor endowment effect is seen as resulting from unplanned learning resulting from myopic choices of technique although it should be recognised that the abundance of natural resources in late nineteenth-century America itself reflected successful institutions (David and Wright 1997).

American natural resources were a magnet for international flows both of capital and of labour during the half-century before the First World War. As the American economy became bigger, transport costs fell and power became cheaper in large urban areas, it was able to take advantage of both internal and external economies of scale especially in manufacturing (Pred 1977; James 1983). In the way envisaged by the 'new economic geography', agglomeration benefits accrued which facilitated a switch in comparative advantage toward manufacturing and underwrote both factor rewards and further factor flows (Crafts and Venables 2001).

Although thinking in terms of endogenous TFP growth provides some further lines of defence of the performance of the pre-1914 economy, it also offers ammunition to the critics. In particular, it highlights areas where a more proactive stance by government might have promoted faster growth. Two aspects are particularly apparent, in the realms of education and company law.

A long tradition in the literature has criticised related weaknesses in technical education, research and development and in university level science and technology (Landes 1969). Since market failures may lead to sub-optimal investment in these activities this might easily suggest

that greater government expenditure was required and an appeal to endogenous innovation theory might enhance such arguments. Although this is not an unappealing argument, its importance should not be exaggerated. Recent discussions of trends in British education have tended to stress that such criticisms are much less valid by 1914 than they had been in 1890 given the vigorous expansion of scientific and technical education in the intervening years – the litany of earlier complaints prompted corrective action and any shortfall may be primarily the result of low demand by the private sector (Sanderson 1999).

It has also been suggested that external finance was particularly important for the new, science-based, industries like chemicals and electrical engineering; critics have argued that the British capital market was handicapped in mobilising resources for innovative new activities, although the extent of this has been disputed by Michie (1988). Critics highlight problems relating to issues of asymmetric information, which, in the absence of adequate legislation on auditing and disclosure of information, stood in the way of new company flotation and typically meant that growth stocks were much less highly valued in the late Victorian capital market than in recent decades. Kennedy (2000) underlined the very high-risk premium that the market attached to the shares of Brunner, Mond despite its impressive track record. In principle, these problems could and should have been addressed by reform of company law, as many later Victorians realised, but attempts at reform were consistently thwarted in parliament by vested interests (Cottrell 1980, and chapter 10 below).

There was another downside to the ability of directors to manipulate accounts at will, namely that shareholders were unable effectively to monitor the management of companies and that there was no hostile takeover mechanism to provide discipline (Hannah 1974). Not until the Companies Act of 1948 was this situation effectively remedied. This implied that the economy was heavily dependent on competition both between domestic producers and from actual or potential imports to enforce sufficient managerial effort in innovation. Not surprisingly, the best-documented case of failure to adopt a cost-effective new technique, namely, the soda manufacturers' neglect of the Solvay process occurred in a heavily cartelised industry not exposed to foreign competition (Lindert and Trace 1971). But this example was the exception rather than the rule; in general, competition could be relied upon to prevent persistent failure in most sectors of the late Victorian economy.

Overall, it seems reasonable to conclude that the general thrust of McCloskey's conclusions is broadly correct. There was no massive failure in the pre-1914 economy, any decline in the trend growth rate was slight and American overtaking was unavoidable. The argument does, however, need to be modernised and taken beyond its original confines of traditional neoclassical economics.

DID THE INTERWAR ECONOMY SUCCEED?

It would be easy to imagine that in an era of sustained high unemployment punctuated by the world depression of the early 1930s economic growth must have been very weak. In general, the empirical evidence is that macroeconomic instability is associated with slower growth, although the reason for this is not entirely clear. Using the econometric estimates reported by Martin and Rogers (2000) and the standard deviation of unemployment rates in chapter 13 below, it can be inferred that, had the lower labour market volatility of the pre-First World War economy been maintained between the wars, growth might have been almost 1 per cent per year higher.

Nevertheless, between the peak years of 1924 and 1937 both output and labour inputs grew more rapidly and labour productivity only marginally more slowly than between 1873 and 1913 (Matthews *et al.* 1982: 208). Indeed, after a lengthy discussion of the quantitative data had taken place, textbook accounts became quite optimistic: 'The view that after a poor performance in the 1920s, the 1930s saw a genuine breakthrough is indeed widespread and finds support not only in the output statistics but also in the quality of the modern investment and the structuring of British industry towards the growth-oriented sectors in the second phase' (Pollard 1983: 53). This relatively favourable interpretation appears to be echoed by the emphasis placed by Matthews *et al.* (1982: 506–7) on a U-shaped pattern in TFP growth in the British economy with a low in the first quarter of the twentieth century followed by revival in the interwar period leading on to the all-time high after the Second World War (cf. Tables 1.4 and 1.5).

The interwar economy also witnessed a major shift in supply-side policy away from Victorian orthodoxy. Prompted initially by high unemployment and the travails of the old staple industries and given considerable impetus by the world economic crisis, governments became more willing to intervene in the market economy. Among the innovations of this period were the beginnings of industrial policy in the 1920s, the general tariff of 1932, the encouragement of cartels and the imposition of controls on foreign investment in the 1930s. These changes were complemented by exit from the gold standard and cheap money so that Britain in the 1930s has been described as a 'managed economy' (Booth 1987).

Two questions immediately arise. First, how much did trend growth performance improve in the interwar period? Second, did the change in policy stance improve long-run growth potential? These issues are the main concern of this section but an important preliminary to engaging with them is to examine interwar productivity performance more closely.

In postulating a U-shape for British trend growth performance, Matthews *et al.* (1982) were claiming both that there was an Edwardian

Table 1.6 Labour productivity and TFP growth in manufacturing, 1871/1913 and 1924/37 (% per year)

	Pre-First World War			
	UK 1873–1913	Germany 1871–1911	USA 1869–1909	
Labour productivity	1.2	1.7	1.6	
TFP	0.6	0.7	0.4	
	Interwar			
	UK 1924–37	Germany 1925–37	USA 1919–29	USA 1929–37
Labour productivity	1.8	2.6	5.6	1.8
TFP	1.9	2.3	5.2	1.9

Note: $\alpha = 0.35$, $\beta = 0.65$ pre-First World War and $\alpha = 0.25$, $\beta = 0.75$ for interwar period. Labour input growth based on hours worked, except for Germany where it is persons employed. No explicit account is taken of education.

Sources: UK from Matthews *et al.* 1982; Germany derived from worksheets underlying Broadberry 1998; USA from Kendrick 1961.

climacteric and that the interwar period saw a return to growth rates both of factor inputs and of TFP on a par with those prior to 1899. Although the notion of a climacteric seems to have been overplayed by these authors, Tables 1.4 and 1.5 do suggest stronger TFP growth in the interwar period, notably in the late 1920s. Table 1.3 suggests that this may have been underpinned in part by more investment in R&D. On the other hand, non-residential investment as a share of GDP fell somewhat compared with the pre-1914 economy and, as Table 1.2 shows, both labour productivity and TFP levels were noticeably lower relative to the United States (though not Germany) in 1937 than they had been in 1911. Table 1.5 also suggests that TFP growth in the 1930s did not compare favourably with that of the 1920s, although, once again, discrepancies between the different ways of measuring GDP muddy the waters somewhat.

Table 1.6 presents estimates of productivity growth in the manufacturing sector which has been the focal point of claims of better performance. Here there is much clearer evidence of a breakthrough in labour productivity growth and, especially, TFP growth which rose from 0.6 per cent per year in 1873–1913 to 1.9 per cent per year in 1924–37. However, this is by no means outstanding relative to what was achieved elsewhere, as Table 1.6 also shows. In particular, at no time did UK manufacturing productivity performance match the surge experienced by the USA when electrification transformed the American factory in the 1920s (David and Wright 1999). If the economy was regenerated between the wars, it might seem natural to expect structural change to have played a large part and this was central to the influential interpretation put forward by Richardson (1967). This need not be the case, however, if productivity improvement took place primarily within sectors rather than being based on the

Table 1.7 Contributions to manufacturing labour productivity growth (%)

	Growth	1924 Weight	Share	1935 Weight	Share
New industries					
Motor and cycle	4.6	3.8	10.11	5.1	12.67
Silk and artificial silk	8.7	0.9	4.53	1.1	5.17
Chemicals	2.4	2.8	3.89	3.9	5.12
Rubber	7.6	1.0	4.43	1.2	4.96
Paper and printing	1.7	4.2	3.75	4.4	4.01
Electrical engineering	0.9	2.8	1.52	4.6	2.34
Aircraft	3.4	0.2	0.40	0.7	1.30
Scientific instruments	3.0	0.4	0.70	0.5	0.82
Aluminium, lead, tin	1.5	0.5	0.43	0.8	0.64
Petroleum	4.3	0.2	0.56	0.2	0.50
Total	*3.1*	*17.0*	*30.32*	*22.5*	*37.51*
Old staples					
Mechanical engineering	1.4	7.3	5.93	7.7	5.83
Iron and steel	1.8	5.5	6.05	5.7	5.57
Clothing	1.1	8.0	5.74	7.9	4.90
Woollens and worsted	1.9	4.5	5.01	3.5	3.64
Cotton spinning and weaving	1.6	7.1	6.91	3.2	2.79
Other textiles	1.2	4.1	3.46	3.0	1.89
Timber	1.3	0.8	0.61	1.1	0.79
Furniture	0.7	1.2	0.51	1.6	0.63
Leather etc.	1.0	1.0	0.54	0.8	0.42
China & earthenware	0.5	0.9	0.28	0.7	0.19
Rope, twine and net	1.6	0.2	0.19	0.2	0.17
Shipbuilding	0.1	2.1	0.13	1.2	0.07
Railway carriage	0.2	0.5	0.05	0.4	0.04
Total	*1.3*	*43.4*	*35.41*	*37.0*	*26.93*

Source: Broadberry and Crafts 1990c.

movement of resources from low to high productivity sectors or if accelerated productivity growth resulted from a new general purpose technology such as electricity which could underpin a very broad advance in productivity.

Table 1.7 reports on the extent to which 'new industries' were responsible for the growth of labour productivity between the *Census of Production* years of 1924 and 1935 using the widest available definition of the term. The table shows that, first, the relative contribution of 'new industries' in productivity growth depends partly on which year's weights are used since their relative importance in economic activity was rising over time. Second, it shows that, on average but not in all cases, 'new industries' experienced substantially faster productivity growth than the 'old staples'. This result is consistent with the suggestion that 'new industries' were important in the interwar period through their impact on intrasectoral

manufacturing productivity growth. On the other hand, a calculation of their impact through structural change does not add greatly to their impact. This is because labour productivity growth took place overwhelmingly within sectors and structural change was slow.[3]

Finally, the productivity performance of the new industries can be put in an international perspective. Here two points stand out. First, in most cases labour productivity was further behind the United States than the average for UK manufacturing. Thus while labour productivity in 1935/7 in all US manufacturing was 2.18 times the UK level, in cars the ratio was 2.94, in aircraft 3.15, in radios 3.47 and in chemicals 2.27; in the old staples, on the other hand, productivity gaps were generally lower than the average, for example textiles and clothing a ratio of 1.45 and in shipbuilding 1.54 (Broadberry 1997c). Second, the 'new industries' did not generally establish a strong position in terms of revealed comparative advantage in exporting where the most notable feature of the late 1930s was the persistence of the old staples as the UK's strongest export sectors (Crafts 1989).

Clearly, 'new industries' more than punched their weight and accounted for a substantial fraction of interwar manufacturing labour productivity growth. There is, however, no reason to believe that this contribution was particularly special. In any dynamic economy, it is normal for newer industries to grow relatively quickly as they become established. And, in this case where on average they accounted for about 6 per cent of total employment, their impact in raising the rate of growth of GDP per hour worked could not have been large. The failure of 'new industries' to establish a strong position in international trade argues against seeing their development as representing a renaissance of the British economy.

The inference drawn by optimistic assessments of the interwar economy is that the UK went through a regeneration that was an integral part of the transformation of the Victorian economy with its relatively

[3] Following Nordhaus (1972) a standard decomposition of productivity growth is obtained as follows:

$$\Delta A_O = \Sigma S_i \Delta A_i + \Sigma A_i \Delta S_i$$

where A_O is aggregate labour productivity which equals $\Sigma A_i S_i$ where A_i is labour productivity in the ith industry and S_i is the ith industry's share in employment. Thus:

$$\Delta A_O / A_O = \Sigma S_i (\Delta A_i / A_i)(A_i / A_O) + \Sigma (A_i / A_O) \Delta S_i$$

where the first term is the intrasectoral contribution (which is an employment-weighted average of within-sector productivity growth) and the second term is the structural change effect (which is changes in employment shares multiplied by their relative productivity levels).

Evaluation of this formula for 1924–35 shows that labour productivity growth was overwhelmingly intrasectoral with the second term accounting for only 0.02 (0.02) percentage points out of 1.72 (1.85) with 1924 (1935) weights (Broadberry and Crafts 1990c). This result is not very surprising: throughout the period 1907–68 labour productivity growth was overwhelmingly an intrasectoral phenomenon (von Tunzelmann 1982) and structural change was actually relatively slow in the interwar years (Matthews *et al.* 1982).

limited growth potential to an economy which could take advantage of the opportunities for faster growth after the Second World War. Looking at the British economy in isolation gives this view some plausibility but international comparisons are less kind to it since other European countries experienced much faster growth, notably in TFP, after the Second World War and overtook the UK during the golden age (Maddison 1996).

This suggests that it may also be useful to consider the interwar economy in terms of its 'social capability', i.e., what was happening to the incentive structures that affect the rate of endogenous innovation. Here the picture is decidedly more pessimistic. Three aspects of the economy give particular cause for concern in this regard, namely, capital markets, competition in product markets and industrial relations.

The weakness of outside shareholders continued in what was 'a golden era of directorial power' (Hannah 1974: 77). The Royal Mail case in 1931 where the use of secret reserves effectively to falsify trading returns was not found to be illegal highlighted the continuing deficiencies of company law (Edwards 1989). Managers continued to be immune from hostile takeover threats. Even after the 1948 Companies Act the diffuse nature of shareholding in the typical British company meant that free-rider problems allowed weak discipline and monitoring of managers by shareholders to continue to be the order of the day.

Competition is crucial to innovation and to productivity performance, as post-war evidence shows (Nickell *et al.* 1997; Aghion *et al.* 2002). Yet competition was already much weaker in the 1930s than at the turn of the century and the trend continued strongly in that direction into the 1950s. The merger boom of the 1920s helped to create a situation where across manufacturing the average share of the top three firms in an industry's output rose to 23.9 per cent by 1935 and the top 100 firms accounted for 25 per cent of all manufacturing output (Leak and Maizels 1945; Hannah 1983). By the mid-1930s, cartels, which were encouraged by government, accounted for about 30 per cent of manufacturing output (Mercer 1995) while the introduction of widespread tariff protection in 1932 reduced competition still further. At the microeconomic level, weaknesses in competition were clearly related to poor productivity outcomes in the 1930s (Broadberry and Crafts 1992a). And, given the difficulty of tackling agency problems within the firm, it is not surprising that business historians point to the 'cosy amateurishness' of large companies (Gourvish 1987) and many examples of inadequate strategic vision among large companies (Hannah 1983).

Finally, the Victorian structure of industrial relations continued with no significant reform. Broadly speaking, it entailed a decentralized system of collective bargaining with a substantial incidence of multiple unionism. This contrasted with the moves towards greater co-ordination in some other European countries which underpinned post-war 'social contracts' geared to wage moderation and high investment (Crouch 1993;

Eichengreen 1996). In conditions where, in general, the bargaining power of workers was undermined by low levels of economic activity and where the scope for introducing American technology was limited, this may not have been a serious handicap but it was to become one in the 1950s and 1960s (Bean and Crafts, 1996).

This analysis as a whole indicates that the new policy stance that had come into being by the 1930s was unfortunate for long-run productivity performance, however understandable it may have been as a political response to the shocks to which the UK was subjected. Interwar economic policy was, of course, strongly affected by the persistent unemployment of the time and in the 1930s by attempts to restore the profitability of industry and the employability of labour in the face of price declines in the tradable goods sector that raised real wages given the stickiness of money wages. This helps to make sense of what otherwise would seem an incoherent package of measures adopted in the 1930s (Booth 1987).

In some respects, policy was successful in the short term. For example, Kitson and Solomou (1990) found that newly protected industries experienced a sharp increase in output and productivity growth in the years 1930–5 compared with 1924–30 while this was not the case for non-newly protected industries. Nevertheless, they saw this essentially as a Keynesian policy that reduced the extent of underutilization of productive resources and accepted that it probably slowed down the regeneration of the economy. In the case of the steel industry, additional tariff protection was given to facilitate rationalisation. While this stemmed contraction in the short run, since the removal of protection was politically unthinkable given the industry's location in high unemployment areas, the policy was ineffective in promoting productivity improvement but merely sheltered inefficent vested interests (Tolliday 1987).

In effect, there was a conflict between short-run employment objectives and the promotion of long-run productivity performance particularly since, once in place, policies that reduced competitive pressures on British business would prove hard to rescind. This has always been recognised in the literature. The advent of new growth economics and the recognition that post-war British innovation and productivity performance has been seriously undermined by agency problems within firms (Broadberry and Crafts 2001) suggests that the downside was considerably more serious than used to be supposed.

Overall, it seems that the optimism about economic growth in the 1930s expressed by writers like Pollard is not really warranted. There was no marked and sustained improvement in TFP growth above the levels that the UK in the second half of the nineteenth century could normally achieve and the increasing contribution of the 'new industries' should not be regarded as a major breakthrough. Relative to the pre-First World War period, manufacturing productivity growth accelerated but still compared less well with other leading economies. Especially during

the 1930s, developments in supply-side policy were generally adverse to long-run productivity growth prospects in that they weakened management incentives to adopt innovations rapidly and to pursue cost reductions energetically. It should be recognised, however, that growth might have been appreciably higher if the macroeconomic environment had been more stable.

POSTSCRIPT: MARKET FAILURE OR GOVERNMENT FAILURE?

Allegations that the pre-1914 economy failed are, at bottom, claims of market failure – either that markets failed to achieve a restructuring of the economy that would have had a positive social rate of return or failed to enforce the efficient management of business enterprises through market discipline or failed to achieve optimal levels of investment in cases where there were positive externalities on offer. The critics assert that government intervention to correct market failures would have been desirable (Elbaum and Lazonick 1986). In this sense, the problem also becomes one of government failure.

Government failure can also, however, come in the form of badly designed interventions and/or policies that seek votes rather than promote economic efficiency. A classic example is protectionism which rewards well-organised producer groups at the expense of small losses per person to large numbers of disparate consumers and which tends to operate therefore to slow down restructuring of economies in the face of technological change or shifts in comparative advantage. The post-1945 history of British industrial policy is a good example of this (Crafts 2002) which, of itself, calls into question the claim that more state intervention would have improved the economic efficiency of late Victorian Britain.

Our review of the interwar economy suggests, however, that for the UK economy the problem has been potentially more serious. If it is the case that there has been a persistent, and distinctly British, weakness in shareholders' ability to control the management of firms, then productivity performance would have been enhanced by stronger competition policies but weakened by moves to industrial policies which entailed subsidies that cushioned management from the need to innovate and to control costs (Aghion *et al.* 1997). Yet, as the problems of the British economy intensified, political pressures pointed in the opposite direction and the role played by competition in preventing egregious failure in the Victorian economy was undervalued. By the golden age period after the Second World War, unfortunately, industrial policy rather than competition policy was to be entrusted with stimulating economic growth.