

# The labour market, I: real wages, productivity and unemployment

## 7.1 INTRODUCTION

Since the 1970s one of the major issues in macroeconomics has been the extent to which low output and high unemployment are caused by deficient demand ('Keynesian' unemployment) and how far they are the result of supply-side factors (high real wages, unemployment benefits and so on). Many of these supply-side factors involve arguments about the nature of the labour market: not only is unemployment a major issue in its own right, but wages are a major element in costs, affecting both profitability and inflation. The question underlying most discussions of these problems is how much unemployment is due to supply-side factors and how much is attributable to the level of aggregate demand. The difficulty is that there is no consensus on how such problems should be tackled. We have, instead, a number of possible approaches, each with its own advantages and disadvantages. In this chapter, we adopt one approach, looking at what are called 'wage gaps'. In chapter 8 we approach the problem in a different way.

## 7.2 REAL WAGES AND PRODUCTIVITY

### The real wage rate

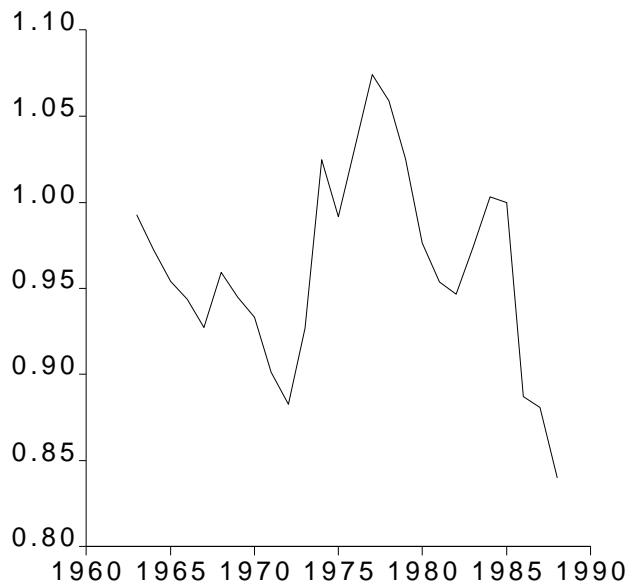
The term 'real wage rate' is often used as though it had a single meaning. There is, however, an important difference between the real product wage rate and the real consumption wage rate.

- The *consumption wage* is the wage rate measured in terms of consumption goods: the nominal wage divided by the price of consumption goods.
- The *product wage* is the wage rate in terms of output: the nominal wage divided by the price of output.

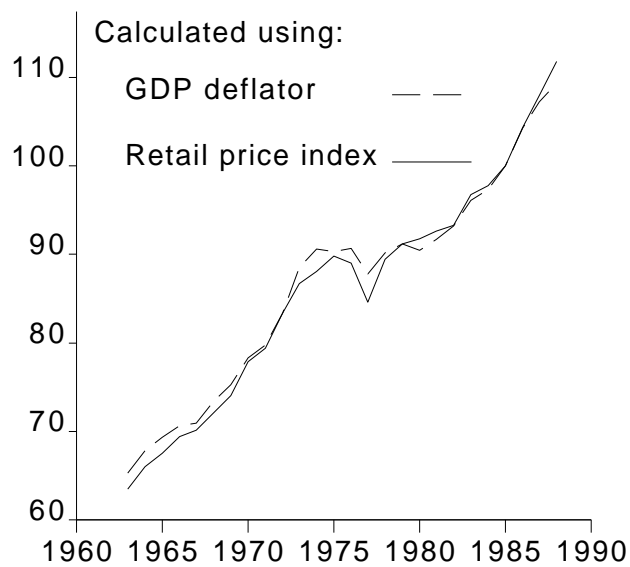
From the worker's point of view it is the consumption wage that matters, whereas firms will be concerned with the product wage. If we are concerned with classical unemployment, therefore, we must use the product wage, not the consumption wage. This gives rise to a further problem, because different sectors of the economy may face very different prices for their products.

Of particular importance is the difference between those sectors producing internationally tradeable goods, which are subject to international competition, and those producing non-tradeable goods. A measure of the relative price of tradeable and non-tradeable goods (the ratio of the price of exports to the GDP deflator) is provided in figure 7.1. Movements in this index will depend on world demand conditions (which will determine the foreign currency prices exporters can charge), the exchange rate (which determines the sterling price they obtain) and the level of UK demand. In 1979-81, for example, the exchange rate rose substantially. However, because there was a world recession, with intense competition in international markets, exporters were not able to raise their prices as much as producers of non-tradeable goods were able to do. Given these changes in relative prices it may be misleading simply to estimate the product wage rate using an aggregate price index such as the GDP deflator.

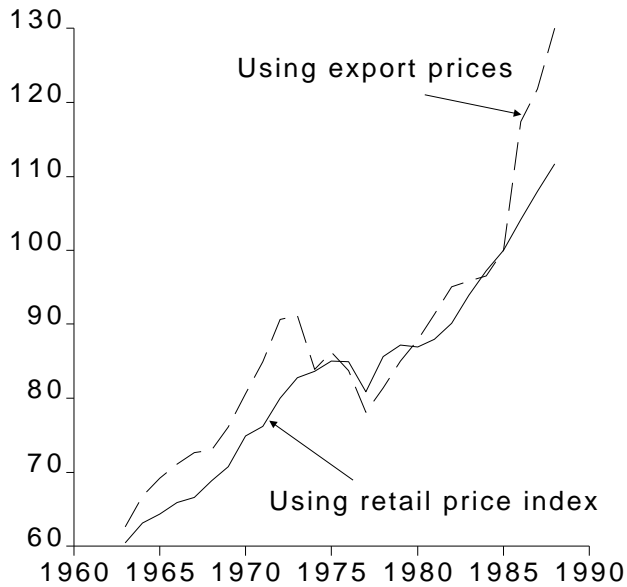
Different measures of the real wage rate are shown in figures 7.2 and 7.3. The consumption wage, both for the economy as a whole and for manufacturing, is calculated using the retail price index. In addition to this we have two measures of the product wage rate. In figure 7.2 we show the product wage obtained using average earnings for the economy as a whole divided by the GDP deflator. In figure 7.3 average



**Figure 7.1** The ratio of export prices to the GDP deflator, 1963-88  
*Source: Economic Trends.*



**Figure 7.2** The real wage rate (whole economy), 1963-88  
*Source: based on average earnings, Economic Trends.*



**Figure 7.3** The real wage rate (manufacturing), 1963-88

Source: based on average earnings, *Economic Trends*.

earnings in manufacturing are divided by an index of export prices, on the grounds that because manufacturing is very exposed to international competition this index is likely to be a better measure of manufacturing prices than is the GDP deflator. Note that the RPI and the GDP deflator move fairly closely together: the export price index, on the other hand, has not moved in line with these. This means that divergences between the product wage and the consumption wage are more important in manufacturing than in the economy as a whole.

### The real wage gap

If we wish to investigate the relationship between real wages and unemployment it is useful to distinguish between two types of unemployment. *Classical unemployment* is caused by the real wage being too high for reasons originating on the supply side of the economy, and *Keynesian unemployment* is caused by aggregate demand being too low. The distinction between these is clearly of great importance for economic policy: policy designed to cure one type of unemployment

might make the other type of unemployment worse. For example, reducing wages would reduce classical unemployment but, if it leads to lower consumers' expenditure, may reduce aggregate demand and exacerbate the problem of Keynesian unemployment.

Actual unemployment may include both classical and Keynesian elements and we need a means of estimating how much unemployment is the result of each cause. The way this is usually done is to calculate what is called the *wage gap*: the difference between the actual real wage rate and the 'full-employment' real wage rate (the real wage at which supply and demand for labour are equal). The idea is that if the real wage rate exceeds the 'full-employment' real wage, employers will be unwilling to employ all the labour that workers wish to supply. This is classical unemployment. The amount of classical unemployment equals the percentage wage gap multiplied by the elasticity of demand for labour. Any unemployment in excess of this is Keynesian unemployment. This is discussed in more detail in box 7.1.

The main problem with measuring the wage gap is that the full-employment real wage rate cannot be observed. The wage gap has to be estimated in other ways. There are several ways we can do this.

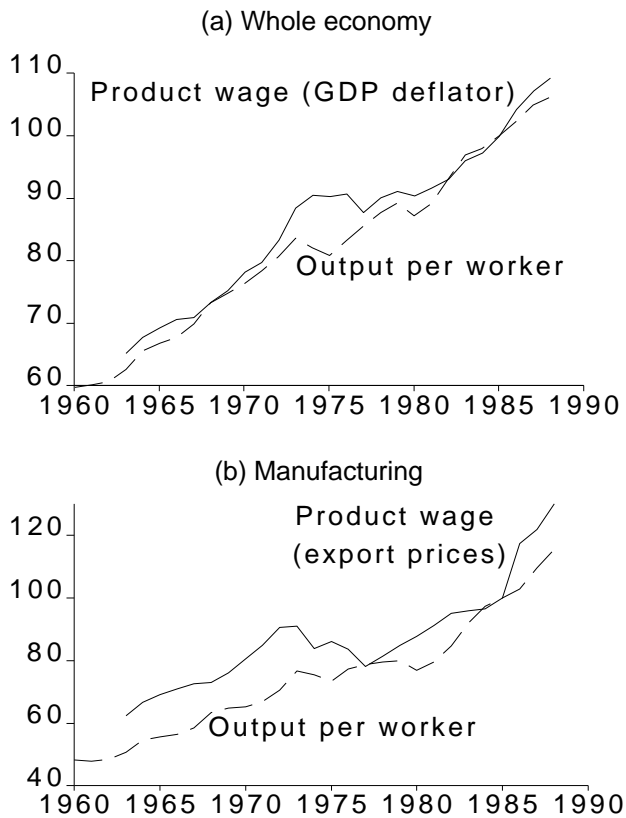
- Comparing product wage rates with output per head. If real wages are growing faster the wage gap is likely to be increasing; if productivity is growing faster the gap is likely to be falling.
- Examining the share of wages in output. The similarity of this to the previous method can be seen by noting that

$$wL/pY = (w/p)/(Y/L)$$

$w$ ,  $p$ ,  $L$  and  $Y$  denoting the money wage rate, the price level, employment and output respectively. This states that the share of wages in output equals the ratio of the real wage to output per head. In theory, therefore, examining the share of wages in output should give *exactly* the same results as comparing real wages with productivity. In practice the results may be different as the data sources may be different.

- Estimating the full-employment marginal product of labour. This can be done in two ways. One is to estimate a production function, relating output to the capital stock and labour employed. Once a production function has been obtained the full-employment marginal product can be calculated. The other is to observe years when the economy was working at full employment (for

example 1964, 1973 and 1979) and to use these 'benchmark' years to infer what the real wage would have been in other years had there been full employment. There are great problems with both methods, but they have the advantage that they provide estimates of how low the real wage would have to be in order to eliminate classical unemployment and hence of how much employment is classical and how much is Keynesian.



**Figure 7.4** Real wages and productivity, 1963-88

*Source: Economic Trends.*

### BOX 7.1 KEYNESIAN AND CLASSICAL UNEMPLOYMENT

We can think of involuntary unemployment as comprising two different types of unemployment.

- *Keynesian unemployment* — employment is low because firms cannot sell all the goods they wish to produce.
- *Classical unemployment* — employment is low because high real wages mean it would be unprofitable to produce the full-employment level of output.

In order to provide a full explanation of Keynesian and classical unemployment we would need to consider the goods market as well as the labour market: in particular it would be necessary to explain how a deficiency of demand for goods (and hence Keynesian unemployment) can arise. We can, however, understand the main features of Keynesian and classical unemployment by considering just the labour market.

Before we can consider Keynesian and classical unemployment we need to consider the demand for labour. If firms can sell as much output as they wish at the going price level, they will employ labour up to the point where the real wage rate equals the marginal product of labour. The demand curve will thus be the same as the marginal productivity schedule, shown in figure 7.B1.1. Note that movements along the marginal product curve are associated with changes in output: as firms move from A to B on the marginal product schedule they also move from A to B on the production function shown in the top portion of figure 7.B1.1.

Now suppose that, for some reason, firms believe that they will be unable to sell more than  $Y_1$  units of output. This means that they will not wish to buy more than  $L_1$  units of labour, whatever the real wage. The demand curve for labour will become kinked at B: we thus have the demand curve  $L_1^d$  in figure 7.B1.2. The meaning of the vertical portion of this demand curve is that even if the real wage falls very low, firms will produce only  $Y_1$  units of output: at any point below

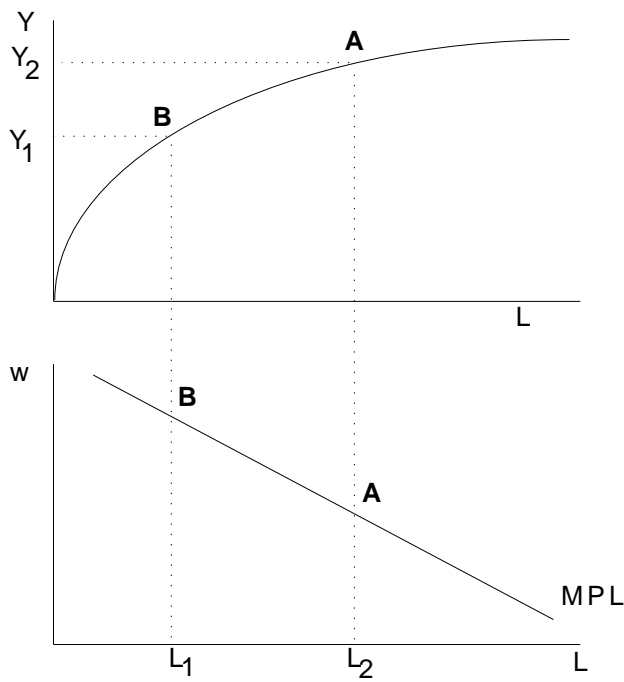


Figure 7.B1.1 The demand for labour

B on the demand curve they will produce at point B on the production function. The demand for labour thus depends not only on the real wage rate but also on the level of output that firms expect to be able to sell. For example, if demand for goods were to increase to  $Y_2$  the labour demand curve would shift to the right, to  $L^d_2$ .

To explain unemployment we introduce a labour supply curve and to keep things simple we assume it is vertical. This is shown in figure 7.B1.2. The 'full employment' real wage rate,  $w_f$  is where the supply curve cuts the marginal product curve. To show Keynesian and classical unemployment suppose that firms believe they will be unable to sell more than  $Y_1$  units of output (shown in figure 7.B1.1) and that the real wage rate is  $w_2$ . Firms will employ  $L_1$  units of labour and unemployment (all 'involuntary') will be  $L_f - L_1$ . Of this we can say that  $L_f - L_2$  is classical unemployment and  $L_2 - L_1$  is Keynesian. The reason is



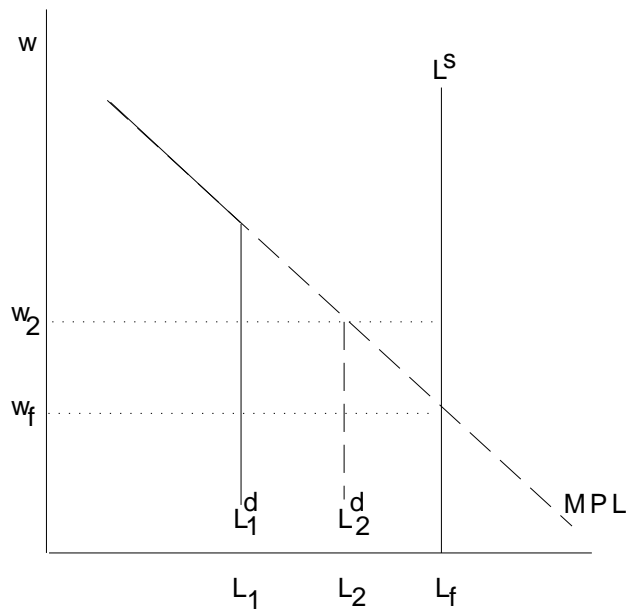


Figure 7.B1.2 Keynesian and classical unemployment

that an expansion of aggregate demand would shift the demand curve for labour to the right and would increase employment up to  $L_2$ . For employment to rise beyond  $L_2$ , however, would require a fall in the real wage rate.

We can measure the amount of classical unemployment by the difference between the real wage rate and the full-employment real wage. In this simple model where the supply curve is vertical the two are related by the elasticity of the labour demand curve:

$$(L_f - L_2) / L_f = e(w_2 - w_f) / w_f = e(w_2 - MPL_f) / MPL_f$$

where  $e$  is the elasticity of demand for labour expressed as a positive number. This gap between the real wage and the full-employment real wage or marginal product is usually referred to as the *real wage gap*.

**Table 7.1** Product wage and productivity growth rates, 1963-88

	Whole economy			Manufacturing		
	Product wage	Productivity	Difference	Product wage	Productivity	Difference
1963-69	2.4	3.0	-0.6	3.3	4.3	-1.0
1969-73	4.1	2.8	1.3	4.6	4.2	0.4
1973-75	1.0	-1.6	2.6	-2.6	-2.0	-0.6
1975-79	0.9	2.5	-1.6	-0.3	2.1	-2.4
1979-81	0.6	0.0	0.6	3.6	0.3	3.3
1981-88	2.5	2.5	0.0	5.2	5.5	-0.3

Source: calculated from data used for figure 7.4.

**Table 7.2** Wages and productivity in Europe and the US

	France	Germany	UK	US
<b>Product wage</b>				
1962-69	5.1	5.0	3.2	3.1
1969-73	5.5	6.3	3.7	2.6
1973-75	5.1	4.8	4.9	0.2
1975-78	5.2	2.7	1.5	2.3
<b>Output per head</b>				
1962-69	5.2	5.3	3.1	2.7
1969-73	5.7	5.2	3.9	2.6
1973-75	2.6	4.0	0.7	0.3
1975-78	5.0	4.5	2.0	2.1

Source: J. D. Sachs 'Wages, profits and macroeconomic adjustment: a comparative study', *Brookings Papers on Economic Activity*, 1979, pp. 275.

### 7.3 REAL WAGES AND UNEMPLOYMENT SINCE THE 1960s

#### Wages and productivity

The behaviour of real wages and productivity is shown in figure 7.4 and table 7.1, which give estimates of product wage rates and output per head, both for the whole economy and for manufacturing. The manufacturing product wage is based on export prices, the assumption being that most manufactured goods are tradeable.

Consider first the whole economy figures. During the 1960s product wage rates were growing at 2.4 per cent per annum, slightly below the growth rate of productivity (3 per cent per annum). After 1969, however, the growth rate of real wages accelerated to 4.1 per cent per annum, substantially higher than the 2.8 per cent per annum growth rate of productivity. From 1969 to 1973, therefore, a wage gap seems to have emerged, the reason being a rapid growth in real wages. The real wage gap continued to grow from 1973 to 1975, but this time the reason was the dramatic fall in productivity caused by the rise in oil prices. Real wage growth slowed to 1 per cent per annum, but even this was high when productivity was *falling* at 1.6 per cent per annum. By 1975 a large wage gap had emerged. Between 1975 and 1979 real wage growth was kept well below the productivity growth rate, the result being that the wage gap was virtually removed.

These figures suggest that a large part of the rise in unemployment which arose after the first oil shock may have been classical unemployment, caused by high real wage rates. A similar story, involving an acceleration of wages in 1969-73 combined with the failure of wages to fall when the oil shock reduced productivity from 1973 to 1975, could be told for most of Europe, as is shown in table 7.2 (note that the data in table 7.2 are for wages and output per hour, rather than per worker, and that they are in 1975 prices). In the USA, on the other hand, real wages fell quickly in response to the rise in oil prices and there is no evidence that any real wage gap emerged. If it were the case that in the late 1970s Europe was experiencing classical unemployment, and the USA Keynesian unemployment, this could explain why European policy-makers were concerned with keeping wages down, whereas their US counterparts were concerned to raise aggregate demand.

It has been suggested that the difference between European and US wage behaviour can be explained by differences in labour market institutions. In the USA wages were fixed by long-term contracts, the

result being that when prices rose real wages fell immediately. In Europe, on the other hand, workers were in a strong position to negotiate wage increases to offset price rises, and were able to sustain real wages. In Britain the situation was made worse in 1974, the year when the effects of the oil shock were first felt, by the existence of an incomes policy that index-linked wages: rises in the retail price index automatically triggered wage rises, in complete contrast to what happened in the USA.

The situation after the 1979 oil shock was very different. From 1979 to 1981 productivity growth fell to zero, but real wage growth remained very low, at 0.6 per cent per annum. No significant wage gap appears to have emerged. Since 1981 product wages and productivity have grown at the same rate, 2.5 per cent per annum.

The story for manufacturing productivity looks, at first sight, very different. It is important to remember, however, that because the figures are index numbers it is only *changes* in the gap between real wages and productivity that are significant (the series are constructed so that they are both 100 in 1985). It is also important to remember that the product wage is constructed using an export price index, which may not be appropriate. The figures must be treated with caution. Table 7.1 shows that when we consider manufacturing there was also a rise in real wages relative to productivity from 1969 to 1973, though slightly less than in the economy as a whole. From 1973 to 1975, however, there appears to have been a *fall* in the product wage of 2.6 per cent per annum, because of export prices having risen rapidly (compare the two real wage rates shown in figure 7.3). From 1975 to 1979 wage growth was low relative to productivity growth, as in the economy as a whole. The second major difference between manufacturing and the economy as a whole arises for 1979-81, when the product wage rose at 3.6 per cent per annum, at a time when productivity rose at only 0.3 per cent per annum. The severe world recession and the rapidly rising sterling exchange rate were keeping export prices low, raising the product wage facing exporters very substantially. The gap between product-wage growth and productivity growth rose to 3.3 per cent per annum. Since 1981, on the other hand, product wages have, on average, grown in line with productivity, both growing at over 5 per cent per annum.

### The share of wages in output

Figure 7.5 shows the share of wages in GDP. Also shown is a 5-year moving average, which smooths out year-to-year fluctuations. This rose

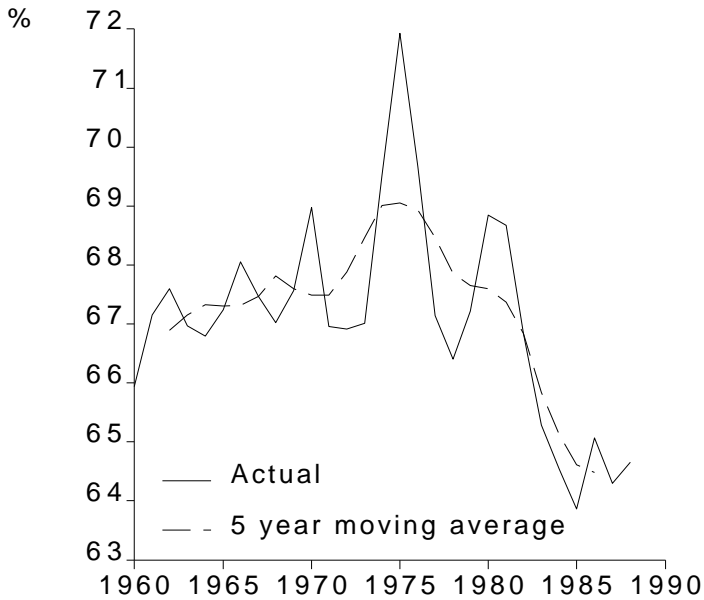


Figure 7.5 The share of wages in national income, 1960-88

Source: *Economic Trends*.

slowly during the 1960s, and then rose significantly from about 1973 to 1975, after which it declined. What stands out from this graph is that the share of wages fell dramatically after 1980. Thus even if there was a large wage gap, together with classical unemployment, during the 1970s, it is, on the surface at least, hard to see how a wage gap could have persisted into the 1980s: the fall in the share of wages in national income seems too large.

### Estimates of the real wage gap

To estimate the real wage gap we need to estimate the full-employment real wage rate. There are two problems here. The first is that productivity data measure output per head: the *average* product of labour, not the marginal product. The second is that we have to work out what productivity would be if there were full employment. The obvious way of doing this would be to estimate a production function, with output depending on the capital stock and the level of employment. Such an approach, however, raises great problems. Instead we adopt a simpler approach.

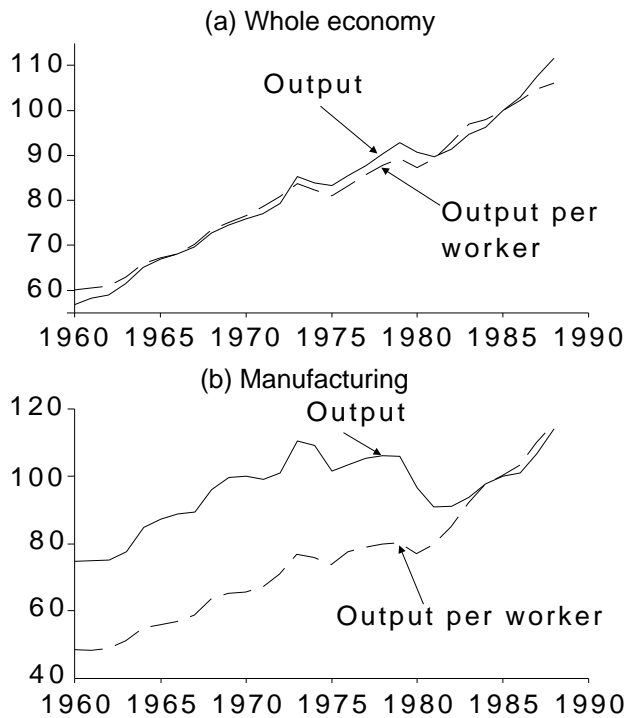
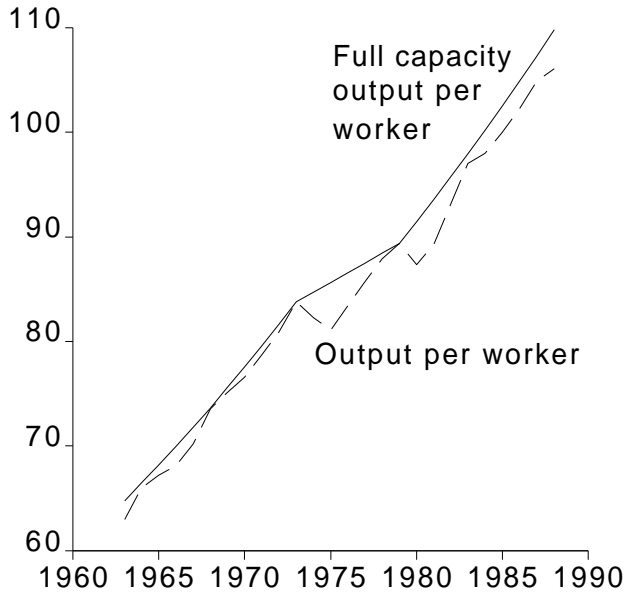


Figure 7.6 Output and productivity, 1960-88

Source: *Economic Trends*.

Figure 7.6 contains data on total output and output per head. This makes it clear that productivity (output per head) fluctuates over the business cycle. In booms productivity rises and in recessions it falls. The explanation of this is the tendency of firms to 'hoard' labour during recessions. It is expensive to hire and fire workers whenever demand changes and, in addition, there is the danger that if firms fire workers during a recession they may be unable to replace them quickly when the boom comes. This suggests that we can estimate the full-capacity level of output per head by looking at those years when unemployment was at its lowest and output was at its highest. Such full employment years included 1964, 1973 and 1979. We can then estimate full-employment (or full-capacity) output per head in other years by interpolating between these benchmark years.

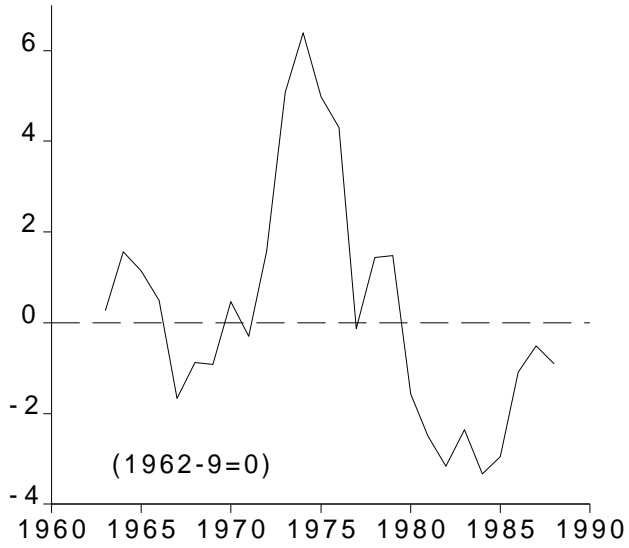


**Figure 7.7** Actual and full-capacity output per worker, 1963-88

*Source:* actual output per worker, figure 7.2.

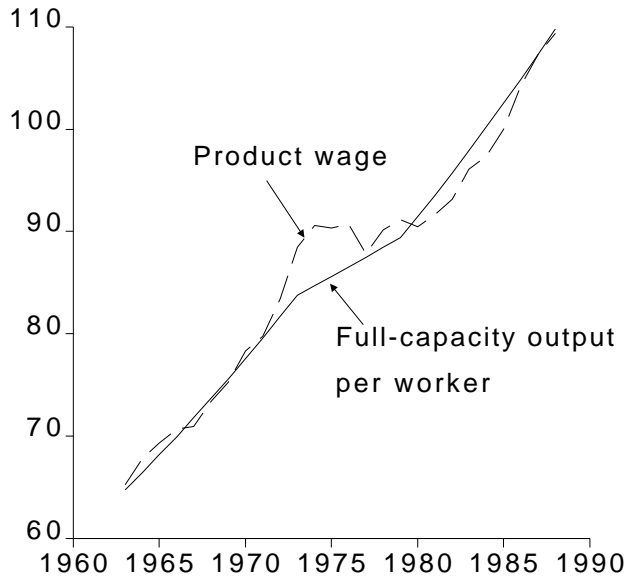
This is done in figure 7.7. We have assumed that the growth rate of full-capacity output per head was constant for each of the three periods, 1963-73, 1973-79 and 1979-88. For the period after 1979, we have assumed that on average full-employment productivity grew at the same rate as actual output per head.

Using this measure of full-employment or full-capacity output per head we can estimate the real wage gap. It is the percentage by which the product wage rate exceeds full-employment output per head. The gap is adjusted so as to make the wage gap zero on average between 1963 and 1969. The reason for this last assumption is that the 1960s were a period of very low unemployment, by today's standards, when we would not expect there to have been a significant amount of classical unemployment. 1969 is chosen as the end-point as this marks the beginning of the period of wage pressure when we believe the wage gap may have been increasing. The resulting wage gap is shown in figure 7.8. Figure 7.9 brings together the product wage rate and the measure of full-capacity output per head from which the wage gap was derived.



**Figure 7.8** The real wage gap, 1963-88

Source: as described in text — real wage is based on average earnings and GDP deflator.



**Figure 7.9** Real wages and full-capacity output per worker, 1963-88

Source: as described in text.



These figures suggest that in the mid-1970s a substantial wage gap emerged, amounting to about 6 per cent by 1974. This gap was eliminated by the end of the 1970s. The gap then became negative for a few years, returning nearly to zero by 1987. These figures must, of course, be treated with very great caution. The estimates rely heavily on 1979 being a year of full employment, despite unemployment being much higher than at previous cyclical peaks. The justification for this is the argument that, for various reasons, the equilibrium level of frictional and structural unemployment had risen. There are also similar problems after 1979. Whilst the economy is, in 1989, showing many of the signs associated with full-capacity operation, there is still substantial evidence of unemployment. Rough-and-ready methods such as those used here may be inadequate to deal with situations where large supply-side changes are taking place.

## 7.4 CONCLUSIONS

The concepts of Keynesian and classical unemployment can be used to ascertain the role of real wages in causing unemployment. The empirical evidence considered in this chapter has to be treated with a great deal of caution, primarily because the estimates of the full-employment real wage are little more than conjectures. It suggests, however, that a large real wage gap did emerge during the 1970s. It seems likely that a significant part of the unemployment which arose in the UK during the 1970s was classical unemployment. After 1975, because of a period of restrictive government policy combined with incomes policies aimed at bringing down wage inflation, the wage gap had been substantially reduced, if not eliminated. Because of the rise in the rate of productivity growth after 1979, high real wage growth during this period does not appear to have led to any large wage gap. Unemployment during the 1980s, therefore, would appear to be Keynesian rather than classical in origin, though this is a conclusion that should be treated with a great deal of caution. It is important to consider other evidence as well. We do this in the next chapter.

## FURTHER READING

The main references here are J. D. Sachs 'Wages, profits and macroeconomic adjustment: a comparative study', *Brookings Papers on Economic Activity* 1979(2), pp. 269-319; M. Bruno and J. D. Sachs *The Economics of Worldwide Stagflation* (Oxford: Oxford University Press, 1985); and M. Bruno 'Aggregate supply and demand factors in UK

unemployment: an update', *Economica* 53 (supplement), 1985, pp. S35-52. Issues of wage gaps have more recently been discussed in R. M. Coen and B. G. Hickman 'Keynesian and classical unemployment in four countries,' *Brookings Papers on Economic Activity* 1987, 2, pp. 123-206; Bert G. Hickman 'Real wages, aggregate demand and unemployment,' *European Economic Review* 31, 1987, 1531-60; and J. Sachs 'High unemployment in Europe — diagnosis and policy implications,' in C.-H. Siven (ed.) *Unemployment in Europe* (Stockholm: Timbro, 1987). Many of the references cited in chapters 6 and 8 are also relevant to this topic.

Readers wanting further discussion of the theory of Keynesian and classical unemployment, which is not covered in all the standard macroeconomic theory textbooks, could read E. Malinvaud *The Theory of Unemployment Reconsidered* (Oxford: Basil Blackwell, 1977).