UK productivity performance from 1950 to 1979: a restatement of the Broadberry-Crafts view*¹

By STEPHEN BROADBERRY and NICHOLAS CRAFTS

The Broadberry-Crafts view of UK relative economic decline in the postwar period was firmly established in a joint paper in 1996 which built on earlier co-authored work and has since been extended in a further article written together.² These papers focused on the microeconomics of manufacturing productivity outcomes in terms of exploring the incentive structures that informed investment and, particularly, innovation decisions by firms and the policy stance of successive governments. The distinctive features of these papers include their use of economic theory and their quantitative approach to testing hypotheses.

Those jointly written papers were part of a wider research programme in which Broadberry explored detailed sectoral estimates of comparative productivity performance across the economy as a whole over the period since 1870 and Crafts aimed to place relative economic decline in the context of postwar European growth as seen through the lens of the new growth economics.³ As the quality of the empirical evidence and the sophistication of the available economic theory have improved over more than a decade, our analyses have evolved.

In the light of this and the challenge presented by Booth in his critique of our work, it seems opportune to provide a clear restatement of our view of postwar relative economic decline which consolidates the various strands of our research.⁴ In what follows we will do so before seeking to refute a number of seriously misleading claims made by Booth.

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The Broadberry-Crafts view can be simply stated in terms of the following propositions.⁵

* This comment was subject to the normal refereeing procedure. Professor Crafts was not involved at any stage and was replaced by a substitute editor throughout the process.
¹ We are grateful to Neil Rollings and two anonymous referees for helpful comments on an earlier draft. The usual disclaimer applies.
³ See, for example, Broadberry, Productivity race, and ‘How did the United States overtake?’, and Crafts, Britain’s relative economic performance, and Can de-industrialisation damage?
⁴ Booth, ‘Manufacturing failure hypothesis’.
⁵ The footnote references that follow point only to the most helpful expositions of these points; they do not attempt to cite all the relevant items.

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(1) The UK could not have grown as fast as countries such as France and West Germany in the 1950s and 1960s because it had less scope for catch-up and, in particular, less opportunity to transfer resources out of agriculture to higher productivity uses.6

(2) Nevertheless, growth was lower than it could have been during the golden age, by about 0.75 to 1 per cent per year, as is shown by quantitative analyses of comparative growth performance. The outcome of British failure was not only to be caught up quickly but also to be overtaken to the extent that levels of productivity and real GDP per head were significantly lower than those prevailing in its European peer group by the end of the 1970s.7

(3) Government supply-side policy was badly directed despite numerous attempts to improve growth performance from the 1950s through the 1970s. In part, this was the result of inadequate analysis and/or evidence of the effectiveness of interventions but there were also no-go areas where reform was precluded by the pursuit of wage restraint and by the fear of departing from full employment. This was politically rational but costly in terms of productivity performance.8

(4) The UK fell behind West Germany in productivity performance in both manufacturing and services. The labour productivity gap was larger in manufacturing than in services or in the total economy in 1979, but a significant part of German overtaking was a transfer of labour out of agriculture to a service sector with relatively high productivity.9

(5) Productivity performance was strongly influenced by incentive structures and institutional arrangements. Given data availability, this is most easily shown for the manufacturing sector. In particular, productivity reflected effort bargains between firms and their workers and the attention paid by managers to reducing costs. Accordingly, the industrial relations system and the degree of competition in product markets were powerful influences on productivity outcomes, especially given the prevalence of principal-agent problems in British companies.10

(6) Within manufacturing there was a variance in productivity performance. The productivity gap was lower in sectors such as food, drink, and tobacco or textiles than in chemicals, engineering, or metals. In particular, British manufacturing was bad at implementing mass production methods. In activities where large scale was advantageous, Britain, in common with Europe as a whole, was disadvantaged relative to the United States.11

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8 Idem, Britain’s relative economic performance, pp. 80-2.
9 Broadberry, ‘How did the United States overtake?’.
10 Broadberry and Crafts, ‘British economic policy’, pp. 77-83; Crafts, Britain’s relative economic performance, pp. 78-80.

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The culmination of the problems in British manufacturing emerged in the productivity debacle of the 1970s and the extent of the failure was revealed by the rapid reduction of the manufacturing productivity gap in the 1980s in the context of a severe contraction of employment in the sector.12

The period of acute relative decline, of weak manufacturing productivity performance, and of policy constrained by the postwar settlement lasted until 1979. For analyses of the early postwar British growth failure this is the breakpoint rather than 1973.13

Table 1. Levels and growth rates of real GDP per person, 1950-1979

<table>
<thead>
<tr>
<th>GDP/person ($1990 international)</th>
<th>1950</th>
<th>1979</th>
<th>% p.a.</th>
<th>rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switzerland</td>
<td>9,064</td>
<td>18,050</td>
<td>2.4</td>
<td>(15)</td>
</tr>
<tr>
<td>Denmark</td>
<td>6,946</td>
<td>15,313</td>
<td>2.8</td>
<td>(13)</td>
</tr>
<tr>
<td>UK</td>
<td>6,907</td>
<td>13,164</td>
<td>2.2</td>
<td>(16)</td>
</tr>
<tr>
<td>Sweden</td>
<td>6,738</td>
<td>14,721</td>
<td>2.7</td>
<td>(14)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>5,996</td>
<td>14,643</td>
<td>3.1</td>
<td>(11=)</td>
</tr>
<tr>
<td>Norway</td>
<td>5,463</td>
<td>14,460</td>
<td>3.4</td>
<td>(9)</td>
</tr>
<tr>
<td>Belgium</td>
<td>5,462</td>
<td>13,861</td>
<td>3.3</td>
<td>(10)</td>
</tr>
<tr>
<td>France</td>
<td>5,270</td>
<td>14,970</td>
<td>3.7</td>
<td>(7=)</td>
</tr>
<tr>
<td>West Germany</td>
<td>4,281</td>
<td>15,257</td>
<td>4.5</td>
<td>(4=)</td>
</tr>
<tr>
<td>Finland</td>
<td>4,253</td>
<td>12,331</td>
<td>3.7</td>
<td>(7=)</td>
</tr>
<tr>
<td>Austria</td>
<td>3,706</td>
<td>13,449</td>
<td>4.5</td>
<td>(4=)</td>
</tr>
<tr>
<td>Italy</td>
<td>3,502</td>
<td>12,731</td>
<td>4.5</td>
<td>(4=)</td>
</tr>
<tr>
<td>Ireland</td>
<td>3,446</td>
<td>8,367</td>
<td>3.1</td>
<td>(11=)</td>
</tr>
<tr>
<td>Spain</td>
<td>2,397</td>
<td>9,388</td>
<td>4.8</td>
<td>(2)</td>
</tr>
<tr>
<td>Portugal</td>
<td>2,069</td>
<td>7,783</td>
<td>4.7</td>
<td>(3)</td>
</tr>
<tr>
<td>Greece</td>
<td>1,915</td>
<td>8,904</td>
<td>5.5</td>
<td>(1)</td>
</tr>
</tbody>
</table>

Sources: West Germany from Maddison, Monitoring; all others from idem, World economy.

A brief review of the statistical basis for these propositions now follows. Table 1 shows rates of growth of real GDP per person in West European countries for the period 1950-79. In this era of rapid catch-up there is a marked inverse correlation between the initial income level and subsequent growth rate. It is noticeable that the UK has lower growth than countries with similar income levels.14 Regression analyses of comparative growth in 1950-73 confirm that the UK underperformed by 0.5 to 0.7 percentage points after allowing for differential scope for catch-up and reconstruction and for the initial structure of employment.15

13 Crafts, Britain's relative economic performance, pp. 84-9.
14 If the period chosen is 1950-73 this is even more clear since the UK is 0.7 percentage points lower than each of Denmark, Sweden, and Switzerland in those years.
15 Crafts, 'Productivity growth', pp. 399-400 and 'Why did Northern Ireland miss out?', p. 11.
Table 2 places productivity levels in the context both of structural change and of sectoral performance. The main messages from this table are as follows. The labour productivity gap between the UK and West Germany or the United States was larger in industry than in agriculture or services throughout the golden age. German labour productivity in agriculture was relatively low and overtaking of the UK was aided substantially by a shift of labour from agriculture to services. Given the relatively large size of the services sector in all these economies, overall productivity performance cannot be explained simply by trends in manufacturing.16

Table 3 reinforces these last two points by reporting a shift-share analysis of labour productivity growth. Intrasectoral productivity growth accounts for only 1.91 out of a total difference of 2.76 percentage points between the UK and West Germany. The remaining 0.85 percentage points is attributed to the ‘net shift’ and ‘interaction’ components, i.e., the result of different scope for structural change in the two economies.17 In this respect the UK fared worse than any of the other European economies in the table except the Netherlands. However, having made allowance for these structural disadvantages, there was still a serious shortfall in total factor productivity growth, of the order of 0.9 to 1.0 percentage points in ‘residual efficiency’ per year compared with France and Germany, as the second part of the table reports.

Turning to manufacturing, table 4 shows a seriously disappointing productivity performance relative to West Germany in the years to the end of the 1970s and a considerable making up of lost ground thereafter (in the context of large falls in employment in UK manufacturing). Note that although careful choice of start and finish dates affects the scale of the UK under-performance, it does not remove the problem. First, Booth prefers to end the story in 1973, arguing that ‘It is unnecessary to invoke cumulative decline’ to explain the post-1973 productivity debacle.18 The German labour productivity growth advantage was 1.31 percentage points per year over the period 1950-79, and was still 0.92 percentage points per year over the shorter period 1950-73. Cumulated over 23 years, this was enough to transform German labour productivity from 96.0 per cent of the UK level in 1950 to 118.6 per cent of the UK level in 1973, as Booth acknowledges.19 Second, Booth prefers to start the story in 1952 rather than 1950. The German labour productivity growth advantage then falls to 0.31 percentage points a year, which Booth regards as trivial, even though cumulated over 21 years it amounts to almost 7 percentage points.20 However, as part (b) of table 4 makes clear, 1952 was an unusual year, and by 1954 German labour productivity was back down

16 Crafts pointed out in *Can de-industrialisation damage?*, p. 16, that services accounted for 48.7% of UK intrasectoral productivity growth in 1950-73 compared with 46.2% attributable to industry.

17 For further explanation and the relevant algebra, see van Ark, ‘Sectoral growth accounting’, pp. 94-7. Broadberry, ‘How did the United States overtake?’, notes that this standard accounting procedure probably biases the comparison between the UK and West Germany in the direction of finding too small a role for structural change.


19 Ibid., p.7.

20 Ibid.

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Table 2.  Structural change and relative productivity levels

<table>
<thead>
<tr>
<th></th>
<th>Employment shares (%)</th>
<th>Labour productivity (UK=100)</th>
<th>TFP (UK=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UK</td>
<td>West Germany</td>
<td>US</td>
</tr>
<tr>
<td>1950</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>5.1</td>
<td>24.3</td>
<td>11.0</td>
</tr>
<tr>
<td>Industry</td>
<td>46.5</td>
<td>42.1</td>
<td>32.9</td>
</tr>
<tr>
<td>Services</td>
<td>48.4</td>
<td>33.6</td>
<td>56.1</td>
</tr>
<tr>
<td>GDP</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>1973</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>2.9</td>
<td>7.2</td>
<td>3.7</td>
</tr>
<tr>
<td>Industry</td>
<td>41.8</td>
<td>47.3</td>
<td>28.9</td>
</tr>
<tr>
<td>Services</td>
<td>55.3</td>
<td>45.5</td>
<td>67.4</td>
</tr>
<tr>
<td>GDP</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>1990</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>2.0</td>
<td>3.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Industry</td>
<td>28.5</td>
<td>39.7</td>
<td>21.8</td>
</tr>
<tr>
<td>Services</td>
<td>69.5</td>
<td>56.9</td>
<td>75.7</td>
</tr>
<tr>
<td>GDP</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note: Labour productivity is defined in terms of output per employee.
Sources: derived from Broadberry, 'Forging ahead'; idem, 'Anglo-German productivity differences', and idem, 'How did the United States overtake?'.

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Table 3. *Decompositions of productivity growth, 1950-1973 (% per year)*

(a) Labour productivity

<table>
<thead>
<tr>
<th></th>
<th>Growth in output per worker</th>
<th>Intrasectoral</th>
<th>Net sectoral shift</th>
<th>Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>3.45</td>
<td>3.08</td>
<td>0.56</td>
<td>-0.19</td>
</tr>
<tr>
<td>France</td>
<td>4.35</td>
<td>3.94</td>
<td>0.33</td>
<td>0.08</td>
</tr>
<tr>
<td>West Germany</td>
<td>4.84</td>
<td>3.93</td>
<td>0.62</td>
<td>0.29</td>
</tr>
<tr>
<td>Italy</td>
<td>5.31</td>
<td>3.87</td>
<td>0.99</td>
<td>0.45</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3.83</td>
<td>4.39</td>
<td>0.37</td>
<td>-0.94</td>
</tr>
<tr>
<td>Spain</td>
<td>5.37</td>
<td>4.16</td>
<td>0.68</td>
<td>0.53</td>
</tr>
<tr>
<td>Sweden</td>
<td>2.99</td>
<td>2.64</td>
<td>0.57</td>
<td>-0.22</td>
</tr>
<tr>
<td>UK</td>
<td>2.08</td>
<td>2.02</td>
<td>0.46</td>
<td>-0.40</td>
</tr>
<tr>
<td>US</td>
<td>1.91</td>
<td>2.09</td>
<td>0.11</td>
<td>-0.29</td>
</tr>
</tbody>
</table>

(b) Total factor productivity

<table>
<thead>
<tr>
<th></th>
<th>Backwardness</th>
<th>Other specific</th>
<th>Residual efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>0.82</td>
<td>0.52</td>
<td>1.72</td>
</tr>
<tr>
<td>West Germany</td>
<td>0.98</td>
<td>0.66</td>
<td>1.64</td>
</tr>
<tr>
<td>UK</td>
<td>0.18</td>
<td>0.41</td>
<td>0.71</td>
</tr>
</tbody>
</table>

Sources: part (a) based on van Ark, ‘Sectoral growth accounting’, tab. 3.1; part (b) derived from Maddison, ‘Macroeconomic accounts’, where backwardness is the sum of ‘catch-up effect’ and ‘structural effect’ in tab. 2.26.

Table 4. *Growth rate of output per person engaged in manufacturing and relative labour productivity*

(a) Growth rate of output per person engaged (% per year)

<table>
<thead>
<tr>
<th></th>
<th>UK</th>
<th>West Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-79</td>
<td>3.29</td>
<td>4.60</td>
</tr>
<tr>
<td>1950-73</td>
<td>3.97</td>
<td>4.89</td>
</tr>
<tr>
<td>1951-64</td>
<td>4.50</td>
<td>5.32</td>
</tr>
<tr>
<td>1964-73</td>
<td>4.18</td>
<td>4.52</td>
</tr>
<tr>
<td>1973-79</td>
<td>0.68</td>
<td>3.47</td>
</tr>
<tr>
<td>1979-89</td>
<td>4.14</td>
<td>1.92</td>
</tr>
</tbody>
</table>

(b) West German/UK output per person engaged (UK = 100)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>96.0</td>
<td></td>
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<tr>
<td>1951</td>
<td>103.4</td>
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<td>1952</td>
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<td>1954</td>
<td>106.7</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>114.7</td>
<td></td>
</tr>
<tr>
<td>1973</td>
<td>118.6</td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>140.3</td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>105.1</td>
<td></td>
</tr>
</tbody>
</table>


to 106.7 per cent of the UK level. There is widespread agreement among economists and economic historians that in calculating trend growth rates, the end points should be chosen to reflect business cycle peaks rather than the priors of the investigator. Abstracting from the business cycle
effects, there can be no doubt that comparative German/UK labour productivity in manufacturing trended upwards during the golden age. Third, it is clear that the decisive change came after 1979, when UK labour productivity growth accelerated as its German equivalent declined. The productivity gap of 40.3 per cent that had opened by 1979 was dramatically reduced during the 1980s.
Figure 1 shows differences in the level of labour productivity in manufacturing between Britain and its major competitors over the long run. The most striking finding is surely that the comparative US/UK labour productivity level has hovered around the 2-to-1 level since at least the late nineteenth century, but with some substantial sustained deviations from this long-run level. Most importantly for any assessment of performance during the golden age, the comparative US/UK labour productivity level in manufacturing rose to a peak of about 270 in the early postwar period, which meant that there was an unusually large productivity gap for UK manufacturing to close during the golden age.

Figure 1 also shows the comparative German/UK productivity level in manufacturing. As in the US/UK case, this is also stationary, but with German and British manufacturers achieving broadly similar levels of productivity over the long run. Again, however, it is instructive to consider deviations from this long-run stationarity, particularly in the postwar period. Taking together the German/UK and the US/UK data as in figure 1, it is difficult to avoid the conclusion that in the period 1950-79, Britain was relatively slow to close the transatlantic productivity gap in manufacturing that widened substantially across the Second World War. This is plainly not dependent on 1950-2, as Booth tries to argue.\(^{21}\) Nor is it dependent on the comparison with Germany, since the picture is very similar with respect to most other West European countries.\(^{22}\)

Table 5. Comparative labour productivity in manufacturing sectors

<table>
<thead>
<tr>
<th></th>
<th>1950</th>
<th>1968</th>
<th>1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemicals</td>
<td>356</td>
<td>281</td>
<td>152</td>
</tr>
<tr>
<td>Metals</td>
<td>274</td>
<td>261</td>
<td>166</td>
</tr>
<tr>
<td>Engineering</td>
<td>337</td>
<td>294</td>
<td>186</td>
</tr>
<tr>
<td>Textiles</td>
<td>198</td>
<td>225</td>
<td>174</td>
</tr>
<tr>
<td>Food, drink, and tobacco</td>
<td>215</td>
<td>246</td>
<td>233</td>
</tr>
<tr>
<td>Other manufacturing</td>
<td>285</td>
<td>276</td>
<td>208</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1973</th>
<th>1979</th>
<th>1989</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemicals</td>
<td>112</td>
<td>152</td>
<td>108</td>
</tr>
<tr>
<td>Metals</td>
<td>120</td>
<td>171</td>
<td>119</td>
</tr>
<tr>
<td>Engineering</td>
<td>117</td>
<td>143</td>
<td>117</td>
</tr>
<tr>
<td>Textiles</td>
<td>116</td>
<td>127</td>
<td>125</td>
</tr>
<tr>
<td>Food, drink, and tobacco</td>
<td>108</td>
<td>132</td>
<td>105</td>
</tr>
<tr>
<td>Other manufacturing</td>
<td>87</td>
<td>158</td>
<td>132</td>
</tr>
</tbody>
</table>

Sources: part (a): Broadberry, Productivity race, pp. 28-31; van Ark, 'Comparative productivity'; part (b): O'Mahony, Britain’s productivity performance, tab. 2.6.

Table 5 takes a closer look at productivity performance within the manufacturing sector and confirms Broadberry’s insistence on a relatively poor performance in ‘heavy’ industry (the first three rows) compared

\(^{21}\) Ibid.

\(^{22}\) Broadberry, Productivity race, pp. 51-6.

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with ‘light’ industry (the next two rows) prior to 1979 in terms of the scale of the productivity gap. The sense of relatively serious productivity failure in those sectors is reinforced by the strong bounce back that they exhibited in the 1980s. It is crucially important to bear in mind at this point the principal message of the catching-up approach, which implies that the larger the productivity gap, the greater the scope for rapid growth to eliminate the gap. Booth’s observation that the US/UK productivity gap in engineering narrowed between 1950 and 1968 needs to be balanced by the fact that this was the sector with the second biggest productivity gap in 1950 and the biggest such gap by 1968. Seen in this light, Booth’s bewilderment at the lack of a literature on the success of British engineering is a little difficult to understand.23

On the basis of tables 4 and 5, there can be no doubt of the serious productivity failure which took place in British manufacturing between 1950 and 1979. Nevertheless, of course, it is true that there was also significant underperformance in services, as table 2 shows, and that manufacturing, which accounted for only about one-third of British employment during the period, was too small relative to the economy as a whole to account for anything like the total productivity shortfall in these years.

Finally, table 6 provides a summary of the main regression results which give evidence to support our analysis of the role of incentive structures in productivity outcomes. These regressions exploit the fact of variance in productivity and innovation performance, together with the possibility of measuring key independent variables, across sectors within manufacturing in order to provide empirical tests of our hypotheses. They are not intended to imply that all the problems, or indeed all the relevant evidence, can be found in the manufacturing sector.

These results first support the hypothesis that productivity growth in postwar Britain can be understood in a bargaining framework. In particular, they suggest that the British experience of multiple trade unionism was a problem. Theory suggests that this would be because this made it difficult for firms and workers to take a long-term view of productivity improvement.24 Weak competition is also shown to have been a problem; theory suggests that this is because it creates rents that are partly dissipated in overstaffing and because weak competition makes it harder for shareholders to monitor and to incentivize management.25 Finally, the absence of a positive Schumpeterian effect of concentrated market structure on innovations suggests the presence of principal-agent problems in firms such that with weak competition managers would be relatively slow fully to exploit the potential of cost-reducing innovations.

25 Machin and Wadhwani, ‘Effects of unions’ and Nickell, ‘Competition’.
Table 6. Cross-section manufacturing productivity regressions

(a) Relative productivity levels, US/UK
44 sectors, 1950: UK labour productivity gap with US is positively related to higher physical and human capital and larger scale of employment in US relative to UK and to weakness of competition in UK product markets.
74 sectors, 1968 and 1977: UK labour productivity gap is positively related to higher physical and human capital in US relative to UK, and large plant size in UK, while exposure to international competition reduces but relatively bellicose trade unions (in 1968) increase the UK productivity gap. Further analysis shows that the adverse industrial relations effect on relative UK productivity is found primarily in large plants.

(b) Labour productivity growth in British manufacturing
97 sectors, 1954-63: productivity growth is weaker in sectors characterized by collusion and multiple trade unionism.

(c) Total factor productivity growth in British manufacturing
1954-86, up to 137 sectors: productivity growth is substantially lower in sectors exposed to multiple unionism prior to 1979 but union density per se has no effect.

(d) Innovations
97 sectors, 1945-60: there is no strong evidence that market power is either good or bad for innovations, indicating that agency costs in British industry are strong enough at least to neutralize the Schumpeterian advantages of lack of competition.

Sources:
(a) 1950 from Broadberry and Crafts, ‘British economic policy’, p. 82; 1968/77 from Davies and Caves, Britain’s productivity gap, pp. 47, 67;
(b) Broadberry and Crafts, ‘British economic policy’, p. 79;
(c) Bean and Crafts, ‘British economic growth’, p. 155;
(d) Broadberry and Crafts, ‘Competition’, p. 114.

II

This section provides a discussion of the Anglo-German comparison, because Booth offers a very misleading view of this important case. It also allows us to spell out more clearly the implications of the Broadberry-Crafts view for this case, since our earlier work has focused more on the Anglo-American comparison due to data availability.26 What were the central features of the economic environment that disadvantaged UK manufacturing firms relative to their German counterparts from the 1950s to the 1970s? These relate to institutional arrangements informing human and physical capital formation and limiting the extent of managerial inefficiency.

Historically, there has been a large difference between Europe and the United States in the training of shopfloor workers, and this difference can be linked to the greater emphasis on skilled labour-intensive flexible production in Europe than in the United States.27 What is particularly striking about the postwar period is that whereas in Germany investment in the shopfloor labour force through apprenticeships continued at a high

26 This point was also raised by Tomlinson and Tiratsoo, ‘An old story?’, p. 70.
27 Broadberry and Wagner, ‘Human capital’.
level in manufacturing and indeed spread increasingly into the service sector, in Britain there was a sharp decline in the apprenticeship system, even in the core engineering industries.28 British, unlike German, industry did not develop a set of institutions based on internal labour markets and employers' organizations to facilitate the appropriation of gains from investment in training.29 By 1978/9, whereas 64.5 per cent of German workers had at least intermediate qualifications, only 29 per cent of British workers did.30

Eichengreen has argued persuasively that European postwar settlements between employers, workers, and governments were a major influence on catch-up growth.31 The idea is that successful postwar settlements stimulated investment through a commitment mechanism such that unions were prepared to moderate wage claims in return for high investment and firms were prepared to invest if unions committed to wage moderation.32 This appears to have worked well in economies such as Germany with centralized unions and employers' organizations, but it faced severe difficulties in Britain which remained a case of powerful but decentralized industrial relations characterized by multiple unionism and plant bargaining.33 By 1979 physical capital per hour worked in German manufacturing as a whole was 50 per cent above the UK level, and in engineering the gap was 77 per cent.34

Strong competition in product markets can be an important discipline on management that encourages the rapid adoption of innovations and elicits the effort necessary to achieve high productivity payoffs from them.35 With weak competition, TFP performance will potentially be weakened. Increased competition was strongly correlated with improved productivity performance in the 1980s and the manufacturing TFP gap with Germany fell from 33 per cent in 1979 to 8 per cent in 1989.36

Competition is especially important where shareholders exercise only weak control over managers as was typical in the UK where shareholding was diffuse. It has been found that a reduction of supernormal profits from 15 to 5 per cent of value added raised TFP growth in a sample of British firms by 1 percentage point per year in the absence, but had no effect at all in the presence, of a dominant external shareholder.37 Yet, econometric investigation shows that price-cost margins were much higher and supernormal profits more persistent in the UK than in West Germany.

28 Broadberry, 'Human capital'.
29 Soskice, 'Reconciling markets'.
31 Eichengreen, 'Institutions and economic growth'.
32 The problem was originally formulated by Lancaster, 'Dynamic inefficiency'.
33 Crouch, Industrial relations. Broadberry, 'Why was unemployment so low?', notes the costs of the British postwar settlement in terms of restrictive practices as well as the benefits in terms of wage restraint.
34 O'Mahony, Britain's productivity performance, p. 25.
35 Aghion et al., 'Corporate governance'.
36 Haskel, 'Imperfect competition'; O'Mahony, Britain's productivity performance, p. 25.
37 Nickell et al., 'What makes firms perform well'.
during the golden age.\textsuperscript{38} This suggests that market power was higher and competition weaker in the UK. Also, import competition was more prevalent in Germany, especially as European integration proceeded, but in the UK tariffs were still as high in the 1960s as in the 1930s.\textsuperscript{39}

There is evidence of an extremely high degree of cartelization in the UK during the early golden age years. It is hard to believe that manufacturing in Germany was equally collusive but we still lack research in a comparative framework.\textsuperscript{40} Olson's view of a wartime shock breaking up the old cartelized structures in Germany, broadly endorsed by Giersch et al., has been challenged by Booth et al., and clearly cartels were still active in Germany.\textsuperscript{41} Both the UK and Germany were much more exposed to collusive behaviour than the United States.\textsuperscript{42} However, even if German cartels were equally prevalent, their UK counterparts were more damaging for three reasons.

First, as noted above, the evidence suggests that there was less market power in Germany. Second, German firms typically had dominant shareholders such that the free-rider problems of monitoring management were largely absent and competition mattered less to productivity performance.\textsuperscript{43} Third, the UK faced a more urgent need to adapt in the face of a trade orientation skewed to 'British countries' which accounted for 55 per cent of UK exports.\textsuperscript{44} Furthermore, this need for adjustment came at a particularly costly time, with the growing importance of consumer durables requiring investment in sophisticated marketing and after-sales facilities.\textsuperscript{45}

Despite Booth's claims to the contrary, the UK was systematically outperformed by Germany in terms of manufacturing productivity from the 1950s to the 1970s. The discussion in this section demonstrates that this outcome is consistent with our explanatory framework for poor British performance although this was not developed on the basis of detailed empirical investigation of Anglo-German productivity differentials.

III

One of Booth's most striking claims is that engineering was 'the shining light of British manufacturing in the long boom'.\textsuperscript{46} He even goes so far

\textsuperscript{38} Crafts and Mills, 'TFP growth'; Geroski and Jacquemin, 'Persistence'. This notion of imperfect competition that creates economic rents and gives opportunities for managerial slack should not be confused with the IMF indices of 'competitiveness', which seek to measure the real exchange rate; cf. the discussion in Booth, 'Manufacturing failure hypothesis', pp. 11-12.

\textsuperscript{39} Jones, 'Protectionism'.

\textsuperscript{40} Broadberry and Crafts, 'Competition'.

\textsuperscript{41} Olson, \textit{Rise and decline}; Giersch et al., \textit{Fading miracle}; Booth et al., 'Institutions and economic growth'.

\textsuperscript{42} Shepherd, 'Causes', tab. 1.

\textsuperscript{43} Edwards and Nibler, 'Corporate governance', find that German firms typically have one or two very large shareholders, and they also show that it is ownership concentration rather than bank share ownership \textit{per se} that delivers good performance.

\textsuperscript{44} Broadberry, \textit{Productivity race}, p. 96.

\textsuperscript{45} The scale of the problem was much greater than in France which is seen as comparable by Booth, 'Manufacturing failure hypothesis', p. 25. French exports to 'French countries' were 38.6% of total exports in 1951: France, \textit{Statistique mensuelle}; and French exports relative to GDP were about half the UK level.

\textsuperscript{46} Booth, 'Manufacturing failure hypothesis', p. 5.
as to ask 'Where is the literature on the success of British engineering?' Evidently, Booth is in denial about the record of national champions such as British Leyland, British Steel Corporation, ICL, Alfred Herbert, British Shipbuilders Limited, Rolls Royce, and British Aerospace.

The quantitative evidence does not bear out Booth's optimistic assessment either. As Table 7 shows, although British engineering was catching up on the United States, it was doing so more slowly than its European and Japanese competitors. Indeed, engineering is a sector in which other countries had overtaken UK productivity levels quite decisively by the end of the 1970s. By 1979, in France, Germany, and Japan, respectively, output per hour worked in engineering was 36, 43, and 38 per cent higher than in the UK. Here is a clear case of the UK falling behind.

Table 7. Growth of output, employment, and labour productivity in engineering, 1950-1973 (% per year)

<table>
<thead>
<tr>
<th></th>
<th>Output</th>
<th>Employment</th>
<th>Labour productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>4.1</td>
<td>0.8</td>
<td>3.3</td>
</tr>
<tr>
<td>US</td>
<td>5.0</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>West Germany</td>
<td>8.7</td>
<td>3.7</td>
<td>5.0</td>
</tr>
<tr>
<td>France</td>
<td>6.7</td>
<td>2.2</td>
<td>4.5</td>
</tr>
<tr>
<td>Japan</td>
<td>20.0</td>
<td>6.4</td>
<td>13.6</td>
</tr>
</tbody>
</table>

Source: derived from O'Mahony, Britain's productivity performance.  
Note: Japanese data refer to the period 1955-73.

A standard explanation of the large and persistent transatlantic productivity gap that is apparent from Figure 1a is based on the distinction between 'mass production' and 'flexible production', a distinction which Booth regards as unhelpful in understanding the Anglo-American productivity gap. This explanation of relative productivity performance has traditionally been most closely linked with engineering.

Mass production is usually seen as evolving out of the 'American system of manufactures', which was already identified by contemporaries in the mid-nineteenth century. The literature on Anglo-American technological differences in the Victorian and Edwardian periods explicitly highlights the differing cost-effectiveness of American methods on either side of the Atlantic. Obstacles to the transatlantic diffusion of mass production methods were clearly lower after the Second World War. Yet large-scale production has frequently been seen as the Achilles heel of postwar British industry, notably by Davies and Caves: 'A central finding of this study [is that] productivity performance in the UK is especially inferior in industries where plants are large'; and by Prais: 'by international standards, important and basic parts of British industry

47 Ibid., p. 6.  
48 O'Mahony, Britain's productivity performance, p. 18.  
49 Booth, 'Manufacturing failure hypothesis', pp. 18, 29.  
50 Broadberry, Productivity race, pp. 77-89; Hounshell, From the American system.  
51 Broadberry, Productivity race, pp. 157-208.  
52 Abramovitz and David, 'Convergence'.

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appear to be conducted on too small a scale ... this complaint is not applicable to the whole of manufacturing, but only to certain sectors'.

Booth dismisses this criticism by arguing that the distribution of plant size and output per employee by plant size was similar in Britain and the US for manufacturing as a whole. However, these similarities were already noted by Prais and by Davies and Caves, and do not dispose of the claim that there was a serious productivity problem associated with emulating large-scale American production methods in the UK. This is revealed by disaggregating the data.

Prais showed that Britain had a relatively low upper quartile plant size in heavy industry (where there is an advantage to scale) but a relatively high upper quartile in light industry (where there is little advantage from scale) compared with both Germany and the United States; in motor vehicles and ferrous metals, the British shortfall was particularly large. Prais went on to show that there was a stronger positive relationship between plant size and strikes in Britain than in Germany or the United States. His interpretation was that British firms tried to avoid the worst of the industrial relations problems associated with Fordism in large plants by keeping plant size relatively small in sectors such as engineering but this was precisely where scale economies could have been realized. The relationship between bad industrial relations and poor productivity performance relative to the United States was confirmed econometrically in large plants, but not in small plants, by Davies and Caves.

Davies and Caves found that, although across UK industry as a whole small plants and large plants experienced a similar productivity gap relative to the United States, there was a significant negative correlation at the sectoral level in manufacturing between the extent of scale economies in the United States and the relative productivity performance of large plants: 'large British plants ... underperform their American counterparts more where scale economies are important'. In regressions to explain relative UK/US labour productivity performance across sectors, Davies and Caves found that after normalizing for other determinants of productivity there were diseconomies of scale of 10 to 14 per cent as median plant size rose in British manufacturing, and described this as their 'most striking result'.

In sum, there is no reason to abandon the traditional conclusions that the UK had a particularly serious productivity problem in engineering and that the UK failed to assimilate satisfactorily mass production methods in heavy industry. This was not by any means the only source of productivity

53 Davies and Caves, Britain’s productivity gap, p. 64; Prais, Productivity, pp. 18-19.
54 Booth, ‘Manufacturing failure hypothesis’, p. 16.
55 Prais, Productivity, p. 10; Davies and Caves, Britain’s productivity gap, p. 65.
57 Ibid., pp. 59-83.
58 Davies and Caves, Britain’s productivity gap, pp. 64-70; Broadberry, Productivity race, pp. 390-1.
59 Davies and Caves, Britain’s productivity gap, p. 70.
60 Ibid., pp. 47, 49, 57, 67.
failure but to regard British engineering as the ‘shining light of British manufacturing’ is not persuasive.

IV

Finally, in this section, we address explicitly Booth’s overall critique of ‘the manufacturing failure hypothesis’. This can be summarized in his own words, as follows. ‘If German performance is the yardstick, British industrial productivity growth was much better during the long boom than commonly supposed.’61 ‘The MFH ... needs to show that this sector recorded either relatively slow productivity growth ... or relative contraction (de-industrialization).’62 ‘Trade performance may have been disappointing during the long boom but was it damaging?’63 ‘To suggest that manufacturing productivity growth should have been at the rate required to have driven the aggregate British economy at the same pace as the German or French economies during the long boom simply defies the rules of compositional argument and common sense.’64

In tables 4 and 5 we have reported the extent of the manufacturing productivity failure relative to West Germany. In summary, those tables show that over 30 years German labour productivity growth in manufacturing was 1.3 per cent per year higher than that of the UK, and that by 1979 the German labour productivity lead was 40 per cent on a per worker basis. This translates into a 47 per cent German lead on a per hour worked basis, and in none of the six main sub-divisions of manufacturing was the gap in output per hour worked less than 27 per cent in 1979.

As for de-industrialization, the number of hours worked in manufacturing in the UK peaked in 1964 at 17.44 million or 35.1 per cent of total hours worked. By 1979 manufacturing accounted for 30.1 per cent of hours worked and by 1989 for 20.7 per cent when the absolute number, 8.74 million, was almost exactly half the 1964 level.65 In West Germany, manufacturing represented 36.4 per cent of hours worked in 1964, 33.8 per cent in 1979, and 31.1 per cent in 1989.66 De-industrialization was already relatively rapid in the UK before 1979 and when protectionism was clearly no longer on the agenda after 1979 employment in the sector collapsed. There is no reason to regard this as regrettable per se and indeed it was an inherent aspect of addressing weak manufacturing productivity performance by strengthening competition.67

Is there more reason to worry about the decline in the UK’s share of

62 Ibid., pp. 6-7.
63 Ibid., p. 27.
64 Ibid, p. 29.
65 O’Mahony, Britain’s productivity performance, tabs. B and C.
66 Ibid.
67 In some circumstances de-industrialization could have seriously adverse consequences for future growth through dynamic effects of specialization, as the Krugman-Lucas model shows. However, this model is far from the realities of the 1980s UK economy; see Crafts, Can de-industrialisation damage?, pp. 60-3.

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world manufactured exports? This fell from 26.5 per cent in 1950/3 to 9.4 per cent in 1979, and was accompanied by a reduction in the manufacturing trade balance from 9.1 per cent of GDP in 1952 to 1.4 per cent of GDP in 1979.68 In part, Booth is right to adopt a sanguine attitude to these developments. Clearly, the trade position was much affected by autonomous developments in non-manufacturing trade.69 Moreover, equally successful countries do, of course, have very different shares of world trade in manufactures.

Nevertheless, two caveats need to be made to the suggestion that UK trade performance gives no cause for concern. First, given that innovation and human capital formation are positive influences on manufactured exports, the UK’s dramatic loss of world market share can be seen as a diagnostic of weaknesses in domestic manufacturing.70 Second, as is well known, the UK had a strong tendency for exports to grow more slowly than imports at a constant real exchange rate. Over time this was corrected by periodic devaluations. The implication was that the terms of trade moved less favourably than was the case for strong trade performers such as Germany. Adjusting real GDP growth for terms of trade effects adds about 0.5 per cent per year to the gap in real income growth between the UK and Germany during 1950-73.71

What if the UK had matched German productivity performance in manufacturing and had had 47 per cent more output per hour worked in 1979? This would have raised GDP by 14.1 per cent and the growth rate of real GDP per person from 2.2 to 2.7 per cent per year for 1950-79. Of course, this does not bridge the gap of 2.3 percentage points per year between UK and German growth reported in table 1. But it would push UK growth up to the Swedish rate and would eliminate a very substantial part of the avoidable growth failure identified above.

It is important neither to overstate British economic failure nor to deny British relative economic decline from the 1950s through the 1970s. Papers in the recent literature have rightly emphasized that preoccupation with economic failure has been overdone and that ‘decline’ is an ideological construct which has been associated with the politicization of economic policy.72 There are good reasons to believe that the UK could have grown a bit, rather than a lot, faster; this would have been enough, however, to have raised real GDP per person in the late 1970s by perhaps 20 per cent above the level actually attained.

Once the extent of relative decline and the avoidable growth deficit are put into quantitative perspective, it is apparent that manufacturing failure was not wholly responsible and that more attention deserves to be given to service sector productivity.73 But this should not lead us to

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68 Rowthorn and Wells, *De-industrialization*, p. 66.
69 Ibid., pp. 141-51.
71 Crafts, *Can de-industrialisation damage?*, p. 58.
72 Supple, ‘Fear of failing’; Tomlinson, ‘Inventing “decline”’.
73 See, for example, Broadberry and Ghosal, ‘From the counting house’.

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believe that manufacturing productivity performance did not matter or was only slightly inferior to that of Germany.

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