4

The Productivity Puzzle in Britain

He who rejects change is the architect of decay. The only human institution which rejects progress is the cemetery.

—Harold Wilson, British Labour Prime Minister (1964–70, 1974–76)

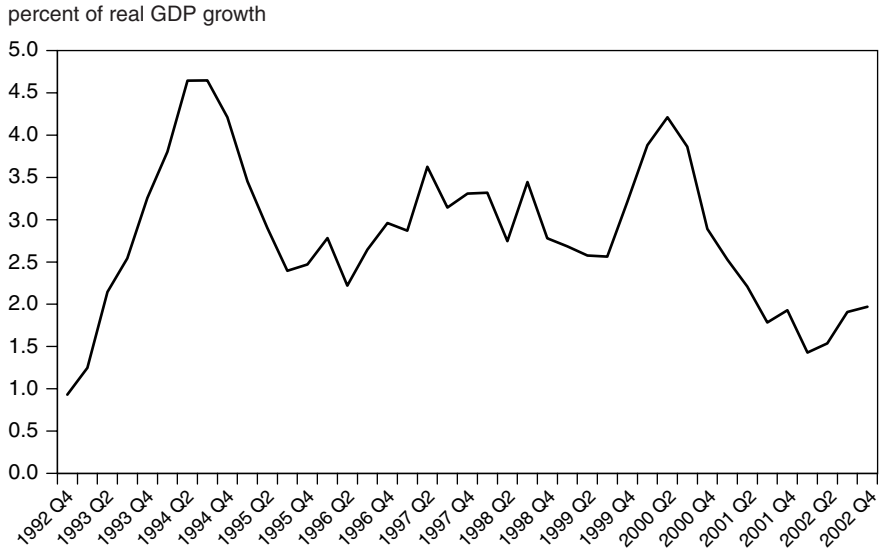
Previous chapters have made the case for economic reform in Europe as a key instrument of improving economic growth, and we have argued that both product-market and labor-market reforms are important. According to some estimates (notably the rankings prepared by the OECD and discussed later in this chapter), the British economy has both liberal and flexible product and labor markets. On that basis, we should expect the performance of the British economy to be among the best in Europe.

In practice, recent British economic performance has not been bad, indeed real GDP grew at close to 3 percent a year on average from the fourth quarter of 1992 through the fourth quarter of 2000, and the British economy has come through the global slowdown after 2000 relatively well (figure 4.1). This compares to the situation for much of the postwar period, when the British economy was more rigid and economic growth was much slower than in continental Europe. The level of GDP per capita, the British economy is now comparable to France and Germany.

The biggest puzzle of the British economy is that the level of productivity remains substantially lower there than in France, Germany, and the United States—a gap of about 20 percent in 2001.[1] Britain has achieved a level of per capita income comparable to that in France and Germany by greater utilization of labor. Labor productivity growth was not bad over the period 1980 to 1995, as measured by GDP per hour worked, but was not fast enough to significantly close the gap with the other economies. Moreover, the rate of productivity growth seems to have slowed since then.

1. This gap is based on GDP per hour worked. Comparisons of business-sector output per worker find a larger gap. See Griffith, Harrison, Haskel, and Sako (2003).

Figure 4.1 Britain's real GDP growth, 1992–2002



Note: Quarterly real GDP growth compared to same period previous year. Seasonally adjusted at chained volume measures.

Source: UK Office of National Statistics (2003).

Understanding the reasons for the low level of productivity in Britain is important in itself, but it also has implications for the earlier discussion about how to improve productivity growth in the rest of Europe. If the British economy really has flexible and competitive markets, then this paradox challenges the conclusions of chapter 3.

We will argue that resolving this paradox relies on several factors. First, productivity in the British economy was held back by several problems that are separate from market competition and flexibility. One such issue is the relatively low-skilled workforce. Second, a time lag seems to be at work. Many of the economic reforms and policy changes that have occurred in Britain have not yet achieved their goal of closing the productivity gap. If true, productivity growth should increase more rapidly going forward. Third, even though significant economic reforms were implemented in Britain, some were incomplete or were not accompanied by a regulatory environment that really encouraged greater competition. Indeed, in some areas, reform efforts were quite inadequate.

Finally, it was noted earlier in this book that average labor productivity in France and Germany is inflated by the exclusion of low-skilled workers from employment. By the same argument, when comparing Britain to France and Germany, the higher levels of British employment are likely to carry a productivity penalty. Although this last point can explain only a

portion of the productivity gap to continental Europe and none of the gap to the United States, it is worth noting.

This chapter will provide a summary view of the productivity issues in Britain. Since the time-lag hypothesis is an important one, this summary starts with a short historical context as a background to understanding the current productivity puzzle.

Economic Performance in the Postwar Period

Although British unemployment, like unemployment in many other European economies, remained low in the 1950s and 1960s, there were other signs of economic difficulties.[2] In particular, productivity growth and overall economic growth were much slower than in the rest of Europe, as we noted in chapter 2. Britain's slow economic growth actually preceded the post–World War II period. Although the first country to industrialize, Britain fell behind the United States in per capita income in the 19th century and then experienced severe economic problems and very high unemployment throughout the interwar years.[3] In 1945, Britain therefore faced the major economic challenge to rebuild and modernize its economy and resume its place as one of the high-income, high-productivity economies. The country did succeed in rebuilding after the war and restoring a full-employment economy, but it failed to meet its full growth performance potential. In fact, Britain became known as "the sick man of Europe."

Among the many reasons for this poor relative performance, the fact that Britain had fought two world wars and experienced chronic high unemployment in the interwar period influenced economic policy priorities and social attitudes. As part of the winning alliance of both world wars, Britons saw the postwar period as a time to reap the returns of victory and preserve traditional jobs and institutions[4]—not a time to embark on an intense global struggle for economic success. The development of the welfare state became a priority of economic policy, and major industries were nationalized rather than being allowed to contract or restructure to be more competitive.

In the British labor market, an attitude prevailed that emphasized fighting over shares of a given economic pie rather than expanding the size of the pie. In contrast, although World War II inflicted terrible losses on the

2. The classic study of postwar Britain is by J. C. R. Dow (1964).

3. Britain was hardly the only country to experience economic problems in the interwar years. It missed out on the extended period of prosperity that the United States achieved from 1918 to 1929 and then was caught up in the Great Depression of the 1930s.

4. The British "government sought a cooperative 'social contract' with the trade unions, in which wage restraint was accepted in return for welfarism, a commitment to full employment and noninterference in industrial relations" (Bean and Crafts 1996, 141).

losing countries—Germany, Italy, and Japan (and even France, which had been occupied)—Olson (1984) has stressed the economic advantages for these countries in losing the war, in terms of disrupting existing special interests and forcing a focus on rebuilding, restructuring, and recovery.

When the slowdown in productivity growth occurred worldwide after 1973, Britain was somewhat insulated. Since the country had never achieved rapid growth after the war, it had never reached the productivity frontier and therefore did not face a substantial slowdown. In other respects, however, Britain did share the tough economic conditions of the 1970s and the high inflation associated with oil price shocks and other disruptions affecting the other advanced economies.

Discontent over prolonged poor economic performance and the sharp relative decline of the British economy compared to Europe eventually caused major change in political fortunes and, hence, in economic policy. The Labour Party lost support in the 1970s partly because of its inability to stand up to intractable unions that escalated strike activity. Margaret Thatcher, who had become the leader of the Conservative party in 1975, became prime minister in 1979. The Social Democratic Party split from Labor in 1981 and together with the preexisting Liberal Party further fragmented the opposition, allowing Prime Minister Thatcher to sustain a majority in the Parliament and remain in power until 1990.[5] The Conservative party under John Major held on to power further until 1997.

Unlike traditional Conservative party leaders, Thatcher was an ideological free marketer, whose mission was to overturn the rigid British economy that had developed for much of the 20th century and break the power of the labor unions. She also wanted to cut back the welfare state that had grown up after the war, reduce taxes as a way of improving economic incentives, and privatize the state-owned industries that had been nationalized by postwar Labour Party governments. Thatcher was a reformer who embraced many of the economic principles that have been praised in this book. In practice, however, her economic policies were a mixture of good and bad.[6] She favored market solutions and privatization, which was usually a move in the right direction for improving productivity. However, these free-market policies did not always result in a high level of competition—an essential element if market forces are to drive higher productivity. In fact, in some industries there are tricky regulatory issues that cannot just be left to the market—situations in which Thatcher was unwilling to face up to the implications of market failures.

In order to reform the British economy, Thatcher had to maintain support among Conservative Party MPs (members of Parliament), whose base of support included a number of special-interest groups uninterested

5. The Social Democrats and the Liberals united in 1988 as the Liberal Democrats.

6. For a critical view of the Thatcher policies, see Buiter and Miller (1983).

in creating a fiercely competitive economy. We will document later, from case study evidence, some of the ways in which both barriers to competitive intensity and subsidies to failing companies were kept in place. But even before that, we have seen in chapter 3 that manufactured-goods prices in Britain in the 1990s were as far above the lowest world prices as those of the other countries in Europe. Thatcher's reforms apparently did not render the British economy fully open to international competition.

Another important issue is macroeconomic policies. Britain faced a serious inflation problem in the 1970s. Thatcher embraced monetarism and the use of rigid money supply targets as the solution to inflation. Paul Volcker did the same when he took over as Federal Reserve chairman in 1979, but he quietly abandoned the use of money supply targets in 1982 when the US economy was plunging into decline. Thatcher and her advisers were not as flexible. In Britain between 1981 and 1995, the unemployment rate exceeded 10 percent for 9 years out of 15 and was below 8 percent in only 1 year.[7] In the United States, by contrast, the unemployment rate exceeded 10 percent only very briefly and was below 6 percent by the end of the 1980s.[8] The macroeconomic instability and stagnation of the 1980s in Britain discouraged investment and left millions of long-term unemployed with limited work experience. *Thus, the poor macroeconomic environment slowed the British economy's ability to achieve strong growth after reforms*.

Despite these setbacks, Thatcher substantially transformed the labor market and shifted away from nationalized industries. The labor unions' power to set wages and control work practices was greatly diminished. With union power reduced, an independent Bank of England committed to flexible inflation targeting has achieved a combination of low unemployment and low inflation since 1997.[9] On the product-market side, one can argue that the rush to privatize was necessary to lock in the shift away from government ownership. Even though the privatized companies remained inefficient and monopolistic for some time, competition increased gradually in such industries as telecom and electricity generation (in the case of the railways, however, privatization has been a failure).

The New Labor Party has been in office since 1997 under Prime Minister Tony Blair but is very different from the old Labour Party. Although there has been a lot of talk and some action to improve social services like

7. The figures are from the US Bureau of Labor Statistics and are comparable to US unemployment definitions.

8. It should be noted that despite the fact that Thatcher was no particular fiscal hawk, British government spending was generally less expansionary than that of the United States during the Reagan years in the 1980s. According to the IMF *World Economic Outlook* database from April 2004, the average British general government balance in percent of GDP from 1980–89 was 2.3 percent, whereas the US similar average balance was 4.4 percent.

9. The Bank of England was granted independence from the UK Treasury by the new Labour government in 1997.

the National Health Service (NHS), most of the fundamental economic changes Thatcher initiated have remained.

In summary, Thatcher was a blunderbuss who first shot away some of the long-standing rigidities in the British economy but was unable to follow through with consistent volleys by not supporting competitive markets and by misunderstanding the real needs of the market.

Resolving the Productivity Puzzle: Capital, Skills, and Other Factors

While reviewing the economics literature we encountered several explanations for the productivity puzzle, and we address some of these issues in this section.

- The level of the capital stock is low in Britain.
- British companies may not be using enough information technology (IT) or using it effectively.
- The British economy is not seen as very innovative. The level of research and development (R&D) is low, and British universities have not developed links with business to the extent that US universities have. Porter and Ketels (2003) have suggested, in particular, that Britain lacks the university-centered technology clusters needed for rapid economic growth.
- The quality of the British workforce may be lower than in other advanced economies. This argument takes various forms: British students perform poorly on standardized tests of literacy and numeracy and many of them lack the job skills that businesses need; A relatively small fraction of the British population has received advanced education; British managers may be inferior to managers from the United States or continental Europe; and British workers are difficult to manage, either because of unions or the legacy of many years of conflicts between workers and managers over work practices.
- Britain is still relatively highly regulated in some sectors such as retail distribution.

We will explore these issues in turn, but some important caveats should be kept in mind. First, even if some of these reasons for lower productivity are valid, they may not be root causes of the problem but instead symptoms of deeper causes. Second, while it is possible to look quantitatively at the education level of the workforce and at the results of standardized tests, the nebulous questions of worker attitudes and manager-

ial capability are harder to pin down. In general, it seems best to rely on explanations of this type only as a last resort.

We start with results from the growth accounting framework, which provides a base analysis of the importance of capital and education/skills to the productivity gap, two of the issues raised above. Growth accounting has been applied to comparative data to assess the relative contributions of different factors to the productivity gap between Britain and other major economies. We noted in chapter 3 how growth accounting is used and some of the problems with this approach, but it is helpful to see what the studies say.

Using Growth Accounting to Decompose the Productivity Gap

A study by O'Mahony and de Boer (2002) compares Britain to France, Germany, and the United States, and the results are illustrated in figures 4.2 and 4.3. The figures take the labor productivity gap in either the market economy (figure 4.2) or the whole economy (figure 4.3) between Britain and each of the other three other economies and sets that equal to 100 for each bilateral comparison. Growth accounting is then used to determine the proportion of each gap accounted for by differences in labor quality (skill), capital intensity, and multifactor productivity (MFP).[10]

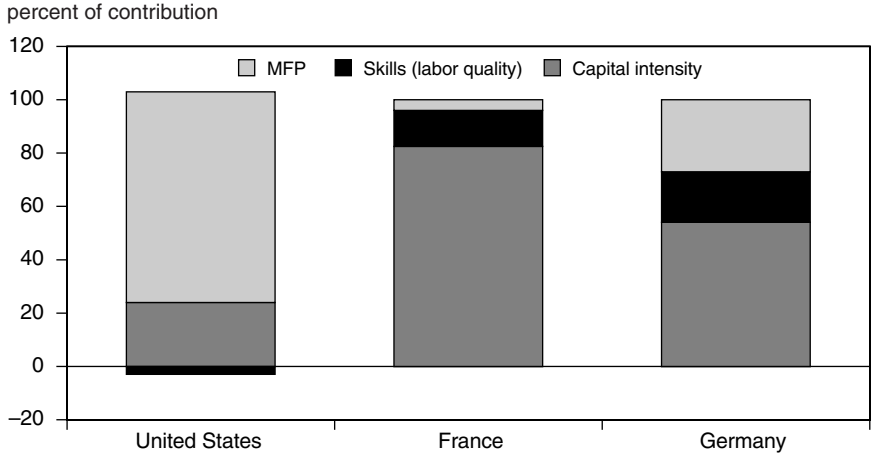
Taken at face value these 1999 results show that for the market economy, Britain's labor productivity gaps to France and Germany were mainly due to differences in capital intensity followed by differences in labor quality. For Germany there is also an MFP advantage relative to Britain. In contrast, the gap to the United States in the market economy is mostly attributed to MFP differences, though capital intensity also plays a role. In addition, the United States has a small skill disadvantage relative to Britain.

With the exception of France, a different picture emerges for the productivity gaps for the whole economy. For Germany, MFP is no longer a factor, and the overall productivity gap is accounted for mostly by capital intensity and some skills. In the comparison to the United States, the gap is accounted for roughly fifty-fifty by MFP and capital intensity. The sources of the labor productivity gaps with France look very similar in both the market and total economy.

Some general conclusions can be drawn from these rather diverse results. First, capital intensity is lower in Britain than in the other three countries. Second, France and Germany maintain a productivity advantage because of higher skill levels in the workforce, whereas the United States has higher MFP. Germany too may have higher MFP in its market economy.

10. Note that the MFP differences are basically the residual gap and unexplained by the other two factors.

Figure 4.2 Labor productivity gap: Contribution of capital intensity, skills, and MFP to the market economy, select countries, 1999



MFP = multifactor productivity

Note: Labor productivity gap = 100.

Source: O'Mahony and de Boer (2002, table 8).

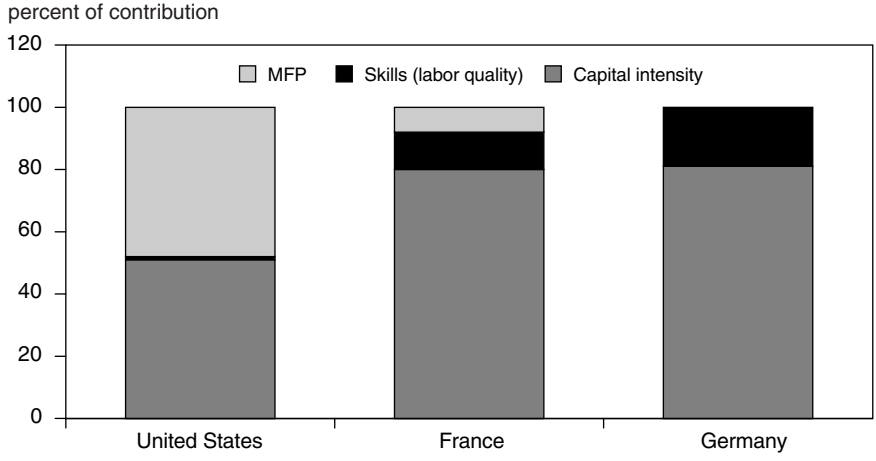
Results like these have given rise to a fairly widely held view of the productivity problem in Britain. Britain has failed to make adequate investment in both physical capital and human capital, which explains why it lags behind continental Europe. Compared to Britain, the United States also has high capital intensity. However, like Britain, the United States has weaknesses on the skill side, which is balanced by better management and business systems that result in higher MFP.[11] Based on these aggregate comparisons, we look in more detail at the issue of capital intensity and skills in Britain.

Capital Intensity

Various explanations have been suggested for Britain's historically low capital intensity compared to its peers: a low rate of national saving; failure to take advantage of economic opportunities; a history of macroeconomic volatility that has reduced investment; and a largely equity-based financial market that favors a short-term outlook.

11. In part France and Germany enjoy the "skill advantage" because these economies eliminate many low-productivity jobs and exclude many low-skilled workers from employment.

Figure 4.3 Labor productivity gap: Contribution of capital intensity, skills, and MFP to the total economy, select countries, 1999



MFP = multifactor productivity

Note: Labor productivity gap = 100.

Source: O'Mahony and de Boer (2002, table 8).

Not all of these explanations make sense. Britain has had a sophisticated and international capital market for many years, with substantial inflows and outflows of capital. If there were good investment opportunities available in Britain, domestic companies could have taken advantage of them, rather than investing heavily overseas. Instead, Britain is the largest holder of foreign direct investment (FDI) in the United States—presumably because British companies judged the returns to be higher.

Given the aggregate findings, it is apparent that British companies do not have the level of capital equipment necessary to become "best practice." The following example illustrates both this point and the fact that just adding capital will not necessarily solve the problem.

In 1994, BMW purchased Rover for £800 million from British Aerospace.[12] Subsequently, BMW invested nearly £4.5 billion in the automobile company, which also included the Land Rover and Mini brands. Nevertheless, BMW had difficulty improving the quality of the vehicles—particularly of the Rover brand—to generate adequate sales, and they faced significant financial losses. In 2000 BMW discarded most of the assets, transferring Rover to its former management team in a management buyout for the "princely sum" of £10 and the Land Rover brand to Ford Motor

12. British Aerospace acquired Rover from the British government in 1988.

Co. for £1.8 billion. BMW CEO Bernd Pischetsrieder, the original architect of the Rover purchase, was fired, and BMW retained only the Mini brand.

The new and completely redesigned Mini has achieved some success, particularly in the United States, after its launch in 2002. Nonetheless, the small volume of Minis that BMW will sell cannot recoup the previous losses it incurred. Hence, while BMW has proven that successful cars such as the Mini can be manufactured efficiently and competitively in Britain, this required billions of pounds in product development and capital investment.[13] Although an increase in capital investment did raise labor productivity in the end, it is clear that BMW received an inadequate return on that investment. BMW's experience in the British auto industry can be contrasted with that of the Japanese, which is more fully described in the case study given later in this chapter. The Japanese built new plants and brought their whole production system with them; they did not try to improve old plants.[14]

More generally, while additional capital is a necessary ingredient in many industries to bring productivity up to world-class levels, the fundamental question is why Britain's rates of return from investment are not more attractive, for both British companies and foreign multinationals seeking FDI opportunities. If market conditions and the resulting rates of return to capital were more attractive, the lack of capital problem would solve itself.

One reason sometimes given for the low capital intensity in Britain, compared with Germany, is that Britain has an equity-based capital market (where companies are expected to show high profit growth even in the short run). By contrast, Germany has used high domestic-saving rates to channel funds to national companies through local banks with very strong ties to area businesses. The high domestic saving then resulted in high domestic investment. Although this may provide a partial explanation of higher capital intensity in Germany, it is less clear that an equity-based system is really the problem. As noted earlier, the German system worked well during the postwar years of rebuilding and expansion, but it is less successful now.[15] Moreover, it is not clear that equity-based systems consider only the short term. For example, there is evidence that the equity market values R&D investment.[16] One can even argue that shareholders in the US equity market in the 1990s were actually placing too great a value on companies with neither short-term earnings nor prospects of positive

13. For additional information on BMW's purchase of Rover, see Brady and Lorenz (2000).

14. Honda, which previously owned 20 percent of Rover, supplied engines and engineering expertise to the company until it was sold to BMW in 1994.

15. See Broadbent, Schumacher, and Schels (2004) for a critique of the German capital allocation model.

16. For examples, see Hall (1998) and Hall, Jaffe, and Trajtenberg (2000).

Table 4.1 Growth in capital investment, 1979–99 (percent)

Years	Britain	United States	France	Germany[a]
1979–99	2.78	0.77	2.48	2.71
1979–89	2.74	0.50	3.20	2.42
1989–99	2.81	1.04	1.75	2.99
1989–95	3.62	0.80	2.50	3.45
1995–99	1.60	1.40	0.62	2.30

a. Derived by using growth rates for West Germany for 1979–89 and unified Germany from 1989 to 1999.

Source: O'Mahony and de Boer (2002, table 4).

future earnings for many years into the future. Thus, the US equity market perhaps had too long a time horizon or too rosy a view of the long run. Presumably investors thought there would be profits some time.

In short, the low capital intensity in Britain may be a proximate cause of the productivity gap with continental Europe and the United States, but it is surely not the root cause. Rather, capital investment has not in the past earned a high enough return to justify closing the capital intensity gap with other countries, as illustrated by the BMW example. The case studies discussed later in the chapter also shed light on the issue.

Even though capital intensity is relatively low in Britain, capital investment has increased significantly in the last decade and was particularly strong in the early 1990s (table 4.1).[17] Increases in capital investment indicate that some of the reasons for low returns may have diminished as the British economy was liberalized and that productivity growth will also pick up going forward.

Innovation and R&D

Product and process innovation is the key to productivity growth. In chapter 3 competitive pressure was emphasized as the most important driver of innovation, and the nature of productivity-enhancing innovation is often organizational rather than technical.

However, in a range of manufacturing industries technology can drive innovation and productivity, and R&D is an important sign of innovative effort. R&D's importance to productivity is necessary given the need for industries to possess the technological sophistication to take advantage of worldwide advances, even if they have not developed the technology themselves. A study of a group of Organization for Economic Cooperation

17. In fact, capital intensity actually grew faster in Britain than in the United States, France, and Germany from 1979–95.

Table 4.2 Average research and development (R&D) expenditures as shares of output, 1973–98

	Britain	United States	France	West Germany
Total economy (percent)				
1973–79	1.36	1.54	1.06	1.42
1980–84	1.45	1.83	1.19	1.75
1985–89	1.49	2.04	1.35	2.04
1990–98	1.35	1.98	1.45	1.77
Manufacturing (percent)				
1973–79	4.61	6.34	3.95	3.77
1980–84	6.13	8.31	4.85	5.17
1985–89	5.73	9.28	5.73	6.16
1990–96	5.94	8.39	6.61	6.37
Relative R&D stocks/output, 1996				
Total economy	100	138	100	126
Manufacturing	100	142	106	109

Source: Crafts and O'Mahony (2001, table 4).

and Development (OECD) countries by Griffith et al. (2000) further supports this view. The study finds that R&D increases productivity directly through more innovation and indirectly via increased technology transfers.

Britain lags France, Germany, and the United States in R&D spending in relation to GDP (table 4.2). In addition, R&D in Britain is concentrated in only a few industries: the pharmaceutical, biotechnology, aerospace, and defense sectors. This contrasts with total R&D worldwide, which is largely concentrated in IT hardware, automotive, pharmaceuticals, and electronics sectors (DTI 2002a).

Does Britain's lack of R&D spending suggest technological inferiority is a reason for the productivity gap? Not necessarily since too much emphasis should not be placed on R&D. The bulk of the British economy—and other advanced economies—is in the service sector where very little formal R&D occurs. In fact, these sectors often use technology but can generally buy existing technology on world markets.

As we will see later in this chapter, there are indeed signs that the British economy lacks innovative initiative. But as was the case with physical capital, the low level of R&D seems more a symptom than a basic cause of the productivity gap. Policies that increase competitive intensity are likely to increase R&D spending and innovation as firms become more efficient in response to increased competitive pressure.

One policy reform that could help the technology sector is to increase basic R&D funding at universities and encourage links between academia and private companies to speed the flow of ideas into commercialization. Although already under way in some schools such as Cambridge University, the funding could be spread more widely. The United States provides

numerous examples of how university funding can increase innovation in high-tech sectors.

IT Capital Investment

Studies have examined the role of IT capital in Britain's productivity growth to determine whether business has invested adequately in IT and whether the investments have been used effectively. Oulton (2001) looks at four types of IT—computers, software, telecommunications equipment, and semiconductors—in an attempt to estimate the contribution of this type of capital to growth in Britain. Based on standard data it seemed that Britain's IT investment level was pretty low.[18] But Oulton adjusts Britain's official numbers for software investment upward by a factor of three on the basis that official statistics are substantially understating the figures.[19] In addition, he uses US producer price indexes (PPI) for IT (after adjusting for exchange rate changes) because the US indexes capture the rapid growth in computer quality over time whereas the British deflators do not. Accepting Oulton's adjusted figures, total British investment in IT was more than 3 percent of GDP in 1998, which is as large as total US IT investment (figure 4.4).[20] The stock of IT capital in Britain is lower than in the United States, but the growth in investment is very similar. OECD comparisons of IT investment also suggest that Britain has invested comparably to France and Germany in this form of capital. Therefore, a lack of IT capital is not an important source for Britain's productivity gap.

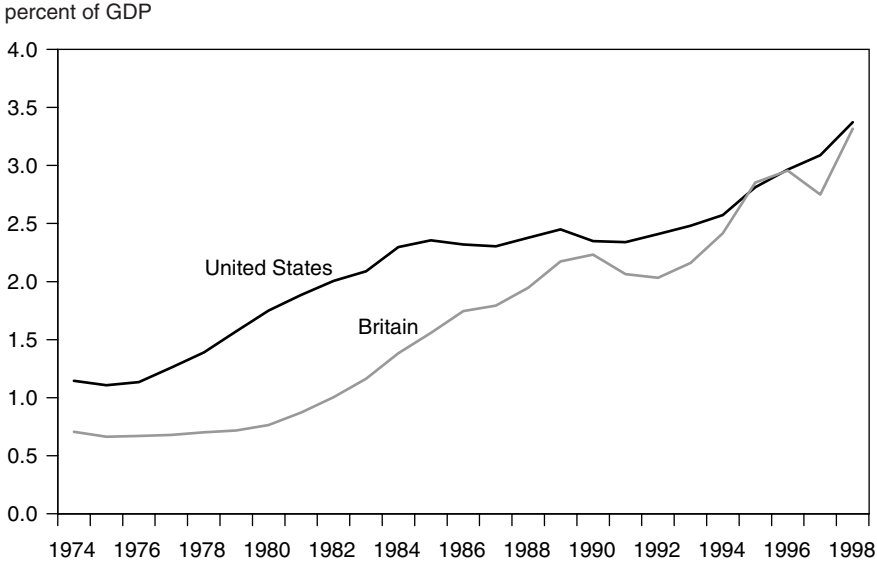
Studies by Basu et al. (2003) and by van Ark, Inklaar, and McGuckin (2002) break down the total economy into industry groupings based on

18. In the past, the higher cost for computer equipment and peripherals in Britain may be one reason the country lagged behind the United States in IT investment. However, these prices are declining rapidly. Brand (2001) provides a comparison of the British producer price index (PPI) for desktop and laptop PCs and US PPI for desktops and workstations. Note, though, that IT prices remain high for British consumers.

19. Oulton (2001) justifies the adjustment on the basis that British software investment in the 1990s was approximately 39 percent of computer investment compared to 140 percent for the United States using official figures—numbers that Oulton does not consider feasible. Oulton also does not find it feasible that the proportion of sales of the computer services industry defined as investment in Britain was 18 percent in 1996 compared to 60 percent in the United States. Furthermore, applying the US methods for estimating "own account" software and a reexamination of the survey data reinforces the need to triple the official software numbers. Finally, Oulton measures capital services differently than the UK Office of National Statistics, where cumulative investment is used to estimate the capital stock for each asset and depreciation is taken to be geometric at Bureau of Economic Analysis (BEA) rates. The assets are then weighted together based on rental prices rather than asset prices to obtain the total capital stock.

20. Oulton estimates software investment to be 1.56 percent of GDP in 1998, which is very close to the 1.7 percent estimate provided by Ahmad (2003). Ahmad's figures were based on OECD Task Force recommendations for estimating software in the national accounts.

Figure 4.4 Adjusted total IT investment in Britain and the United States, 1974–98 (current prices)



IT = information technology

Source: Oulton (2001, chart 1).

their use of IT. We discussed the van Ark, Inklaar, and McGuckin study in chapter 3. It suggests that industries using IT in Europe were not as successful in taking advantage of new technological advances as were US companies in the same industries. For Britain, van Ark, Inklaar, and McGuckin found that slower productivity growth after 1995 was concentrated in industries that were not major IT users.

The Basu et al. study (2003) focuses on comparing the effect of IT in the United States and Britain. The main hypothesis is that a lag time exists between purchasing IT capital and its subsequent positive productivity. The lag occurs because companies must accumulate know-how or other forms of intangible capital along with the IT investment. Basu et al. argue that productivity growth will actually be held down during periods of rapid IT capital accumulation because companies devote resources to developing the intangible capital needed to take advantage of their investment rather than just producing output.[21]

The authors' key empirical result, based on industry-level productivity estimates over time, is that US MFP growth is positively related to past IT

21. Basu et al. acknowledge that the lag-time hypothesis is present in earlier literature. See also chapter 3 for more information.

investment but negatively related to contemporaneous IT investment.[22] Therefore, they conclude that *IT investment has a strong positive but delayed impact on productivity*, with a lag of about five years. Basu et al. apply this idea to Britain and argue that the rapid IT investment in the late 1990s actually slowed productivity growth in the same period. They are correspondingly optimistic that future growth will be faster. They are very cautious in their ultimate conclusions, however, because the statistical regression analysis that showed the delayed effect of IT in the United States failed to yield comparable results in the British data.

Although some merit should be given to the Basu et al. argument, some caution is needed as well. As they acknowledge, their empirical results are not strong enough to take a lot of weight. For instance, the authors turned US standard growth accounting on its head by suggesting that the rapid rate of IT capital investment in the late 1990s actually lowered productivity growth.

We believe that the evidence about the lag time between IT investment and productivity does provide some support for the view that the productivity convergence in Britain will occur. But in line with the discussion in chapter 3, it is important not to overstate the extent to which IT is the cause of slow or fast productivity growth. The evidence described in this section is valuable but not conclusive.

Labor Skill and Education: Skill Shortages Affect the Productivity Gap

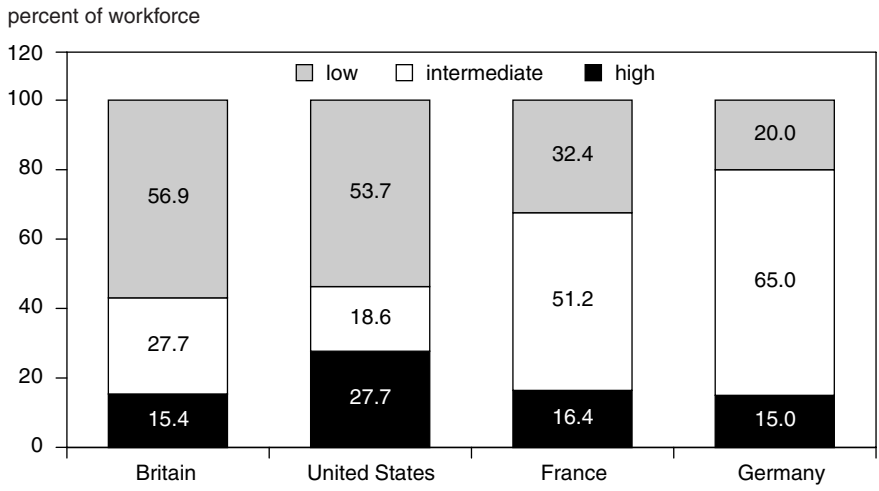
One interpretation of the growth accounting results given earlier is that Germany and the United States followed different paths to high productivity. Germany relies on a workforce with a large segment of workers with intermediate (vocational) skills (and high capital intensity), a large manufacturing sector, and the production of high-quality, high-value-added products. Although the bulk of the US workforce is low skilled, the United States also has strong universities as well as a strong managerial and entrepreneurial component to balance its workforce. The high variance of skill levels in the United States is reflected in the wide distribution of wages.[23]

Britain's economy falls between two stools. Lacking trained and innovative managers, Britain does not have the ability of US companies to be

22. Since their dependent variable is MFP growth, Basu et al. have included the normal positive effect of contemporaneous IT capital investment on labor productivity growth. Their regression results then suggest that standard growth accounting substantially overstates the effect of IT capital on labor productivity growth.

23. Unlike Britain, the United States has an extensive community college system that primarily teaches vocational skills with training programs in such fields as electricity, auto mechanics, and computer technology. In 2000, nearly 6 million students were enrolled in these two-year colleges in the United States. Davis and Wessel (1998) argue that community colleges have increased worker skills and allowed people to find employment or obtain better jobs.

Figure 4.5 Skill levels of workforce, select countries, 1999



Note: High = degree level or above
Intermediate = vocational qualifications above general schooling but below degree
Low = general schooling only

Source: O'Mahony and de Boer (2002, table 5).

productive with low-skilled workers (the Wal-Mart or McDonald's model). The country also does not have the highly skilled labor—created with vocational training—to produce high-value-added products like German luxury autos or specialized machine tools.

In evaluating this idea, there clearly is evidence that the skill and education level of the British workforce is low. Figure 4.5 illustrates the pattern described above, with Britain having fewer intermediate-skill workers than France and Germany and fewer high-skilled workers than the United States. According to the Sector Skills Development Agency (SSDA) (2003, 7), "over a third of the working-age population in Britain have no trade, professional or advanced qualifications" and "nearly 7 million adults are functionally illiterate." Many children in Britain drop out of school at age 16 (the legal minimum), and Britain has one of the lowest participation rates in education among OECD countries for those 17 years of age (SSDA 2003, 7).

The SSDA also reports that "at least a third of organizations [in England] that experience skill shortages or skill gaps report negative effects on organization performance" (2003, 6). In 2001, 8 percent of all establishments in England had skills shortages and 25 percent of companies with vacancies found it hard to fill positions due to the lack of appropri-

ately skilled workers. A study by Campbell et al. (2001) for the UK Department of Education and Skills concluded that skill deficiencies in certain occupational categories have a more pronounced negative effect in the range of problems they cause and the number of organizations they affect, particularly for those in management, skilled trades, and professional occupations.

The UK Employers Skill Survey of 2002 (Hillage et al. 2002) also measured skill gaps. The survey asked respondents (employers in the sample) to assess whether their employees were fully proficient at their job and, if not, to what extent they were not proficient. In the survey a firm has a skill gap if some employees are not considered fully proficient. The main components of proficiency according to the survey respondents are quality and efficiency of performance. The survey results suggest that about 23 percent of firms had internal skill gaps in 2002—an increase from the 16 percent reported in 2001. The skill gaps occurred most frequently among sales and customer-service staff, with only 16 percent of respondents considering over half or more of their staff proficient at their job.

Management skills in Britain are considered by many to be below US standards. One reason put forward is that many British firms do not operate on the best-practice frontier and therefore many managers learn the job in a second-best environment (Nickell 2002). Moreover, Britain has a lower share of formally educated managers and tends only slowly to adopt modern management techniques. For example, according to Mason and Finegold (1997) graduate engineers are responsible for gradual innovations and improvements in the work of less-skilled employees in US manufacturing factories that increases productivity, whereas Britain has a relative shortage of graduate supervisors in the manufacturing sector.

A statistical study by Haskel and Pereira (2002) used matched employer-employee data on individual British establishments to examine what proportion of the variation in labor productivity across establishments is due to differences in skills. Their findings suggest businesses that hire more highly skilled workers (above median human capital) have higher productivity than businesses hiring less-skilled workers. The positive effect of hiring more highly skilled workers in terms of productivity gains was found to be economically significant, although it explains only a small proportion of the variation in productivity across establishments.

Case Study Evidence on the Importance—or Unimportance—of Skills and Education

Further evidence of education's role in productivity is provided by the case studies described in chapter 3. The McKinsey Global Institute (MGI) has explored reasons for productivity differences across a wide range of countries and industries—the studies of France and Germany were de-

scribed earlier in chapter 3, but the results from other countries are also informative. For instance, the MGI teams did not find that differences in *production-worker* capabilities were a major reason for productivity differences across countries. Brazil, in particular, was a surprising study. In Brazil the general consensus is that low education and the low-skilled workforce are a key reason for low productivity. In construction, for example, the workers lack the basic literacy skills to read plans, which apparently creates an important barrier to high productivity. However, the same MGI team from Brazil visited a construction site in Texas and found it is *five times as productive* despite the fact that most of the workers were Mexican immigrants who could not speak English and also lacked basic literacy skills. The difference seemed to stem from larger-scale projects, better work planning, more use of prefabricated materials, and better-designed buildings (making them easier to build). Thus, if the low level of production-worker skills among Brazilian construction workers is not the main barrier to higher productivity in that industry, then one wonders if there might not be ways to use British workers much more productively, despite their skill deficiencies.

Other evidence comes from the Japanese auto industry. Japanese companies entering or expanding US operations carefully screen and select a small number of workers. The companies test for dexterity, ability at spatial relationships, numeracy, and—most importantly—attitude. They want workers who will show up on time, work hard, be trained, and be infrequently absent. These skills may be correlated with school performance but, with the exception of numeracy, are not based directly on what children learn in school. Many companies report a preference for hiring workers from farm families even though their education may not be of the best quality, thus making the case that people raised on farms learn to work hard.

Companies may not emphasize education-based skills because they can design business processes and train workers to maximize their potential. For example, we are told that British store clerks cannot correctly make change for someone purchasing three items. In contrast, checkout clerks at a German grocery chain are trained extensively to accurately make change and may even be required to memorize the prices of all items in the store. But how big a problem is the lack of arithmetic skill? Modern retail stores have scanners and automatic change machines, so whatever the deficiencies of the British workers, these should not block the road to higher retail productivity. In fact scanners have the additional advantage that they allow for efficient inventory management, so even the German stores invest in the technology. In a food retail study (MGI 1998), productivity in Britain was actually very high and was constrained mostly by the small size of the stores, not by labor force skills.

Not all the evidence from company or industry studies points in the same direction, however. The work of Bartel, Ichniowski, and Shaw (2002)

on steel and other industries has pointed out ways in which skill requirements have changed over time, particularly because of increased IT use. In the past, for example, steelworkers worked on the factory floor monitoring and adjusting machines mechanically. Today, steelworkers work with computers away from the factory floor and make changes electronically. Autor, Levy, and Murnane (2001) find that computers reduce the demand for workers who perform routine manual activities and increase the relative demand for workers who can perform tasks using information to make decisions. These studies support a broader literature that links rising returns to education with the increase in IT use in companies. The increased demand for skilled workers (the existence of skill-biased technological change) may strengthen the case for education.[24]

Moreover, even if companies do not demand that workers have strong educational qualifications, they generally train workers with the specific skills they will need to perform their jobs. Rural workers in Mexico are given six to twelve months of training when they join an auto plant. The Japanese plants in the United States and in Britain also train their workers continuously while they are employed.

On-the-job training is an important issue. British companies complain that their trained workers are often hired away by smaller companies who can offer higher wages since training costs are unnecessary. This "externality" from training is well known in the literature, and it implies that too little training will be offered. In the British case studies discussed in more detail later, the auto industry illustrates how the low-skilled production workers posed a problem for the Japanese transplants in Britain.

In contrast, Germany provides an apprenticeship program, which locks workers into the company that has trained them. Although the externality inflicted by worker poaching is avoided, the program imposes substantial costs. It fosters the labor-market rigidity that Germany must overcome. During the postwar period when the demand for skilled workers in established companies was growing, the system worked well to provide the high-quality workforce that was needed. In the current economic environment where greater mobility is needed, however, the apprenticeship programs have become a barrier to change. With employment declining in manufacturing industries and the need for overall labor-market flexibility, it would be hard to justify setting up a German-style apprenticeship system in Britain today.

24. The increased demand for skills could simply mean employers find it more important to hire workers with high intrinsic ability. Moreover, some studies find that the return on education is much higher for graduates of elite schools than for those from other schools. Elite schools may provide a better education—or a degree from a school such as Harvard may indicate superior skills.

Overall Assessment of Education and Skill as Reasons for Britain's Low Productivity

In economics, there is robust empirical evidence that years of education are strongly correlated with earnings, even after controlling for other observable characteristics of individuals (Ashenfelter, Harmon, and Oosterbeek 1999; Card 1999). For a given family background and IQ score, for example, persons with a higher level of education will earn more than those with a lower level of education. A natural concern about this result is that higher-ability individuals will generally choose to acquire more education, so the causality may run in the other direction. Through a variety of creative statistical techniques, however, labor economists have concluded that this possibility of reverse causality does not eliminate the result that more education implies higher earnings.[25]

Despite the studies noted above supporting the theory that more education and training equal higher wages, support for the productivity value of the education itself is much more mixed. The basis for linking earnings to productivity is the argument that employers would not pay higher wages to more educated or skilled workers unless they were more productive. However, the value of increased education to overall economic growth may not be as great as this implies, if education is valued primarily as a signaling tool to employers (diplomas may have a substantial value in the marketplace even when the education itself has only a modest effect on a worker's productivity).

Empirical work that could estimate the direct contribution of education to overall economic growth or to productivity growth has produced very mixed results. There is no question that wealthy societies tend to have a better-trained and -educated workforce than poor ones, but the direction of causality in this relation and the exact importance of education and training to economic success are hard to pin down.

Educational quality should be improved for many good reasons. Not only does education broaden one's knowledge and perspective as a citizen in a global world, there are also positive benefits to economic growth. Furthermore, the current labor market may well require more advanced literacy and numeracy skills than past jobs required. In fact, there is evidence that US workers who can use computers fare better in the labor market than those who cannot (Autor, Katz, and Krueger 1997).

So on balance, it is likely that part of the productivity gap between Britain and Germany may be the result of a more skilled workforce in Germany. And some part of the gap with the United States is because in the United States a larger number of people go on to obtain higher education.

25. The identical-twin studies are one such example. A twin with the same genetic and environmental conditions as its sibling will achieve higher earnings if he or she acquires more years of schooling (Krueger and Ashenfelter 1994).

The growth accounting calculation suggested that 19 percent of the productivity gap between Britain and Germany was the result of skill differences. Even if this is correct, it means that worker skills account for only a modest part of the total productivity problem in Britain.

Because of concerns about the quality of education, spending on education in Britain has been rising. In 1999 the share of the English population holding qualifications equivalent to NVQ4 or NVQ5[26] was 26 percent, up from 17 percent in 1991. The share of those employed qualified up to NVQ3 has also increased, whereas the share of the employed population with no qualifications has declined significantly from 25 percent in 1991 to 13 percent in 1999 (Campbell et al. 2001). Therefore, if skill levels are a reason for the productivity gap today, this gap should diminish going forward.

Productivity Differences Associated with Nationality of Ownership and with Being Part of a Multinational Company

An interesting line of productivity research used in the United States has been applied to British data with some new results. We discuss these findings in this section because they are both useful and suggestive about the reasons for the British productivity gap. Although the new findings do not definitively find the root cause of the gap, they add to the overall perspective on the performance of British companies.

Many studies have found that foreign-owned firms operating in Britain have substantially higher productivity than their British equivalents (Davies and Lyons 1991, Oulton 2001, Griffith and Simpson 2003). But why are British firms less productive? A number of obvious explanations immediately come to mind, including one mentioned earlier: British managers are less skilled than their counterparts. Less obvious explanations, however, may include the fact that foreign-owned companies may be more capital intensive.

A recent study by Criscuolo and Martin (2002) of companies operating in Britain has added a new dimension to earlier findings. Using newly available (pooled cross-section, time-series) data covering 1996–2000, they compare the productivity performance of foreign-owned and British manufacturing firms separated for the first time into multinational and domestic manufacturers.[27] Looking at the raw data, Criscuolo and Martin discovered that the labor productivity of plants owned by British multi-

26. NVQ4 is defined as a first degree, teaching or nursing qualification or higher diploma. NVQ5 refers to master's degree or above.

27. Their work parallels the US studies by Doms and Jensen (1998a, 1998b).

nationals was £36,900 compared with £28,000 for plants owned by purely domestic British companies—a productivity advantage of 32 percent. The productivity of plants operated in Britain by foreign-owned multinationals is higher than that of plants operated by British multinationals, but the gap is not as large as that found in previous studies when all British-owned companies are grouped together. Plants operating in Britain owned by foreign non-US multinationals have a labor productivity of £43,100 (an advantage of 17 percent over British multinationals), while US multinationals had productivity of £46,600 (a 26 percent advantage).

In order to control for other factors, Criscuolo and Martin conduct a regression analysis. After controlling for industry they find that if a plant in Britain is part of a multinational company it has a 28 percent advantage over domestic companies. If that plant is also part of a foreign-owned, non-US multinational then there is an additional 4.7 percent productivity advantage (i.e., these plants are 32.7 percent more productive than domestic plants). A plant that is part of a US multinational has an additional advantage of 14.7 percent (these plants are 42.7 percent more productive than domestic plants and 10 percent more productive than plants owned by non-US foreign companies).

When the authors add additional controls to their analysis, notably the age of the company and size (number of employees), then the productivity gap associated with being part of a multinational is reduced to 16 percent (but it is still statistically significant). The additional advantages of being owned by a non-US foreign-owned multinational or a US multinational are not substantially different.

Criscuolo and Martin then see whether or not their results carry over into differences in MFP by using gross output per employee as their labor productivity measure and controlling explicitly for the capital-labor ratio and the level of material inputs per employee. The productivity advantage of being part of a multinational company drops sharply in these results—to 4.7 percent, still statistically significant. So the productivity advantage of being part of a multinational seen in the prior results seems to be associated with the fact that the multinationals have more capital and/or use material inputs more effectively. The productivity advantage that foreign non-US-owned plants have over British plants largely disappears—it falls to an insignificant 1 percent. The productivity advantage of US-owned plants compared to British multinationals is 4.5 percent, which is not a huge gap, but one that is statistically significant.

Summarizing these results, domestic British plants on average have much lower labor productivity than plants operated by multinationals, regardless of the nationality of the owners. Plants owned by US parent companies have the highest productivity, while foreign-owned non-US plants are somewhat more productive than the plants owned by British multinationals.

The gaps in labor productivity carry over to some extent into differences in MFP. Being part of a multinational company still confers a modest MFP benefit, but being owned by a US parent company confers an additional advantage. In the MFP estimates, there is little productivity difference between British-owned and foreign non-US-owned plants. Of course it should not be surprising that the gaps in labor productivity are larger than those in MFP. Important advantages of being a multinational are the lower cost of capital, better supply chains, and the ability to source components at lower cost.

The idea that low capital intensity is a productivity issue in Britain can be inferred from Criscuolo and Martin's results, but the fact that British multinationals seem to use lower capital intensity than other multinationals indicates that these companies are choosing not to invest, rather than being unable to invest. This conclusion is reinforced by the fact that British multinationals invest heavily overseas, including in the United States.

Because they were able to track plants over time, the authors also made the important discovery that plants operated by US multinationals were generally highly productive at the time they were taken over. Managers at US companies therefore are better at buying productive plants.

Can these results help explain Britain's relatively poor labor productivity performance in the manufacturing sector relative to its peers?[28] One could claim that Britain had relatively few multinational companies compared to other countries. That is not the case, however. The concentration of foreign manufacturing affiliates was relatively high in Britain, accounting for 20.4 percent of total British manufacturing employment in 1999. Although France had an even higher share of foreign affiliates at 28.5 percent, US foreign manufacturing affiliates accounted for only 15.1 percent of total manufacturing employment and Germany had an even smaller share at 6.2 percent. Moreover, to the extent that the US productivity advantage comes from acquiring the most productive plants, the productivity impact of encouraging takeovers by US companies would be limited.

One possibility consistent with the Criscuolo and Martin findings is that domestic British companies are not exposed to the kind of competitive pressure that multinationals face; therefore, they do not develop best-practice operations. Regulation or a specific market niche could be mechanisms to protect these domestic companies.

There is also the residual possibility that highly skilled managers are unavailable in Britain. The multinational companies may hire the best managers or transfer their own managers to Britain. Although it is possible that managers are of intrinsically lower quality in Britain, it is more likely that British managers with high intrinsic ability are inexperienced

28. In 1999, labor productivity in the British manufacturing sector (excluding food) was $32 per hour compared with $40 per hour in Germany, $49 per hour in France, and $49 per hour in the United States.

in operating a well-run company. If true, weak productivity may become self-perpetuating or at least slow to reverse even if regulations are eased or competition heats up.[29]

Case Study Evidence of Barriers to Productivity in Britain

In October 1998 the MGI released a study using data from the mid-1990s that examined six industries—automotive, food processing, food retailing, hotels, telecommunications, and software—to determine the extent to which British labor productivity lagged behind the US and continental European levels and, if applicable, why the lag occurred. As mentioned earlier, the MGI study of France and Germany also included Britain as a comparison country in its analysis of electricity generation and distribution. The specific results are summarized below.

Automotive

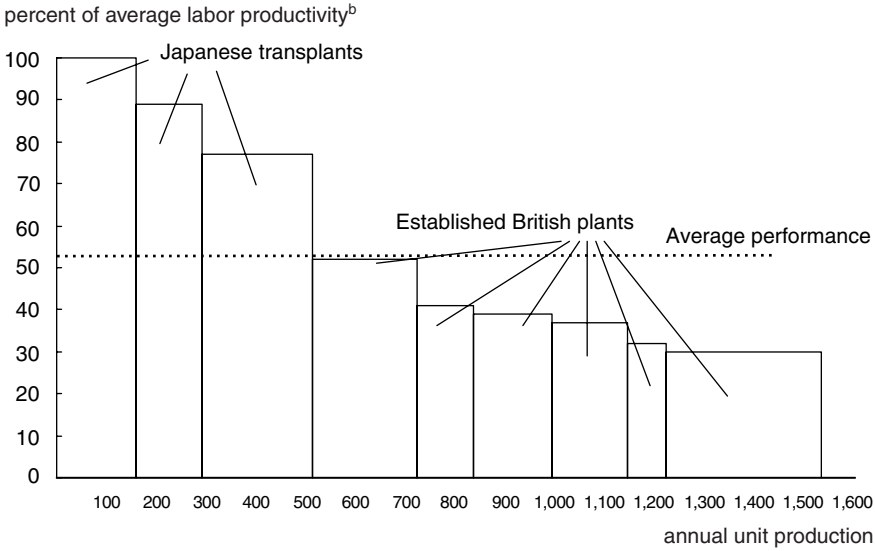
The automotive industry in Britain developed as a mixture of local companies such as Austin and Morris competing against transplants from the US industry, primarily Ford and GM Vauxhall although Chrysler was also present in the market for a short period. As in many markets, the industry underwent a series of restructurings, and smaller or weaker companies were taken over or shut down. In the 1980s the British government negotiated with the Japanese to allow their companies to enter the market. The first Japanese company in Britain was a large Nissan plant in Sunderland. Today, Toyota and Honda also operate in Britain.

In 1996 the labor productivity of vehicle assembly (the original equipment manufacturers, or OEMs) in Britain was 40 percent of the best-practice Japanese industry and well below the US industry.[30] Figure 4.6 shows how the level of labor productivity was distributed among the main auto assembly plants in Britain in 1996. Confidentiality restrictions prohibit identifying specific plants, but the three large Japanese transplants are acknowledged. As the figure shows, the Japanese transplants were able to achieve high labor productivity levels—ranging from 75 to 100 percent of the average Japanese performance. One large Japanese transplant actually equaled the Japanese average. In contrast, the older, established British plants had dramatically lower productivity, with one

29. These issues were recently discussed by Dominic Casserly, in a lecture in London organized by the MGI and the London School of Economics, March 15, 2004.

30. The British study excluded light trucks and SUVs, an area where the US industry has relatively high productivity because of high value-added production. If only cars are included in the study, the US industry had 71 percent of the Japanese labor productivity in 1996. Therefore, these numbers differ from those in the France-Germany study discussed in chapter 3.

Figure 4.6 Level of labor productivity among main OEMs[a] in Britain, 1996



OEMs = original equipment manufacturers

a. Represent 90 percent of British production.

b. Level of Japanese auto companies, operations located in Japan.

Source: EIU data, company accounts, DRI data, MGI (1998).

very large plant below 30 percent of the level of the best-practice Japanese industry in 1996.[31]

The auto parts industry in Britain had similar levels of relative labor productivity, with the sector as a whole achieving 45 percent of the Japanese average. The British industry did appear to improve its parts industry in the 1990s with labor productivity growing at 9 percent a year from 1993–95 compared to slow productivity growth in Japan and the United States. Although the parts industry in Britain was highly fragmented, there was no correlation between plant size and productivity level.

Based on comparisons of plant-by-plant performance in the assembly sector, a major reason for Japan's higher productivity was its detailed assembly line operation, which made it much more efficient (lean manufacturing). Japan's success also depended on specific operational differences, including the use of teams and multitasking, continuous improvement programs, employee suggestions, and statistical measures to aid improvement. Another important factor is that the Japanese cars are designed to be

31. Note that the comparison is with the Japanese industry average since they have the best-practice standard. The highest productivity plants in Japan are well above this average.

simpler and easier to assemble. Employees also affected productivity. As noted earlier, Japanese transplants carefully screened their workforce, testing for attitudes and numeracy skills as well as providing extensive training for employees. This investment paid off with higher motivation levels and lower absentee rates than in traditional plants. The transplants also did better at matching capacity to demand and in managing their relations to parts suppliers.

Compared with Japan, Britain's capital intensity was also lower in the traditional assembly plants and in the parts sector, which contributed to the productivity difference. The lower relative cost of labor in Britain motivated the use of somewhat lower capital intensity, relative to the United States, Germany, and Japan. In 1995, labor costs among British autoworkers were 78 percent of those in Japan and just over 50 percent of those in Germany.

The key issue for the automotive industry, then, is why the traditional British producers did not improve their performance as the level of competitive intensity increased with production by Japanese transplants and increased imports from other European producers. A number of reasons come to mind. First, it takes time for any new entrant to establish a significant market share, including developing products best suited locally. For example, Japanese auto companies took many years to gain significant market shares in both the United States and Europe. Thus, it took time before the extent of the foreign-owned companies' threat was appreciated.

Second, the British industry maintained production by exporting to the rest of Europe by relying on lower labor costs. Third, although the European auto market became much more integrated in the 1990s, the Japanese companies were subject to quantitative restrictions by many EU countries—notably France, Germany, and Italy. The restrictions prevented the Japanese transplants in Britain from expanding production by exporting to the rest of Europe, which would have increased the average level of productivity in the British industry.

Fourth, the traditional auto producers in Britain had great difficulty modernizing their operations. Both unionized production workers and the existing cadre of managers were highly resistant to change.[32] Threatening to close a plant or ordering massive layoffs may be required to force major changes, but sometimes such measures are too late at that point. Fifth, all auto companies in Britain report that the quality of graduate engineers in the industry is low.

Sixth, massive state aid was provided to prop up the weak auto plants in Britain. From 1973 to 1988, £3.4 billion were given to the Rover company alone. Even after the European Union tried to restrict further state aid, loopholes allowed state aid to plants in "development" areas. Britain

32. Resistance to change is not a problem unique to Britain, it is also a serious problem in the US and German industries.

alone did not continue in this policy direction—there is large-scale overcapacity in Europe.[33]

Britain's auto industry is an important example of why labor productivity in manufacturing is low even though international trade exposure has apparently become much higher over time. The good news is that the exposure to best-practice competition is now working. British policymakers encouraged best-practice Japanese companies to enter the market, bringing the same successful production methods used in their own country and the United States. Traditional British suppliers are now restructuring, and some plants have been sold to US or German companies. However, plants where workers and managers resisted change are being downsized or closed.

The bad news is that the process of increasing British productivity is very slow because the forces resisting change were strong. In fact, change was slowed significantly by state support for low-productivity plants. Lack of skills and education also affected the rate of change.[34]

At the engineering level, the US and German auto industries were able to raise productivity in some of Britain's traditional plants by designing higher-value-added vehicles and avoiding some of the drastic production changes that would have been necessary to remain competitive.[35] Since engineering and design skills are available on a global basis, the lack of these skills may not be an insurmountable problem. Nevertheless, having skilled engineers in close proximity to production facilities is an advantage in the automotive industry, and therefore a potential disadvantage for the British industry.

Food Processing

The food processing industry, which is the largest manufacturing sector and one where competition is less intense, was examined in the second MGI manufacturing case study. Since tastes in food differ quite strongly across local and regional markets, processed food is produced domestically in most countries to a greater extent than other manufactured goods.

33. It is notable that the Thatcher government did not halt state aid. Prime Minister Thatcher could thus be "strategically ambiguous" in her commitment to reducing government involvement in the economy: Most of the state aid to Rover (then British Leyland) was disbursed in 1983—just prior to a national election in Britain.

34. State aid included using local training colleges to augment production-worker skills.

35. This is not intended as a statement about what constitutes good business strategy over the long run. In the United States, the Big Three auto manufacturers are now facing increased competition in the SUV and pickup market. And the luxury German producers have reportedly "overengineered" their latest models, so their US reliability ratings are now very low (see Consumer Reports 2003, auto ranking reported in *USA Today,* November 3, 2003, www.usatoday.com/money/autos/2003-03-11-cr-picks_x.htm, accessed May 24, 2004).

There has been substantial foreign direct investment in this industry, however, allowing for the entry of best-practice methods—at least in principle.

Labor productivity in Britain was 74 percent of the US level in 1994 at a time when the German industry productivity was 94 percent of the US level. Capital intensity is relatively low in the food processing industry, especially relative to Germany. Multifactor productivity in Britain was about the same as in Germany and 81 percent of the US level.

Food processing encompasses a wide range of subindustries, and labor productivity varies quite a bit among them. Nevertheless, differences in the mix of subindustries accounted for minimal differences in overall productivity in Britain, Germany, and the United States. Rather, the gap occurs within each subindustry. Therefore, two subindustries—biscuits (and bakery) and dairy—were chosen for detailed analysis.

Labor productivity in the British biscuit industry lags the United States by 36 percent and is about the same as the German industry. Capital intensity is very low in Britain so the MFP gap to the United States is 15 percent while MFP is higher than in Germany. Britain manufactures many more products than the United States (2.6 times the number of stock-keeping units, or SKUs), which causes the 15 percent gap in productivity. The greater number of products reduces the ability to automate production in Britain, the "run time" for any product, the resources devoted to process improvement in any particular product, and the scale of production.

Then why are British manufacturers not consolidating some of the brands in order to take advantage of the higher productivity and lower cost that would follow? The MGI research team's immediate answer is relative market size. They find that Britain's food industry is dominated by large retailers who demand product proliferation despite a small overall market. In contrast, large US food processors such as Nabisco have established national brands with name recognition in the larger US market. New products are introduced only after successful test marketing and only when a large enough market is available to justify production at minimum efficient scale.

That answer is not reasonable from an economic point of view, since there must be a reason for the retailers' demands. Given the importance of shelf space—retailers often apply pressure to reduce, not increase, the number of SKUs—retailers are obviously responding to British consumers' preference for a range of biscuits.

The biscuit case study illustrates an important principle: In manufacturing industries where consumers have strong preferences for local products, overall competitive intensity of the industry is reduced and global best practices do not emerge. From a policy point of view, there is little to be done. This may simply be a situation where the larger scale of the US economy confers some advantage. More generally, free trade does not always produce a fully competitive domestic industry, particularly in the short run. If adult consumers purchase the same products from child-

hood (an important issue in food processing) then new product entry may be slowed and local producers will survive, even if their productivity is lower than best practice.

The dairy industry is somewhat similar to the biscuit example. Product proliferation resulting in small-scale operations causes lower labor productivity, with some combination of consumer tastes and retailer pressure again at work. Britain's labor productivity is 84 percent of the US level, while Germany's labor productivity is far higher (132 percent of the United States)—driven largely by very capital-intensive production methods. The US industry is not world best practice by a wide margin and is characterized by highly regulated local markets.

Productivity in the British dairy industry is affected adversely by EU regulation. Under the Common Agricultural Policy the flow of milk products is restricted. Fresh milk is a relatively low-value-added per worker activity and is always produced locally for freshness. Fresh milk takes up much of British milk production, and dairy processors cannot get access to additional milk product supplies to produce higher-value-added dairy products. The output of the dairy industry in Britain is 60 percent fresh milk compared with 47 percent in the United States and 28 percent in Germany.

Food Retailing

Britain not only has a high level of competitive intensity in food retailing but its major retailers are quite efficient. Nevertheless, their labor productivity is at 88 percent of the US level and even lower compared with France at 118 percent of the US level. Britain's planning restrictions have slowed the introduction of large retail stores that allow higher productivity.[36] France also has strict planning restrictions, but exceptions have allowed large hypermarkets to develop, which account for the bulk of food sales.[37]

An MFP calculation, using square meters of retail space as the measure of capital, suggested productivity is as high in Britain as in France and higher than in the United States. US MFP is lower because stores stay open longer than British and French stores, which lowers measured labor productivity.

Britain made a trade-off between encouraging maximum labor productivity in retailing and attempting to preserve local, small retailers. How-

36. Wal-Mart has become the largest food retailer in the United States since the mid-1990s, and its distribution system may be the most efficient in the world. Wal-Mart's efficiency pressure on competitors was a major driver of faster productivity growth in retail in the United States since the time of the data reported here. Wal-Mart has also entered the British market by acquiring Asda. However, this is one of the smaller players in Britain and has small supermarkets.

37. For stores selling both food and merchandise, like hypermarkets in France, the MGI team separated the value added and the hours associated with the food retailing in their productivity estimates.

ever, consumer demand for large supermarkets is gradually overwhelming this policy decision, and the small grocery stores are disappearing despite efforts to save them.

Hotels

Labor productivity in the British hotel industry is very low at 55 percent of the US level—compared with France, which is at 88 percent of the US level. Modern, productive hotels have a number of advantages. They are designed to allow rapid servicing of rooms—maids can use service carts and follow standard procedures for each room, which allows quick turnaround and customer satisfaction. Hotel layouts are also well structured to be efficient in terms of size and location (e.g., storage areas, kitchen placement, etc.). Large hotels are more productive than small ones because of scale economies of operation, and franchise hotels have access to both computerized reservation systems (raising occupancy levels) and bulk suppliers.

The United States and France have a much higher proportion of modern, productive hotels than Britain. First, planning restrictions in Britain make it very difficult to build new hotels or even modernize old ones. Second, both business and vacation use of hotels is very low, and the market has not grown rapidly. Third, an inefficient construction industry makes it costly to build new hotels. The fact that hotels are relatively expensive in Britain is of course an endogenous reason why demand growth has been weak. But beyond the price effect, the lack of business travel reflects the concentration of the business activity in London or in cities a short train ride or drive from London.

Based on both the food retailing and the hotel case, it is clear that planning restrictions are holding back Britain's productivity. Although we do not support the unrestricted takeover of land that seems to characterize US development, there are ways to achieve the goals of a highly productive industry sector while preserving open land and historical values. For example, the historical façade of a hotel can be saved while gutting and remodeling the interior, which is not currently possible in Britain. A French company that operates hotels in both France and Britain provides a telling example of each country's barriers. Operating in France is a nightmare because of complex labor laws that require the company to retain a permanent team of lawyers to avoid ongoing problems.[38] Operating in Britain is a nightmare because the company cannot move a door or

38. High labor costs lower employment and raise labor productivity in French hotels. For example, low-price hotels in France have automated check-in and check-out procedures and very few employees.

change a doorknob in any hotel classified as historic.[39] It is also noteworthy that British-based companies operate large-scale hotel networks in the United States. They apparently moved to the US market after giving up on profitable expansion in Britain—yet another example of why capital intensity is lower.

Telecommunications

The study of the British telecommunications industry is rather dated, because it does not reflect the effect of the mobile phone network. However, the analysis of the wire-line industry is still a helpful case study since it examines the Thatcher-inspired privatization of the old post office–run telephone system. As of 1995 labor productivity in the telecommunications industry in Britain was comparable to other European industries, and MFP was higher than the rest of Europe. Comparison with the US system was less favorable with labor productivity 49 percent of the US level and MFP at 62 percent.

The higher US productivity levels in fixed-line telecommunications are familiar from many comparisons with European industries. The United States has a higher volume of phone calls and consequent network usage, which partly stems from more aggressive marketing and pricing. Sweden is similar to the United States in terms of productivity performance as well as marketing and pricing strategy. Furthermore, phone usage seems to reflect household income and taste differences as well as business practice differences.[40]

British Telecom (BT) was established as a private company in 1984 and faced a single competitor, Mercury. A strict price-cap regime forced BT to reduce the price of a basket of telephone services, and any increase in access charges (the fixed cost of having a phone line) were also regulated. Although these regulations were helpful in forcing efficiency and productivity gains, they lacked full flexibility and discouraged the two companies from lowering the cost per call, which would have encouraged greater use of the system. Other aspects of the regulatory system effectively maintained the BT monopoly so that by 1992 the company still controlled 93 percent of the market.

After 1992 open competition made it easier for new companies to enter the market, and in 1995 price restrictions were lifted. In 1996 BT's market

39. An abandoned Victorian hospital in London provides another example of preservation laws run amok in Britain. The century-old building remained idle and decaying for years, because it could not be remodeled for alternative uses. Arguably, bulldozing the building would have been optimal for both aesthetic and economic grounds.

40. Marketing calls are illegal in most European countries.

share had fallen to 84 percent, which indicated that open competition was slowly working and reiterated the fact that developing full-scale competition with equal partners is not an easy task. Since the mid-1990s, however, mobile telecommunications has exploded and is providing significant competition to the fixed-line providers. Although the productivity benefits of privatization and competition were very slow in coming in Britain, it is apparent that if given enough time and incorporating evolving technology, a state-owned monopoly can eventually be transformed into a more efficient industry.

Software

The British software industry in 1996, which compared somewhat more favorably with France and Germany, was much smaller and less productive than the US software industry. Productivity in software services (measured as sales per employee) in Britain, France, and Germany was estimated to be about 75 percent of the US level. At the time of the MGI study, the size of the European industries was much smaller than their counterparts in the United States (on a per capita basis). Subsequent work has suggested that in-house software development is much larger in Europe than in the United States so these size comparisons were likely misleading.

The productivity of packaged software in Britain (again using sales per employee) was 53 percent of the US level, less than France at 59 percent, and much less than Germany at 84 percent of the US level. The production of packaged software has very high fixed-development costs and low marginal costs (low cost for the production of each package). High productivity in the US packaged-software industry is driven by a small number of software vendors (such as IBM, Microsoft, Oracle, and Computer Associates) who operate at large scale and have benefited from first-mover advantages. Germany has been quite successful in this industry also, notably with SAP.

The software industry's success is based on the strong demand for leading-edge programs in other industries. For instance, in the United States in the 1950s and 1960s military demand prompted many innovative developments in software. As the industry shifted toward civilian-oriented demand, the existence of a dynamic US service sector drove the need for software and hardware. In Germany SAP developed a strong customer base among manufacturing companies. In Britain, one area of relative strength in software is in companies that serve financial institutions in the City of London.

Over time, a successful software company can expand to a global market and is no longer reliant on its domestic industries. But in the start-up phase, the existence of large dynamic domestic customers is critical to success. Therefore, policies that stimulate growth in several large sectors of

the economy will generate spillover benefits to industries such as telecommunications and software. Any industry subject to high fixed costs or some other form of increasing returns to scale will benefit in its productivity from increased growth and demand from the rest of the economy.

Electric Power

Looking back, the power industry illustrates the dangers of a hasty, ill-conceived liberalization.[41] In 1989, the UK Electricity Act created four separate entities from the government-owned generation and transmission monopoly known as the Central Electricity Generating Board: two power producers (PowerGen and National Power), a transmission company (National Grid Company [NGC]), and a distribution network (consisting of 12 regional power companies). All four entities were gradually privatized.

In order to balance the national supply and demand of power in the newly privatized sector,[42] the British government established "The England and Wales Power Pool" to act as the link (clearinghouse) between producers (PowerGen and National Power, plus a limited number of independent power producers) and consumers. The "power pool" functioned via a day-ahead uniform price auction, i.e., an auction in which the price of power is set a day in advance, and all consumers pay the same price. Producers, such as PowerGen, would announce the amount of power they would be willing to supply to the grid at a given price—the higher the price, the more power a producer would generally be willing to supply. Electricity demand, based on consumer requirements, would subsequently be estimated, and the price at which the power market for the day after cleared, meaning where power supply and demand equaled each other, would be determined. All consumers would pay the price of the marginally supplied unit, with supply generated by power producers, whose "supply-bids" were at or below the market-clearing price for the day.

With PowerGen and National Power by far the dominant producers in the British electricity market (just below 70 percent of generation output in 1990), however, it quickly became apparent to government regulators that the two were able to use their market power to manipulate the power-pool price. In 1993 PowerGen and National Power were forced to auction 15 percent of their generating capacity to rectify their duopoly of the market. While the forced auction likely enhanced competition, the fact remained

41. This section on the development of the British power industry is not based on the 1998 MGI study.

42. Due to the large fluctuations between times of peak demand (morning and early evening hours) and "trough demand" (nighttime), and the twin facts that power is "instantaneous in character" and cannot be stored profitably (which means that grid supply must effectively equal grid demand at all times), this is a highly complex operation.

that power prices in Britain rose from 1990 to 1998 by 10 percent despite privatization, capital cost declined up to 40 percent, fuel (spot gas) prices declined by almost 50 percent, and the introduction of a daily spot market for power highlighted above.[43] Obviously such increases in energy prices adversely affect companies' profitability, investments, and, ultimately, productivity. In other words, during the 1990s, the power industry was a clear example of economic liberalization producing an unfavorable consumer outcome.

Despite the adverse effects of the misguided privatization of Britain's power industry, incentives to increase labor productivity were created. In the electricity generation sector from 1992 to 2000, the British industry attained labor productivity growth of 7 percent a year—faster growth than the United States, France, and Germany (albeit starting at a rather low level). (Unfortunately the study did not compute an estimate of the capital stock of the British industry.) Britain's rate of labor productivity growth in electricity distribution was actually even faster at 7.7 percent growth a year over the same period, which again made it the fastest in productivity growth among the studied countries. This latter result is particularly noteworthy because the distribution system was a monopoly, and its strong performance was achieved only through the privatization and liberalization of its operating procedures in response to regulatory pressure to reduce prices. Nevertheless, as of 2000 Britain's level of productivity remained lower than the other countries.

To overcome the remaining problems in the power industry, in 2001 the British government instituted the New Electricity Trading Arrangement (NETA) to replace the power pool, opening up for bilateral contracts (direct contracts between particular producers and consumers) as well as power futures exchange trading (contracts for the delivery or purchase of a given amount of power at a fixed time in the future). Both factors have greatly facilitated competition by empowering consumers and have led to significant price declines of 20 to 25 percent, depending on the time of consumption.[44]

The power industry is an interesting case study. It shows that economic liberalization can raise productivity and lower prices. However, the full benefits of economic liberalization were delayed by more than 10 years because of weaknesses in the process and the restrictive regulatory structure that was created. We believe that future benefits are likely to be substantial in the industry.

43. Data from Eileen Marshall, *What NETA Was Designed to Achieve*, Office of Gas and Electricity Markets (OFGEM) presentation, May 20, 2003.

44. See OFGEM Web site, NETA at a Glance, www.ofgem.co.uk.

Overall Conclusions from the Case Studies

The case studies of British industries reveal that several sources of the productivity gap described earlier are affecting the market: Privatization, liberalization, and reform appear to be working in the industries where they have been implemented though *the time lag seems unnecessarily long*. The process of reaching best-practice productivity levels is occurring over many years.

In several of the case studies, the high level of capital intensity in Germany is a factor in explaining Britain's productivity gap, which is consistent with the growth accounting results reported earlier. It is less clear whether specific policies are needed to overcome this gap. With expensive, inflexible labor and low-cost capital, it is not surprising that German companies reduce employment as much as possible and rely on automation. However, the same level of automation may not be optimal or profitable in Britain.

The lack of skilled workers—particularly in engineering and design—showed up as a problem in the automotive industry and may have slowed the expansion of transplant production in Britain. Furthermore, managers and workers alike resist change in production processes in traditional auto producers and may have also affected productivity (although whether this is worse than in other countries is debatable).

None of the case studies supported the idea that Britain's low productivity stems from a failure to develop clusters, even in the food processing industry. The most productive automotive plants were built in the north of England away from the location of traditional suppliers and assemblers, and most other service industries are scattered round the country serving local customers. However, Britain has successfully developed in industries not examined in the case studies. For example, the financial service industry already has a cluster in the City of London. In high-tech and biotechnology, Britain is in fact at the European forefront of clustering with more than 1,600 high-tech firms established around Cambridge University by 2001.[45]

The results of the case studies suggest that the British economy is not as competitive and deregulated as is sometimes claimed. The biggest barrier to industry change and greater competition came from planning restrictions (reinforced by a weak construction industry; see box 4.1). The Thatcher government and subsequent policymakers have been reluctant to deal with that problem. It is a very sensitive political issue in Britain since preservation is an important tradition. Based on MGI studies in several European economies, the general conclusion is that intelligent plan-

45. See *The Economist*, "Silicon Fen Strains to Grow," www.economist.com/displaystory.cfm?story_id=569685 (accessed April 12, 2001).

Box 4.1 Problems in the construction industry exacerbate problems from planning restrictions: Conclusions from a UK Treasury report

It would be too optimistic to assert that improving land use planning in Britain would solve all of the problems described in the industry case studies. A recent UK Treasury report on British housing supply (Barker 2003), which includes an in-depth study of the British construction sector, suggests a complex relationship between the construction sector and planning regulation. It is not simply a lack of available land with the required planning permits that beleaguers Britain. The UK Treasury reports that planning regulation in itself does not prevent developers from obtaining the necessary building permits to rapidly meet demand in the housing market. In fact nearly all British home builders own substantial "land banks" for which planning permission has already been obtained and which is frequently "worth" several years of development capacity to develop land for the company.

Instead of serving as an obstacle, the planning permits and the Section 106 obligations[1] significantly increase the value of builders' detailed knowledge of a local housing market. The builders' advantage creates a highly localized and fragmented construction industry, limiting companies' opportunities for introducing economies of scale as well as the ability to raise capital, which subsequently reduces their ability to undertake single big development projects. More importantly, the highly fragmented construction industry serves to promote opportunities for "localized market power" to small firms thereby reducing both real competitive intensity and the pace of innovation.

This problem is exacerbated by how companies manage the "approved land banks." In the highly volatile British housing market a "wait-and-see" behavior—where local supply is restricted—allows the home builders to gauge local price signals and mitigate their market risk. Thus, "approved land banks" are highly valued, and may soon drive profitability for a British home builder rather than its ability to provide high-quality, price-competitive housing.

In other aspects the UK Treasury study uncovers the same British productivity weaknesses described elsewhere in this chapter. Fully 80 percent of home builders and their subcontractors report difficulties in recruiting skilled laborers such as bricklayers, plasterers, and carpenters (Barker 2003, 97). Aggravating this skills shortage is the very small number of apprentices in the British construction industry—only a quarter of the relative German level and less than half the corresponding level in the Netherlands (Barker 2003, table 6.4). Subsequent quality problems seem to plague the industry with only 54 percent of new homebuyers saying they would buy a new home or another home from the same home builder.

The bottom line is that even substantial improvement in Britain's planning regulations would not be enough. The construction industry must also reform and greater competition from best-practice companies must be allowed.

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1. This section of the 1991 Planning and Compensation Act lets local planning authorities "require specified operations or activities to be carried out in, on, under or over land" available for development.

ning could free up land for commercial and industrial use without destroying the historical and aesthetic assets of the country. Resistance to liberalized planning is often irrational, whether it takes the form of preserving aging buildings created in Britain during the industrial revolution or preserving pig farms in the Netherlands in the name of saving green space.

The lack of competition resulting from consumer preference for local products and the resulting product proliferation and inefficient scale create another interesting issue. In a study of South Korea, product proliferation in food processing appeared to be a market failure: Local companies had overinvested and failed to test-market new products while multinational food companies had been excluded from the economy. In Britain the situation is different: Big multinationals such as Nestlé, Nabisco, and Procter and Gamble all compete in the market. In fact, the large retailers are driving suppliers to achieve lower costs. The food processing industry may consolidate over time, or else consumer tastes will prevail and measured productivity will understate the value of product variety to consumers.

In many country studies regulation on agriculture has been found to negatively affect the food processing industry. The dairy industry in Britain is one such example, where restrictions created under the Common Agricultural Policy prevented the development of a segment of the food processing industry in Britain.

In Britain and other countries, initiating reform can generate faster productivity growth in scale-dependent industries, such as telecommunications and software. Britain should be doing pretty well on that score since it has had relatively strong GDP growth, especially in service industries that are big customers for other industries.

Why Does the OECD Conclude that Product Markets in Britain Are Deregulated?

As mentioned at the outset of the chapter Britain has the least regulated product markets according to the OECD product-market regulation (PMR) index (see box 4.2). The OECD summary PMR indexes are meant to capture the influence of regulations on the intensity of product-market competition. The detailed indicators refer to economic regulations concerning market access, administrative regulations, and barriers to trade and investment.[46] The OECD defines restrictions to competition as "barriers to access in markets that are inherently competitive, or as government interference with market mechanisms . . . in areas in which there are no obvious reasons why mechanisms should not be operating freely" (Nicoletti, Scarpetta, and Boylaud 2000, 8).

In chapter 3 we described how the OECD PMR indexes are indeed correlated with productivity performance across the OECD economies as a whole (Nicoletti and Scarpetta 2003). That makes sense since many of the problem areas the indexes discover—such as the difficulty or delay in starting a new business—are indeed important in several OECD econo-

46. The indexes deal only with formal regulations, not enforcement issues.

Box 4.2 Constructing the product-market regulation (PMR) index

Members' responses to the OECD regulatory questionnaire provide most of the basic data used for the PMR index. The questionnaire requested information on 1,300 regulatory provisions concerning economywide and industry-specific laws, regulations, and administrative procedures in 1998. The data are qualitative and quantitative, and the responses are classified according to three criteria:

- Scope: economywide (e.g., administrative burdens) and industry specific (e.g., price controls in a particular industry);
- Type of restriction: thematic domains (e.g., state control, barriers to entrepreneurial activity) that identify how regulation may restrict market mechanisms; and
- Function: economic (e.g., legal barriers to competition, barriers to trade and investment) versus administrative (e.g., reporting, information, and application burden on start-ups) regulations.

The raw data were coded into numerical values, and 17 detailed indicators were constructed. The 17 indicators were then classified into three domains: state control over business enterprises, barriers to entrepreneurship, and barriers to international trade and investment. The 17 detailed indicators are aggregated into summary indicators by regulatory area. A statistical approach based on factor analysis is used, where each component of the regulatory framework is weighted by its contribution to the overall variance in the data.

mies. However, the restrictions to competition that showed up in Britain's case studies would not have been captured by the OECD indexes given the way these are constructed (see box 4.2)—in particular the planning restrictions, the subsidies to failing companies, and the spillover from agricultural policy to food processing.

Boylaud and Nicoletti (2001) construct an index for the retail distribution sector along the same lines as the overall OECD PMR index. Regulations are sorted into three categories: restrictions on access (includes store size), restrictions dealing with operations (store hours, for example), and price regulations. In 1998, France, Japan, and Greece had the most restrictive regulations in retail distribution whereas the Czech Republic, Switzerland, and Australia were the least regulated. In contrast to the overall OECD PMR index where Britain is the least regulated country, Boylaud and Nicoletti's index found it to be the eighth (of the 21 countries in the sample) most regulated country for retail distribution.

What caused the difference? One of the main reasons is that large retail establishments—and expanding stores—require a complex and burdensome application procedure. Moreover, existing retail stores enjoy considerable product protection: Some items can be sold only in outlets under local or national monopoly, and professional bodies (such as an association of pharmacists) and/or representatives of commercial interests influence licensing agreements.

Conclusions on the Productivity Gap in Britain

Some uncertainty about the reasons for Britain's productivity gap remains. After reviewing the literature, we are somewhat surprised that the current productivity gap remains as large as it does. We determine that the main reasons for the continuing productivity gap are as follows (listed in subjectively determined order of importance):

- Many of the causes of weak productivity in Britain, including low competitive intensity, have been reduced or eliminated, but the productivity benefits have not yet occurred. The time lag is an important consideration.
- The deregulation of the product market in Britain was less complete than is suggested by the OECD PMR indicators. Significant barriers to full industry evolution and consolidation remain, especially those created by restrictive planning regulations and a low-quality, expensive construction sector. Weak companies were protected, which limited the effect of rising competition.
- The nature of the privatization and deregulation instituted under the Thatcher government lengthened the time lag before productivity benefits were realized. Privatization occurred without adequate competition and without the right procompetitive regulatory structure in place.
- Britain's workforce does seem to fall between two stools. There remains a large proportion of the workforce that has very low skill and education levels. And a large cadre of managers is inexperienced and untrained in best-practice companies.[47]
- The slow adjustment to rising competitive pressure in the traditional part of the automotive industry suggests that the legacy of conflicted labor relations is still hampering the transition to more productive operations in some sectors.
- Part of Britain's productivity gap is associated with a lower level of capital intensity, which appears to be a symptom primarily of other problems that limit the returns to investment.
- Improving basic science and engineering education and research would be helpful as part of the creation of a stronger R&D and technical base. British universities are not as closely connected to the business sector as US universities.

47. An article by David Turner and Dell Bradshaw in the *Financial Times*, March 18, 2004, discusses the issue of Britain's lack of managerial skills, including a proposal in the new government budget to provide financial incentives to overseas managers to transfer to Britain.