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Ten Years of Mrs. T.

Introduction

Throughout the Sixties and Seventies Britain's economic performance deteriorated. Economists queued up with their prognoses, but without any noticeable effect. Then came Mrs. Thatcher. Her favourite economist was Adam Smith with a respectful nod to Milton Friedman, and since 1979 her government has set about rolling back the frontiers of the state. In doing so she broke decisively with the postwar consensus on the role of the state in the economy.

Early assessments of the Thatcher economic revolution, such as Buiter and Miller (1981, 1983), were perhaps too early to appraise the success of the new regime. A more complete assessment on ten years should be possible, and there has been a veritable flood of eulogies and epitaphs (e.g., Burns, 1988; Layard and Nickell, 1989; Matthews and Minford, 1987; Maynard, 1988; Walters, 1986). Yet in some ways the waters are as murky as ever, for while it is relatively easy to document what has happened, it is harder to say what would have happened under alternative policies. Would the benefits have been greater or the costs smaller under an alternative set of policies? That, unfortunately, is a question to which we can never know the answer.

However, we can at least assess the Thatcher programme against its stated objectives. Table 1 provides snapshots of the British economy at the start of Mrs. Thatcher's administration (which coincides with the peak of the previous cycle), at the trough of the recession in 1981 and in 1988 (which may well turn out to be another business cycle peak).

From a macroeconomic perspective the immediate objective in 1979 was to achieve a steady and sustained reduction in the rate of inflation through monetary control. To limit upward pressure on interest rates,

peak of the previous cycle), at the trough of the recession in 1981 and in 1988 (which may well turn out to be another business cycle peak).

From a macroeconomic perspective the immediate objective in 1979 was to achieve a steady and sustained reduction in the rate of inflation through monetary control. To limit upward pressure on interest rates, the monetary targets were part of an overall framework—the Medium Term Financial Strategy (MTFS)—which envisaged a decline in the government's borrowing requirements over a number of years. The government also promised a reduction in government spending and taxes but, unlike the Reagan programme, there was to be no dabbling in the black arts of the Laffer curve. Tax cuts would come only when the government's financial position allowed.

The primary objective—the achievement of a low and relatively steady rate of inflation—clearly has been achieved, current "blips" aside. Similarly the public sector borrowing requirement (PSBR) has swung from a large deficit to what is now quite a sizable surplus, and for this reason has now been renamed the public sector debt repayment (PSDR). The share of government spending in total output, and with it the share of taxes, however, has changed rather little until the last year or two. (This is not simply due to increased transfer payments stemming from higher unemployment; the share of government expenditure on goods and services in GDP was 19.8% in 1987 against 19.7% in 1979.) The next section of the paper discusses in more detail this aspect of the government's record, and in particular the role of the PSBR targets in the MTFS.

Table 1 SELECTED UK ECONOMIC STATISTICS

	1979	*1981*	*1988*
GDP[a]	100.0	96.7	121.0
Manufacturing output	100.0	85.9	107.8
Output/head	100.0	99.9	121.3
Manufacturing output/head	100.0	99.5	148.1
Unemployment rate	4.9	9.4	8.6
Long-term unemployment rate (more than 12 months)	1.2	2.1	3.5
Retail price inflation	13.4	11.9	4.9
Real earnings	100.0	105.3	126.0
Real earnings (Male manuals, lowest decile)	100.0	102.1	107.0
Profit share (% of GDP[b])	20.4	16.5	21.0
Public Sector Debt Repayment (% of GDP[c])	−6.4	−4.1	2.4
Government expenditure (% of GDP[c])	43.4	46.1	38.6
Tax Revenue (% of GDP[c])	34.1	37.8	37.2
Current account (% of GDP[c])	−0.3	2.7	−3.1

Notes: (a) Average of income, output and expenditure measures
(b) At factor cost
(c) At market prices

Source: Economic Trends, Employment Gazette, and *New Earnings Survey*

As far as the real side of the economy goes, the picture is mixed. Furthermore the perspective is very different viewed from 1979 (favoured by critics of Mrs. Thatcher) and 1981 (preferred by supporters). The annual growth rate of output is an anaemic 2.1% judged from the former, but a healthy 3.3% from the latter. There is no doubt that the record on unemployment has until recently been rather bad, while that on productivity has been relatively good. The unemployment rate, which peaked at 11.8% in 1985, has reached levels second only to those experienced during the Great Depression. Almost all of this increase in unemployment is due to an increase in duration rather than an increased probability of unemployment, resulting in a large increase in those who have been unemployed for a year or more. Reasons for this rise in unemployment are discussed in Section 2 of the paper.

Productivity growth of 2.2% per annum (4.5% in manufacturing) since 1979 may not seem startling to the average Japanese (or German) reader, but it does represent a significant improvement over Britain's past record, both in absolute and relative terms. The sources and sustainability of this resurgence in productivity are discussed in Section 3.

Alongside this acceleration in productivity has been a sharp rise in average real (pre-tax) earnings. However as Section 4 details, the inequality between both pre- and post-tax incomes has risen greatly during the Thatcher years, with the result that the real incomes of those at the bottom end of the income distribution have hardly risen at all. Gains there may have been from the Thatcher years, but they have been shared very unequally.

1. Inflation and the Public Finances

The immediate objective of the government after its election in 1979 was the eradication of inflation. To this end it instituted a Medium Term Financial Strategy (MTFS) embodying guidelines for both monetary and fiscal policies over a rolling four-year horizon. In particular the MTFS envisaged a steady reduction in nominal GDP growth through a gradual reduction in the rate of growth of the money stock (£M3), accompanied by a declining path for the PSBR.

Targets for £M3 were not new, having been first introduced by the Labour government in 1977. The MTFS, however, was different in providing target ranges for a number of years ahead. Unfortunately, in the first two years of the strategy, £M3 vastly overshot its target range (18.4% in 1980 and 16.3% in 1981 as against targets of 7–11% and 6–10%) leading both to a further tightening of monetary policy and to upward revision of the ranges in ensuing MTFSs. This led some observers to

claim that monetary conditions were far too loose and the rampant inflation (retail price inflation peaked at 22% in May 1980) was a consequence of this monetary laxity.

With hindsight it is clear that this was incorrect and that the country was in the grip of a tight monetary squeeze. The rate of growth of the monetary base slowed from 12.1% in 1979 to 2.6% in 1981. Furthermore the nominal exchange rate appreciated by no less than a quarter between the beginning of 1979 and the end of 1980, resulting in a similar loss of competitiveness. Some of this is certainly due to North Sea oil—in particular the revaluation of oil rents in the wake of OPEC II—but a variety of studies using different approaches all point to a real appreciation from oil of around 8–12% (see Bean 1987, for a survey). Although there are some difficulties in squaring a monetary explanation of the rest of the appreciation with the ex post behaviour of interest differentials (see Buiter and Miller 1983), it seems reasonable to attribute a significant part of the remaining 13–17% to the monetary squeeze.

In any case the outturn for nominal GDP growth seems to have been pretty much as the government would have hoped. Burns (1988) reports internal figures lying behind the 1980 MTFS which envisaged a reduction in nominal GDP growth from 17.5% in the financial year 1979–80 to 9.6% in 1982–83. The outturn for 1982–83 was in fact 9.2%. Where things went somewhat awry was in the split between inflation and real output growth in 1980 and 1981. Since then, despite continued misbehaviour of the monetary aggregates due to financial innovation, nominal GDP growth has been fairly steady, ranging between 7% and 10% per annum.

1.1 THE PSBR TARGETS

That some sort of monetary deceleration would be associated with the disinflation process is relatively uncontroversial, although it is open to debate whether the disinflation could have been less painfully accomplished. A natural alternative for instance would have been an exchange rate target, perhaps within the EMS. An incomes policy might have provided a second nominal anchor (more on this below). An interesting issue, however, is the role played by the targets for the PSBR in the MTFS. Were they important in the disinflationary process and, if so, how?

In the original 1980 MTFS, the PSBR, as a percentage of GDP, was set to decline steadily from 4.7% in 1979–80 to 1.5% in 1983–84. However, as Table 2 shows, it took the government considerably longer to reduce the PSBR than was originally intended in the 1980 MTFS. In fact progress has been even less dramatic, for the PSBR treats the proceeds from privatisation as a form of negative capital expenditure rather than a way

of financing the deficit. The Public Sector Financial Deficit/Surplus (PSFD/PSFS) instead treats privatisation proceeds as a form of finance and thus gives a more accurate picture of the pressures government policy is putting on the capital markets. Table 2 shows that this changed remarkably little until the rapid growth of the last few years swelled tax receipts.

The overrun of the PSBR targets in the wake of the deeper-than-expected recession of 1980–81 is an indication that they did not constitute an unconditional rule for fiscal policy. However, it is clear that the permitted overrun was less pronounced than could have been expected under previous administrations. Table 2 also contains the OECD's cyclically corrected measure of the budget deficit which gives an indication of the "discretionary" changes in fiscal policy (although it does *not* necessarily provide a good measure of the impact of policy on demand). This shows policy tightening in 1980 and, especially, 1981 when the economy was undergoing its severest slump since the early Thirties. Thus while fiscal policy has not been unconditional, it has been considerably less responsive to short-run fluctuations in activity than in the past, reflecting the government's emphasis on medium and long-term objectives.

1.2 INTEREST RATES AND THE MTFS

So much for what happened to the PSBR. What has the fiscal part of the MTFS achieved? It is helpful to start by recording what the government *thought* it would achieve. The 1980 MTFS gave the following rationale:

Table 2 THE PUBLIC FINANCES (% OF GDP AT MARKET PRICES)

	PSDR	*PSFS*[a]	*Cyclically Adjusted PSFS*	*Oil Revenues*	*Permanent Income PSFS*
1970	0.0	1.3	5.0	0.0	6.8
1975	−9.6	−7.2	1.1	0.0	−0.3
1978	−4.9	−5.0	−1.0	0.4	−0.1
1979	−6.4	−4.3	0.9	1.3	0.2
1980	−5.1	−4.5	2.1	1.8	−0.1
1981	−4.1	−3.1	5.3	3.0	0.2
1982	−1.8	−2.7	5.6	3.3	0.2
1983	−3.8	−3.4	3.7	3.4	−0.6
1984	−3.2	−4.0	3.2	4.3	−2.3
1985	−2.1	−2.7	3.6	3.8	−0.6
1986	−0.6	−2.1	3.1	1.5	0.8
1987	0.4	−1.1	3.0	1.1	2.2

Note: (a) Excludes certain other financial transactions as well as privatisation proceeds.
Sources: Economic Trends, Financial Statement and Budget Report, OECD Economic Outlook, (various) and Begg (1987).

It is not the intention to achieve this reduction in monetary growth by excessive reliance on interest rates. The consequence of the high level of public sector borrowing has been high nominal interest rates and greater financing problems for the private sector. If interest rates are to be brought down to acceptable levels the PSBR must be substantially reduced as a proportion of GDP over the next few years (Financial Statement and Budget Report, 1980–81).

It is clear that the government's primary argument for the PSBR targets was to prevent the crowding-out of investment that might occur if the private sector was asked to absorb increasing quantities of government debt. This rationale was severely criticised at the time by such diverse economists as Dornbusch, Friedman, Laidler, and Kaldor (see Treasury and Civil Service Committee 1981), and does not look stronger with hindsight. Nominal short-term interest rates have never fallen much below 9% since 1979 and are currently almost as high as when the government took office. Real short-term interest rates—approximately zero in 1978—have averaged around 4% over the last five years. Furthermore, this is not because of a fiscal-inspired recovery in investment; investment in 1978 stood at 18.5% of GDP while over 1983–87 it averaged only 16.8%.

Of course, other things have changed since 1980. In particular the level of world real interest rates has risen dramatically. But this merely serves to emphasize the fundamental weakness in the basic argument; namely that real interest rates are determined primarily in international capital markets. Empirical evidence suggests that the effects of changes in the relative supplies of different assets has relatively little effect on real interest differentials (e.g., Frankel 1985), and once this is recognised the original rationale for the PSBR targets looks distinctly shaky.

1.3 SOLVENCY AND THE MTFS

An alternative rationale advanced for the PSBR targets is that it enhanced the credibility of the government's monetary targets. According to this line of argument, sustained budget deficits now must be associated with either budget surpluses or increased monetisation in the future. A lower rate of monetary growth today can thus engender expectations of higher future inflation unless accompanied by a reduction in the fiscal deficit (Sargent and Wallace 1981).

Is this argument relevant to the UK? Start by recalling that the government budget identity implies that for a given debt-income ratio, b, the rate of inflation, π, is given by

$$\pi = v[d+(r-n)b]-n \quad (1)$$

where v is the velocity of high-powered money (assumed constant for simplicity), d is the primary deficit as a proportion of GDP, r is the real interest rate and n is the rate of growth of the economy ($r > n$). It follows that the nominal deficit must certainly fall if inflation is to be permanently lower, as also must the primary deficit. If these cuts are not made at the same time as any cut in monetary growth, there is a danger that private agents will be led to expect higher monetary growth and inflation in the future rather than fiscal retrenchment.

The first point to note is that seigniorage has never been an important source of revenue in the UK because the velocity of circulation is so high (roughly 20). During the Seventies seigniorage averaged 0.8% of GDP, and half that in the Eighties. Since a 10 percentage point reduction in inflation calls for a reduction of the primary deficit of around .5 percentage point, and the political costs of inflation are high, it is much more likely that a future government would resort to conventional taxation rather than the printing presses in order to cover the increased debt service resulting from a lower rate of monetary expansion today. Consequently an essential ingredient of the Sargent-Wallace argument—that future primary deficits are fixed independently of the rate of monetary growth—would seem to be missing.

More relevant, however, is the existence of long-dated nominally-denominated debt. Unanticipated disinflation represents a windfall subsidy to bondholders which has to be financed from somewhere. Consequently the primary deficit would need to fall for as long as the overhang of high real interest payments on existing long-dated nominally-denominated debt lasts, if the debt-income ratio were not to rise. The problem with this line of argument is that the government could avoid a squeeze on the primary deficit by carrying out a swap of indexed for non-indexed debt prior to initiating its disinflationary programme. Nominal interest payments would then decline with inflation.

An associated argument is that the existence of nominally-denominated debt encourages governments to indulge in bouts of unanticipated inflation to expropriate bondholders. The mere announcement of a low inflation path may thus not be credible. Sticking to the PSBR targets was one way of building up the credibility of its monetary programme. The problem is that, as before, the authorities can avoid this problem of time inconsistency by issuing indexed debt before initiating the disinflationary programme while it still lacked credibility. Now although the government has been issuing indexed stock since 1980 it still constitutes only 11% of the face value of the outstanding debt, and thus falls well short of a full debt swap. Possibly the government had not realised that it could avoid the pains of building up

credibility through this simple device; it seems more likely that both the government and the private sector (which seemed reluctant to absorb large quantities of indexed debt) simply did not regard the time inconsistency problem as serious.

A third line of argument is that the initial levels of the deficit were unsustainable. The primary deficit between 1978 and 1980 averaged around 2.33% of GDP. Given a net debt-income ratio of a fraction over 40% and a real growth corrected interest rate of 1–2%, equation (1) implies a steady-state inflation rate of around 50%. Although such a situation does not require that adjustment be made today, correction of an unsustainable financial plan has to begin sometime.

To see whether existing fiscal plans were ex ante unsustainable, start by noting that the government comprehensive balance sheet requires that (Buiter 1985):

$$G \equiv \begin{cases} \text{Present value of exhaustive consumption spending} \\ + \text{ present value of transfers, grants and subsidies} \end{cases}$$

$$= \left.\begin{cases} \text{Public sector net assets (financial and real)} \\ + \text{ present value of taxes} \\ + \text{ present value of seigniorage} \\ + \text{ present value of public sector capital formation programme} \end{cases}\right\} \equiv W.$$

If R is the real long-term interest rate, then the indefinitely sustainable flow of government spending is given by the annuity value of net worth, RW, and a measure of the fiscal elbow room the government is bequeathing to its successors is given by the "permanent income deficit" (Buiter 1985), $g - RW$, where g is the flow of real consumption spending and transfers. If this is negative then future governments will have to reduce future spending or increase net worth, e.g., by raising taxes.

Begg (1987) has calculated a time series for this quantity, assuming a constant share of non-oil taxes in output and his figures have been updated for Table 2. Compared to the conventional PSFD/PSFS there are three important adjustments. First, the debt burden is evaluated at the long-term real interest rate. Second, North Sea oil taxes are replaced by their permanent income equivalent (based on the prevailing real oil price). Third, half of the public sector investment programme in dwellings and public corporations are deducted on the (conservative) assumption that this half yields cash returns to the government at the market rate. The figures indicate that the permanent income deficit was roughly zero in 1979, suggesting no obvious sustainability with existing taxation and spending plans.

Finally a number of industrial countries have carried through successful disinflationary programmes without fiscal retrenchment. Ireland (Dornbusch 1989) and Italy (Giavazzi and Spaventa 1989) are two cases in point. Both of these countries have net debt-income ratios in excess of 90%. In addition the United States has managed to combine low inflation with growing public debt, albeit from a low base. Fiscal correction may often be an essential part of a disinflationary programme, particularly where capital markets are thin and seigniorage is important, but it is not obvious that it was necessary in the British case.

1.4 THE MTFS AND THE CHANGE IN REGIME

So what have the PSBR targets achieved? We think two things. First, at a rather mundane level, the setting of PSBR targets has brought the two sides of the public accounts, expenditure and revenue, together. In the UK, public spending plans have always been laid out in the autumn, whereas taxation decisions have been made at budget time in the spring, with only a rather tenuous link between the two processes. There is now a greater awareness that spending and taxation are two sides of the same coin and the increases in the spending of one department must come out of another department's allocation, or increased taxation.

The second achievement was to establish the credibility of the government as a "tough" one that would not accommodate inflationary wage demands through expansionary macroeconomic policies. In particular the 1981 budget was a watershed in which policy tightened despite high and rising unemployment. At a time when the monetary targets were being overshot by a considerable margin, this was an important signal of an irrevocable break with the past (see Buiter and Miller 1983 and Begg 1987, for a similar view). However, it was not simply a disavowal of Keynesian stabilisation policies that represented a break with the past. Equally significant was the fact that it signalled the end of attempts to sustain a cooperative low unemployment equilibrium through the use of neo-corporatist policies. This is a theme we develop in the next section.

2. *Unemployment*

The reduction in inflation, the stabilisation of the public finances, and the resurgence in productivity (discussed in Section 3) are the most conspicuous economic successes of the Thatcher years. The most obvious failure has been the level of unemployment, plotted in the first panel of Figure 1. Critics have blamed this on the government's contractionary fiscal and monetary policies. But the defence of the government has

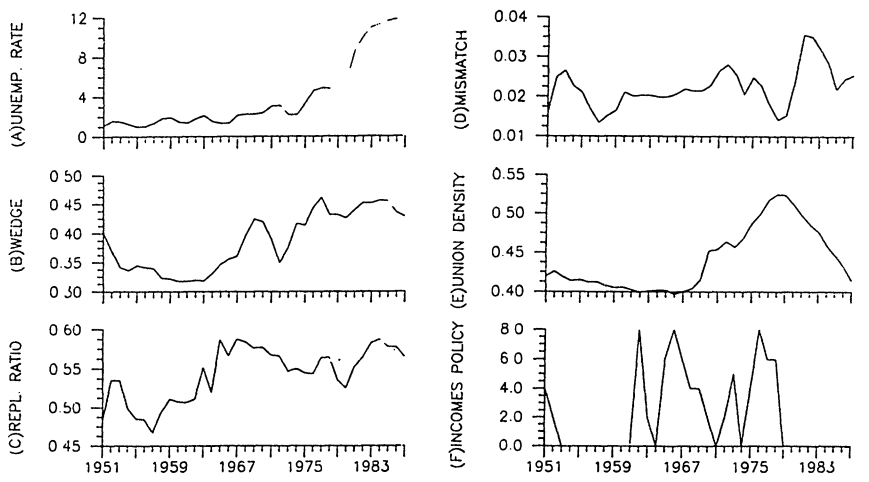
been to argue that, while deplorable, the unemployment is a consequence of private sector decisions and not government actions.

We begin by putting the UK's unemployment experience in an international context. Most of the industrialised countries went through a bout of disinflation during the first half of the Eighties. Were the effects of this worse in the UK than elsewhere? Table 3 reports inflation and unemployment rates in 1980 and 1985 in the UK and a number of other countries. The final column, the "sacrifice ratio," reports the ratio of the cumulated excess of the unemployment rate over its 1980 level during this period to the reduction in inflation. Of course, since unemployment could have risen because of adverse supply-side developments as well as counterinflationary macroeconomic policies, this does not necessarily provide an accurate measure of the costs of disinflation, but it does at least provide a rather crude indicator of comparative macroeconomic performance.

Compared to Japan, Sweden and the U.S.—three countries with very different economic and institutional structures—British performance was rather poor. However, her comparative performance is rather better compared to the rest of the European Community; Germany for instance fared especially badly under the sacrifice ratio criterion. However, the most obvious comparison, in terms of similarity of initial conditions, is with Italy. Viewed in this light, British performance looks somewhat less satisfactory.

The fact that unemployment may be widespread in the European Community does not, however, necessarily absolve the Conservative

Figure 1 FACTORS AFFECTING THE NATURAL RATE



government from all responsibility. Many of the policies followed by Mrs. Thatcher have been emulated by other European governments, so the common unemployment experience could simply reflect common policies, as well as common exogenous shocks which may have also tended to raise the equilibrium rate of unemployment. We must therefore delve a little deeper into the forces behind the movements in the British unemployment rate.

2.1 THE DETERMINANTS OF THE NATURAL RATE

We start by considering factors that may have raised the natural rate of unemployment (meaning the rate of unemployment at which wage-setters' intended markup of wages over prices is consistent with price-setters' intended markup of prices over wages). The following list includes most of the obvious candidates: the tax and import price wedge; the benefit system; skill and regional mismatch; and union power. Time series of these variables are also plotted in Figure 1 and are discussed further below.

2.1.1 Taxes and Import Prices Workers care about the purchasing power of wages post-tax, while for firms the relevant variable is the cost of labour in terms of the price of its output. Anything that changes the "wedge" between post-tax consumption wages and own-product labour costs could affect equilibrium unemployment. An argument that is often

Table 3 COMPARATIVE INFLATION AND UNEMPLOYMENT PERFORMANCE

	Inflation[a]		*Unemployment*[b]		"*Sacrifice Ratio*"[c]
	1980	1985	1980	1985	
Germany	4.9	2.3	3.0	7.2	6.8
France	11.6	5.9	6.3	10.2	2.1
Italy	21.5	9.2	7.5	10.1	0.7
Japan	3.9	1.5	2.0	2.6	1.0
Sweden	11.9	6.9	2.0	2.8	0.4
United Kingdom	19.1	5.8	6.4	11.2	1.8
United States	9.1	3.0	7.0	7.1	1.0

Notes: (a) GNP/GDP deflator.
(b) Standardised unemployment rate.
(c) $\left[\sum_{1981}^{1985} (\text{Unemployment}_i - \text{Unemployment}_{1980})\right]$/[Col.(1) − Col.(2)]

Source: OECD Economic Outlook, December 1988.

advanced to explain the initial rise in unemployment in 1974–75 is that it was the outcome of attempts by labour to maintain the consumption wage in the face of the deterioration in the terms of trade due to the first oil price shock.

Panel (b) of Figure 1 shows an upward movement in the total wedge from the mid-1960s due primarily to increasing income tax rates, while in the 1973–75 period we see a second widening in the wedge due to the terms of trade deterioration. There are, however, good reasons for believing that an increase in the wedge should not permanently raise equilibrium unemployment. The reason is that in most optimising models the wedge affects unemployment only via the consumption wage. This has increased manyfold since the Dark Ages, but without much altering the unemployment rate. Thus one might expect changes in the wedge to have at most a transitory effect (a finding that is confirmed by Newell and Symons 1985).

2.1.2 Benefits An increase in the generosity of unemployment benefits should make workers more willing to risk unemployment or be more selective about accepting job offers if they are unemployed. Panel (c) of Figure 1 plots the ratio of supplementary benefit to the lowest decile of manual earnings after taxes (since most unemployed can expect to go into lowly paid manual jobs). While there was a big increase in the replacement ratio in the mid-Sixties, it has since risen little, and there is nothing with which to associate the upward movement in unemployment. Of course, the way benefits are administered may be more important and, in particular, the vigour with which the work-test is enforced. Layard and Nickell (1987) suggest that, until recently at least, attitudes had indeed become more lenient in this regard. Furthermore, as discussed below, the characteristics of the benefit system may be important in understanding the dynamics of unemployment.

2.1.3 Mismatch One common explanation of the increase in unemployment lies in the impact of new technology, especially computers, and the effect of increasing competition in traditional industries from Japan and the NICs. This has made the human capital of a large portion of the work force redundant, especially manual workers in the traditional manufacturing industries like cars and shipbuilding. If firms in the South East want skilled computer operators, a large pool of unemployed welders on Tyneside will be of little help to them in filling vacancies. But, if retraining and relocation is costly, the unemployed may choose to remain where they are in the hope of getting their old jobs back in due course. An increase in the mismatch between the type/location of vacancies and

the type/location of unemployment can therefore be expected to reduce the efficiency of the process of matching unemployed workers to jobs, resulting in higher equilibrium unemployment.

Appealing as this line of argument may be, it does not receive strong empirical support. A direct measure of mismatch can be based on a comparison of the share (in total unemployment) of unemployment in a particular category (skill/location/industry) with the share (in total vacancies) of vacancies of the same category. Such measures do not reveal increased skill or regional mismatch (in fact the latter appears to have been falling in recent times); only industrial mismatch seems to have increased (Jackman and Roper 1987). Because this index of industrial mismatch is only available for a short period, our empirical work below employs a measure with similar time series properties based on (a distributed lag of) the weighted standard deviation of employment growth rates across nine major employment categories. This variable is plotted in panel (d) of Figure 1 and exhibits a very marked increase over 1979–81, after which it falls back. However if industries respond differently to a common aggregate demand shock, movements in this variable could reflect aggregate demand shocks as well as sector-specific real shocks.

2.1.4 Unions Increased union power will tend to raise equilibrium unemployment in most models, even where there is bargaining over employment. To see this consider the following canonical case of a closed economy composed of n identical imperfectly competitive firms, each of which faces an inverse demand function $P_i=\delta Y_i^{-\epsilon}$ ($\epsilon<1$; $i=1,.,n$) and possesses a Cobb-Douglas technology $Y_i=N_i\alpha$ ($\alpha<1$). Here Y_i is output, P_i the firm's relative price, N_i is employment and the demand shift parameter, δ, is a decreasing function of the general price level. The firm bargains with a single union over wages and employment. Union utility is given by the utilitarian utility function $N_iV(W_i) + (M-N_i)\tilde{V}$ where $V(W_i)$ is the utility of an employed worker, W_i is the real consumption wage, $\tilde{V}$ is (expected) utility for an unemployed union member and M is the membership. Wages and employment in each firm are given as the outcome of a generalised Nash bargain between management and the union:

$$Max\ [V(W_i)-\tilde{V}]^{\beta}N_i^{\beta}(\delta N_i^{\alpha(1-\epsilon)}-W_iN_i)$$

where we have assumed that the status quo points for the union and firm are $M\tilde{V}$ and zero respectively and β is interpreted as a measure of union power. The first order conditions are then:

$$\beta V'/(V-\tilde{V}) = N_i/(\delta N_i^{\alpha(1-\epsilon)} - W_i N_i)$$

$$\beta + [\alpha(1-\epsilon)\delta N_i^{\alpha(1-\epsilon)} - W_i N_i]/[\delta N_i^{\alpha(1-\epsilon)} - W_i N_i] = 0.$$

Now in a symmetric equilibrium $W_i(=W)$ and $P_i(=1)$ are the same for all firms. Then if $\tilde{V}=(1-u)V(W)+uV(B)$, where u is the unemployment rate and B is benefits, and assuming for simplicity that $V(W)=W^\gamma/\gamma$ with $\gamma<1$, it follows that the equilibrium unemployment rate is given by:

$$u = [1-\alpha(1-\epsilon)]\beta\gamma/[\beta+\alpha(1-\epsilon)](1-\rho^\gamma)$$

where ρ is the replacement rate, B/W. Real wages are given by:

$$W = [\beta+\alpha(1-\epsilon)]/(1+\beta)[M(1-u)]^{1-\alpha}.$$

It follows that an increase in union power (an increase in β) will, in general equilibrium, tend to be associated with (i) a rise in unemployment (and therefore also in labour productivity) and (ii) a rise in real wages. The argument extends to other environments, including the "right-to-manage" model, in which bargaining takes place over only wages.

The impact of union power on unemployment will be ameliorated if there is a secondary sector in which wages are determined competitively and wherein workers who lose their jobs in the unionised sector can find alternative employment. However, if some of these workers choose to remain unemployed because the wage in this sector is less than their reservation wage, an increase in aggregate unemployment will still result.

Union density is the most obvious choice as a measure of union power. As panel (e) of the figure shows, this rose steadily during the Seventies, but fell back during the Eighties. Of course, union power is a multi-faceted concept, depending on institutional structure and the legal environment as well as simple density, but the series is consistent with the commonly held view that union power and influence was at its height under the Labour governments of the Seventies.

In addition to the question of quantifying union power, there is also the issue of how it is used. Decentralised bargaining by one union-firm pair may impose externalities on other bargaining units (Blanchard and Kiyotaki 1987). Moderation in wage and price setting will then raise employment and welfare, but is not individually rational. This problem would not arise in a fully competitive economy, and one approach is thus to limit union and firm monopoly power with the aim of approximating the competitive ideal, viz. the United States. Neither does the

problem arise in a fully centralised economy, such as in Scandinavia, where the externalities are internalised. A halfway house with decentralised unions and firms with market power is the worst of all worlds (see Calmfors and Driffill 1988). Unfortunately it appears to be the one inhabited by the UK, as well as some other members of the European Community.

During the Sixties and Seventies successive British governments sought to limit the adverse effects of the decentralised exercise of market power through the development of corporatist machinery, such as the tripartite National Economic Development Council, and the use of incomes policy. Such policies are best thought of as tools to lower the equilibrium rate of unemployment. This is easily seen in the model above where the imposition of a (binding) side constraint $W_i < \bar{W}$ necessarily produces a lower equilibrium unemployment rate, u_{IP}:

$$u_{IP} = u/[1+\mu u\bar{W}(1-\rho^{\gamma})/\beta\gamma]$$

where μ is the multiplier on the incomes policy constraint and u is the unemployment rate without an incomes policy.

However, the corporatist machinery and incomes policies in particular, proved a very blunt weapon for sustaining the cooperative equilibrium. An important characteristic of the British union movement is the considerable degree of autonomy accorded to local shop stewards in representing their members' interests. This meant that some groups of workers were able to negotiate extra payments through more favourable overtime arrangements, etc., and thus exploit the moderation of other groups, provoking discontent among workers in less favourable positions. In addition, the imposition of incomes policies invariably hit those groups of workers due to settle contracts in the near future especially hard, since it limited the extent to which they could recoup losses due to past unanticipated inflation. Finally firms sometimes found incomes policies inconvenient, as they limited the extent to which wages could be raised to attract scarce labour or reward productivity increases. As a result incomes policies were only politically feasible as a temporary measure.

The long history of incomes policy is summarised in the final panel of Figure 1. This series is due to Desai, Keil, and Wadhwani (1984) and tries to measure the intensity as well as the occurrence of an incomes policy, by comparing the intended rate of inflation embodied in the policy with the existing rate. The most recent experience of an incomes policy—the "Social Contract" under the Callaghan government—was initially rather successful in facilitating the first bout of disinflation during 1976–78 without a significant rise in unemployment, but came badly unstuck

during the "Winter of Discontent" in the first few months of 1979. This was a significant, perhaps crucial, factor in the first election victory of Mrs. Thatcher later that year.

In the light of this experience, as well as on ideological grounds, the Thatcher government resolved to have nothing to do with incomes policies in particular and neo-corporatism in general. The private sector was to be free to make its own decisions, but would have to live with the consequences. The government chose direct legislative measures to curb union power, in particular the three Employment Acts of 1980, 1982, and 1984. The 1980 Employment Act outlawed mass secondary picketing and provided employers with legal remedies against secondary action. The 1982 Employment Act removed the previous blanket immunity of unions in tort, and made union funds liable to sequestration in cases of unlawful disputes. At the same time disputes for political reasons were outlawed, union labour-only requirements were forbidden, and employers were empowered to dismiss striking workers without facing unfair dismissal claims. The 1984 Employment Act introduced a variety of measures to increase the democratic accountability of union leaders, in particular mandatory secret ballots of the membership before undertaking strike action. Finally, other measures, such as reducing employment protection provisions and the scope of wage councils, also tended to weaken unions.

2.2 PERSISTENCE

So far nothing has been said about the role of the demand contraction in generating high unemployment. Because the effect of a demand shock on unemployment should last only as long as it takes any nominal inertia to work its way out of the economy or for the credibility of macroeconomic policies to be established, some persistence mechanism whereby high unemployment today raises the natural rate in future periods is also required if demand is to play much of a role in explaining continued high unemployment. Two main channels have been proposed, one focussing on the behaviour of those with jobs (the insiders); the other highlights on the behaviour of the unemployed (the outsiders). These provide a mechanism whereby temporary demand (or supply) shocks can have long-lasting effects on unemployment and output.

Blanchard and Summers (1986), Gottfries and Horn (1987), and Lindbeck and Snower (1988) have analysed the first channel. The idea, roughly speaking, is that the insiders fix real wages to ensure their continued employment. If an adverse shock reduces the number of insiders (assuming the unemployed cease to be members of the union), the next period's employment, absent further unforeseen shocks, will be lower by the same amount.

While this theory has a ring of truth, it cannot easily explain the outward shift in the unemployment-vacancy relationship which occurred in most high unemployment countries, and is especially pronounced in the United Kingdom. None of the extant insider models incorporate turnover, but one would expect the operation of the insider effect to be associated with a movement along a given unemployment-vacancy curve rather than an outward shift. To explain this one needs to understand why the rate at which unemployed workers are matched to vacant jobs has fallen so much. The insider mechanism thus cannot be the whole story.

The idea behind the second channel is that a history of continued unemployment itself reduces the chances of an unemployed person finding a job. This mechanism has been stressed especially by Layard and Nickell (1986, 1987). To begin with there is clear evidence that in all countries the exit rate from unemployment is much lower for the long-term unemployed than for the freshly laid off. In Britain the rate is but one-tenth of its initial value for those who have been unemployed over four years. Furthermore, as was made clear in the introduction, most of the rise in British unemployment has been due to reduced overflow and increased duration rather than the increased frequency of spells of unemployment.

Although this decline in exit rates could just be a consequence of heterogeneity among the unemployed, there are a number of ways in which genuine duration dependence might arise. First, the human capital of the unemployed depreciates, making them less attractive to employers. Second, firms may use the unemployment history of a worker as a screening device so that long duration is taken as a signal of low productivity. Finally, the unemployed might become progressively more disillusioned and apathetic as duration lengthens, leading to less intensive search activity.

There is some evidence which suggests that this mechanism helps account for the outward shift in the unemployment-vacancy relationship (Budd, Levine, and Smith 1986; Franz 1987) as well as why the downward pressure on wages is so limited at the present time (Layard and Nickell, 1987). Clearly, however, its importance is likely to vary with the generosity and, especially, the duration of unemployment benefits. We test this proposition below.

2.3 EMPIRICAL EVIDENCE

There have been an enormous number of studies of British and European unemployment. Most of these provide estimates of, at a minimum, a labour demand/price-setting relationship and a labour supply/wage-setting relationship. However, the identifying assumptions underlying

such models are not to everybody's taste. Rather than provide yet another set of estimates of a small macro model, we instead provide estimates of a reduced form unemployment equation, leaving the reader to put his or her own interpretation on the underlying structure. Specifically we assume that:

$$u_t = \lambda u_t^* + (1-\lambda)u_{t-1} + \epsilon_t \quad (2)$$

where u_t^* is the "long-run" natural rate and is a function of the variables discussed above, u_{t-1} captures insider and outsider persistence mechanisms (as well as any dynamics inherent in the matching process), and ϵ_t reflects the effect of demand shocks which drive the unemployment rate away from its instantaneous natural rate. In a New Classical model with incomplete information this would simply be proportional to the price "surprise." In a world in which wages and prices are set to clear labour and goods markets ex ante, but are fixed ex post because of menu or transaction costs, it would reflect instead a quantity "surprise." In either case, under rational expectations, the forecast errors should be orthogonal to available information. (We also tried proxying nominal demand shocks directly with the change in the rate of inflation and the change in the rate of growth of nominal income; this left the coefficients on the other variables virtually unchanged.) The error term could, of course, reflect other factors driving the natural rate, but which have been omitted from the equation. Finally, both a rise in taxes and a fall in import prices will be associated with a decline in the demand for domestically produced goods, and hence may be correlated with the error. For this reason the change in the tax-import price wedge is entered into the equation lagged; in practice only the income tax component turns out to be important.

In addition to the variables already discussed we include the proportion of the working population born after 1930. One of us has suggested that labour has become more willing to risk unemployment as fewer workers are able to recall the experience of mass unemployment during the interwar years (Newell and Symons 1988). However, the trended nature of this variable means that it may also act as a control for any omitted but trended variable which affects the natural rate. In any case one would want to be wary of projecting its effects into the future.

To maximise the rather limited information in the data, we have included the interwar years in the sample. There is some evidence of heteroskedasticity across the war years, for which the estimates have been corrected, but little evidence of parameter instability (a Chow test gives $F(5,42)=0.87$). Finally a non-nested test suggests that it is better to

specify the equation with the logarithm, rather than the level of the unemployment rate as the dependent variable. Our estimated equation is:

$$\Delta \log u = \underset{(2.46)}{-0.847} + \underset{(1.46)}{0.369D} + \underset{(3.40)}{13.6\Delta TY_{-1}} + \underset{(1.54)}{0.738RR} + \underset{(0.57)}{1.62MM}$$

$$+ \underset{(1.94)}{1.83UD} - \underset{(1.72)}{0.018\text{IPD}} + \underset{(1.10)}{0.322POP} - \underset{(2.49)}{.195\text{logu}_{-1}}$$

t-statistics in parentheses.
Sample period: 1923–38, 1948–87.
Standard error 1923–38 = 0.198; Standard error 1948–87 = 0.171
LM test for second-order serial correlation: $\chi^2(2) = 4.61$
where *D* is a dummy on 1923–38, *TY* is the income tax rate, *RR* is the replacement ratio, *MM* is industrial mismatch, *UD* is union density, *IPD* is the incomes policy dummy, *POP* is the proportion of the working population born after 1930, Δ is the difference operator and all variables are defined net of their 1955 values. While most of the variables are not especially significant, which is unsurprising given the limited sample information, in all cases they do at least have the anticipated signs. A particularly notable feature is the high degree of persistence embodied in the equation (further legs are not significant).

This equation contains most of the contending explanations for an increase in the natural rate, yet leaves much of the rise in unemployment in 1980 and 1981 unexplained, for there are two very large positive residuals in these years which it seems natural to identify with the severe contraction in the growth of nominal demand discussed in Section 1. Conditional on this identifying assumption (which should give an

Table 4 CAUSES OF THE RISE IN UNEMPLOYMENT AFTER 1978 (% POINTS)

Due to:	*1980*	*1982*	*1984*	*1986*
Dynamics	1.4	2.0	2.4	2.6
Benefits	−0.5	−0.4	0.0	0.2
Mismatch	0.1	0.5	0.7	0.7
Working population born after 1930	0.1	0.4	0.8	1.3
Unions	−0.1	−0.9	−2.1	−3.6
Incomes policy	1.2	2.4	3.3	3.6
Income taxes	−2.4	−1.7	−1.1	−0.7
Demand	1.0	3.1	2.5	3.1
Total	0.8	5.3	6.5	7.0

upper bound on the effect of demand) Table 4 gives a breakdown of the rise in unemployment after 1978 into its constituent parts. This is obtained by dynamic simulation of the estimated equation, setting each independent variable in turn to its 1978 level.

The picture is as follows. At the start of 1979 unemployment was below its underlying long-run natural rate u_t^*, so unemployment would have shown some tendency to rise in any case (see the first row of the table). To this must be added the effects of the demise of incomes policy as manifested in the "Winter of Discontent." These two factors together raise unemployment by 45 percentage points by 1982. On top of this is a further 3 percentage points coming from the demand contraction. The weakening of the unions since then has acted to reduce unemployment, but the persistence mechanisms have ensured that this beneficial effect has been offset by the continuing effects of the demand shock as well as the end of incomes policy. In fact by 1986 the effect of incomes policy and union density exactly offset; one could say the Iron Lady obtained the same effect by decimating the unions as Jim Callaghan obtained by collaborating with them!

Unfortunately data for all the explanatory variables is not available for 1988. However, by 1987 the long-run employment rate u_t^* is some 3.5 percentage points *below* the actual unemployment rate. Consequently even in the absence of further beneficial supply-side developments, or positive demand shocks, some fall in unemployment in 1988 could have been expected. This may help to explain events in the last year.

How does this assessment relate to other studies? Both Bean and Gavosto (1989) and Newell and Symons (1988), using rather different structural frameworks, attribute around 3.5 percentage points of the rise in unemployment from the late Seventies to the early Eighties to nominal demand shocks. Layard and Nickell (1986) attribute an even stronger role to demand; they calculate that virtually all of the rise in unemployment is attributable to the demand shock. None of these studies find an important role for benefits or mismatch. There is some comfort in the fact that these studies produce similar results to the approach adopted here.

A striking feature of Table 4 is the persistence of the effects of the demand shock. This persistence seems far too large to be attributed to the ordinary lags inherent in the process of matching workers to jobs: is it due to insider or outsider mechanisms? It is difficult to say much about this from time series evidence on one country alone. Accordingly we have examined differences in the degree of persistence across countries to see whether they are better explained by insider or outsider phenomena. Although the insider mechanism need not be confined to unionised industries—it could occur anywhere incumbent labour has some mo-

nopoly power—one would expect it to be more pronounced in countries with a high level of unionisation, other things being equal. Conversely where replacement ratios are high and, in particular, where the period for which benefits are payable is long, the outsider mechanism should be relatively strong.

The basic data for this exercise is drawn from the CLE-OECD databank, augmented by data on benefit levels and duration drawn from Emerson (1986) and OECD (1988). In the spirit of equation (2), we conduct a panel regression of the standardised unemployment rate on its lagged value, where union density, replacement rates, benefit duration, and the Bruno-Sachs 1985 corporatism ranking are interacted with the lagged unemployment rate. To proxy the long-run natural rate in each country we incorporate a country specific constant, as well as union density and the replacement ratio which exhibit time series as well as cross-section variation. We also include a common time trend to control for unmodelled shifts in the natural rate (results are similar if country specific trends are included instead). The countries in the sample are Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom, and the United States. The sample period runs from 1961 to 1986. We obtain (omitting country constants):

$$\begin{aligned}\Delta u = (&0.0052CORP + 0.00054DUR + 0.239RR - 0.263UD - 0.151)u_{-1} \\ &(2.01) \quad (5.60) \quad (2.82) \quad (3.41) \quad (6.53) \\ &+ 0.313RR + 1.59UD + 0.031t \\ &(1.20) \quad (3.43) \quad (5.02)\end{aligned}$$

where *CORP* is the Bruno-Sachs corporatism ranking, *DUR* is the number of weeks for which benefits are payable (set at 260 for benefits of indefinite duration), and the other variables are as defined above. *t*-statistics are in parentheses.

The results are striking. Adjustment is apparently more rapid in corporatist economies (a *low* value of *CORP* corresponds to a highly corporatist economy), but controlling for this, high unionisation actually appears to *speed up* adjustment, contrary to the insider thesis (although higher unionisation does raise the level of the natural rate, as one would expect). Per contra, the higher the replacement rate and, especially, the longer the duration of benefits, the slower is adjustment. Raising duration from 26 weeks to two years raises the coefficient on lagged unemployment by 0.042, which for an "average" country raises the mean lag from 5.3 years to 7.5 years. While this regression is crude, it does suggest

that the primary source of unemployment persistence may come via the outsider rather than the insider effect.

2.4 THE VERDICT ON UNEMPLOYMENT

So is the unemployment record to be counted on the debit side of the government's ledger? Could it have done better? Some would argue for continued efforts to build consensus through the development of corporatist machinery, aided by the use of more flexible (tax-based?) incomes policy. Supporting a cooperative equilibrium in this fashion would in their opinion have been preferable to the painful and divisive process of breaking down power groups. A successful incomes policy would also have served as a second nominal anchor during the disinflation process.

Whether such policies could have worked is open to debate. What is certain, however, is that they were not on offer to the electorate in 1979, for it was difficult to see how an increasingly divided Labour party could deliver a pact with the unions after the disastrous "Winter of Discontent." Mrs. Thatcher declared, "There Is No Alternative," and from a purely political perspective she was probably right.

3. *PRODUCTIVITY*

3.1 AN INTERNATIONAL PERSPECTIVE

The defeat of inflation was by no means the only objective of the Thatcher administration. Tax cuts to reward enterprise, deregulation and privatisation to promote efficiency, and measures to limit the influence of trade unions were supposed to enhance the supply performance of the economy. A low and stable rate of inflation would simply provide the right macroeconomic environment. What evidence is there of improved performance on the supply side?

Table 5 presents data on the rate of growth of labour productivity in

Table 5 PRODUCTIVITY GROWTH (GNP/GDP PER WORKER; % PER ANNUM)

	1967–73	*1973–79*	*1979–83*	*1983–87*
United Kingdom	3.3	1.1	2.1	2.3
United States	0.9	0.0	0.2	1.4
France	4.4	1.3	1.6	2.1
Germany	4.4	2.2	1.3	1.7
Italy	4.9	1.7	1.0	2.5
Japan	8.4	3.0	2.5	3.5

Source: Economic Trends and OECD *Economic Outlook.*

the UK and its five main industrial competitors. Prior to 1973 Britain's productivity growth rate lagged behind all of them except the U.S. The second half of the Seventies saw a marked slowdown in all countries, but Britain's performance since 1979 has been relatively good, being exceeded only by that of Japan.

Table 6 puts these growth rates into perspective by comparing absolute productivity levels to those of the U.S. at various dates in the postwar era, using the OECD's estimates of 1980 purchasing power parities. This shows that, although British productivity prior to Mrs. Thatcher had been improving relative to the U.S., performance relative to the other four countries had been poor. The picture is broadly consistent with the Gerschenkron thesis; those countries that exhibited particularly rapid productivity growth during the postwar period were also those that lagged furthest behind. France, Germany, Italy, and Japan all started the postwar era with severely depleted capital stocks. Consequently they also had the biggest potential for growth. Why was Britain overtaken by her European partners? While the other countries appeared to be closing in on the U.S., Britain seemed to be converging to a lower level.

The following simple "catch-up" regression makes this point forcibly. The sample is a panel of the nineteen countries in the CLE-OECD data bank running from 1950 to 1980, i.e., prior to Mrs. Thatcher. The dependent variable is the rate of growth of productivity in the country in question relative to the rate of growth of productivity in the leading country (ΔRP). This is related to (the logarithm) of lagged relative productivity (RP_{-1}) and a string of variables which might explain asymptotic differences in productivity levels. These are (all measured relative to the lead country): days lost through industrial action per worker to control for the degree of conflict between labour and capital (*STR*); the proportion of the 20–24 age group in higher education to control for differences in the level of human capital (*EDN*); the share of taxes in total income to

Table 6 RELATIVE OUTPUT PER WORKER (US=100, AT 1980 PURCHASING POWER PARITIES)

	1951	*1960*	*1970*	*1980*
United Kingdom	55.2	56.7	60.4	66.5
France	38.9	48.2	63.9	80.7
Germany	37.1	50.9	63.5	77.9
Italy	34.1	57.9	67.9	79.4
Japan	16.0	23.5	46.1	62.8

Source: OECD *National Accounts.*

control for any effect on the effort levels of both workers and managers (*TAX*); and union density as a proxy for union power (*UD*). In addition, for the UK only, there is a constant (*D*) to allow for any unexplained difference in long-run productivity levels. Note that physical capital per worker is not included as a regressor. Obviously this is central to explaining productivity differences in the short-run. However, in the long run capital is endogenous and, assuming perfect capital mobility and access by all countries to an identical production technology, differences in capital per worker should reflect cross-country differences in total factor productivity due to variables such as tax rates and skill levels. The estimated equations can thus be thought of as simple reduced forms. Estimation by SUR (for brevity, diagnostics for individual countries are not presented) gives, with *t*-statistics in parentheses:

$$\Delta RP = \underset{(9.86)}{-.0439RP_{-1}} - \underset{(0.33)}{.0008STR} + \underset{(4.48)}{.0353EDN} - \underset{(2.92)}{.0042TAX} - \underset{(0.58)}{.0024UD} - \underset{(7.33)}{.0128D}$$

Given the simplicity of the model, the results are suprisingly sensible. Most of the variables enter as one would expect; viz. higher taxes lower long-run relative productivity, an expansion in higher education tends to raise relative productivity and the productivity "gap" is eliminated at around 4% per annum. The dummy for the UK is highly significant and implies an asymptotic productivity level some 30–35% below other countries with a similar structure. This is despite controlling for some of the most frequently cited reasons for Britain's poor relative performance: high taxes, low skills, bad industrial relations, and excessive union power. Countries such as Sweden have high tax rates and high union density, but also a high relative productivity level. What is so special about the United Kingdom? Any explanation for Britain's poor productivity performance—and its possible reversal under Mrs. Thatcher—must come to grips with this peculiarity. With this as background let us therefore turn to a closer examination of recent experience.

3.2 THE PRODUCTIVITY REBOUND

The acceleration in productivity growth is not apparently due to a revival in investment, which has grown strongly only very recently, but rather to rapid total factor productivity (TFP) growth. We use a measure that caters both for labour hoarding and imperfect competition in product markets. Start by assuming a *CRS* technology of the form $Y=HF(AN,BK)$ where H is effective hours worked per shift, A is labour-

augmenting technical progress and B is capital-augmenting technical progress. Following Hall (1986), *TFP* growth ($\hat{X}$) is given by:

$$\hat{X} \equiv \hat{Y} - \hat{H} - \mu S_N \hat{N} - (1-\mu S_N)\hat{K} = \mu S_N \hat{A} + (1-\mu S_N)\hat{B} \quad (3)$$

where a caret denotes a growth rate, μ is the ratio of price to marginal cost, and S_i is the share of factor i. As a simple correction for the possibility that observed hours, H_0, may exceed effective hours, we employ the correction suggested by Muellbauer (1986):

$$h = h_N + (H_0 - H_N)/H_N - \beta H_N/(H_0 - H_N)$$

where lower case letters denote logarithms, H_N is a measure of normal hours, and β is a parameter to be estimated. Since the overtime hours term $(H_0 - H_N)/H_N$ is procyclical, this last term should also control for labour hoarding along the heads dimension.

For each two-digit industry, over the period 1969–86, we estimate the regression:

$$\Delta[y - h_n - (H - H_N)/H_N - k]_t = \alpha - \beta\Delta[H_N/(H_0 - H_N)]_t + \mu[S_N \Delta(n-k)]_t + u_t$$

using the rate of growth of total domestic output[1] and the rate of growth of world output as instruments for the endogenous (labour-share-weighted) capital-labour ratio. We then use the associated estimates to calculate $\alpha + u_t$. We allow for shifts in the drift parameter, α, at the beginning of 1974 and again at the beginning of 1980.

For brevity we shall not report the full regression results for each industry here. The mean estimates of μ is 1.52. Most industries are fairly close to this, although the individual standard errors are sometimes quite large. However, there are a few industries which produce unreasonable estimates of μ. For this reason we have employed a Bayesian estimator in which the prior distribution of μ is normal with a mean of 1.33 and a standard deviation of 0.5, while the prior distribution on the other parameters is diffuse. This is sufficient to eliminate any a priori implausible estimates of μ, which might otherwise contaminate the estimates of TFP growth.

1. Domestic output will be correlated with the equation error if economy-wide productivity shocks are an important source of economic fluctuations. Under the maintained hypothesis that the rate of growth of world output is a valid instrument, the hypothesis that domestic output is uncorrelated with the equation error can be tested with the aid of the usual Lagrange-Multiplier instrument orthogonality test. For only two out of the twenty-six industries is the χ^2 statistic significant at the 95% level and for the twenty-six industries taken together the test statistic is 31.3, distributed as $\chi^2(26)$.

The associated TFP growth rates over key sub-periods appear in Table 7. Two points are worth making. First, although politicians and the media began to draw attention to the productivity miracle only in the mid-Eighties, for some industries the revival can be dated as early as 1980. Industries like metal manufacture and shipbuilding are cases in point. Second, the productivity revival is not confined to manufacturing, although it is more pronounced there. Construction, distribution, transport, banking, and other services all show an acceleration.

We have also calculated a second set of estimates of TFP growth for industries in the manufacturing sector. These are based on the same methodology except that they use different capital stock estimates. A number of authors have suggested that the official capital stock figures may overstate the rate of capital accumulation during the second half of

Table 7 TOTAL FACTOR PRODUCTIVITY GROWTH BY INDUSTRY (PER CENT PER ANNUM)

	1969–73	*1973–79*	*1979–82*	*1982–86*
Agriculture	3.2	0.5	7.5	2.8
Coal	−0.9	−0.6	1.8	5.6
Oil and natural gas	22.6	71.8	−16.7	11.8
Oil processing	−5.8	−4.1	−0.6	−0.7
Electricity, gas, and water	7.4	2.5	1.2	3.9
Manufacturing Industries:				
Metal manufacture	2.4	3.0	13.9	6.0
Other mineral products	6.6	1.5	2.0	4.2
Chemicals	5.8	1.1	3.1	5.5
Other metal products	1.2	−0.8	1.0	0.5
Mechanical engineering	3.3	0.7	3.5	2.4
Electrical engineering	7.8	3.8	5.9	6.5
Motor vehicles	1.3	−0.9	6.6	4.4
Ships and aircraft	5.7	−1.9	7.1	5.1
Food	2.5	1.1	4.3	1.9
Drink and tobacco	2.9	0.8	0.9	3.4
Textiles	4.5	1.4	3.3	4.9
Leather, footwear, and clothing	3.9	4.9	3.4	7.3
Timber	5.6	−1.4	0.2	−0.3
Paper	4.0	1.7	3.3	2.6
Rubber	4.2	3.6	4.0	7.9
Construction	2.8	0.0	1.8	3.9
Distribution	3.2	0.1	1.9	2.7
Transport	6.5	1.3	2.8	4.1
Communications	3.9	3.4	2.6	4.8
Banking	0.6	0.4	2.2	2.7
Other services	−2.6	−1.6	1.5	0.3

the Seventies and the early Eighties when there was extensive unrecorded scrapping following the two oil price shocks. Conversely, the rate of capital accumulation during the mid-Eighties is likely to have been understated as some imputed retirements would already have taken place.

Quantifying the size of this effect is no easy matter, but Wadhwani and Wall (1986), provide an alternative time series from 1972 to 1982 for total manufacturing using a firm's historic cost accounts, which suggests a cumulative overprediction of around 14% between 1974 and 1982. They provided us with alternative estimates of the rate of capital accumulation from 1972 until 1982 by industry. These were then used in place of the official figures for this period and the estimates for after 1982 adjusted upwards to take account of the lower based.

For brevity, the results (available on request) are not reported here. However, the (unweighted) mean annual TFP growth rates over 1973–79, 1979–82, and 1982–86 are, respectively, 1.3%, 3.6%, and 4.0%. The corresponding figures for Table 7 are 1.2%, 4.2%, and 4.2%. Thus the attenuation in the estimated acceleration in TFP growth is really very modest. Furthermore, the correlation across industries of the two different measures of the TFP acceleration between 1969–79 and 1980–86 is also very high at 0.95. This suggests that explanations for differences in productivity performance across industries may not depend too critically on the choice of measure. However, to be on the safe side the estimates reported below employ both measures.

Finally, technical progress both before and after 1980 seems to be primarily labour-augmenting. Suppose that in industry i, $A_i = \bar{A}+\tilde{A}_i$, and $B_i = \bar{B}+\tilde{B}_i$, where $\bar{A}$ and $\bar{B}$ are the economy-wide average levels of labour and capital-augmenting technical progress respectively. Then (cf. equation (3)):

$$\hat{X}_i = (\mu S_N)_i\bar{A} + (1-\mu S_N)_i\bar{B} + (\mu S_N)_i\tilde{A}_i + (1-\mu S_N)_i\tilde{B}_i.$$

Provided $\tilde{A}_i$ and $\tilde{B}_i$ are uncorrelated with $(\mu S_N)_i$, consistent estimates of $\bar{A}$ and $\bar{B}$ can be obtained from a cross-section regression of TFP growth on (μS_N) and $(1-\mu S_N)$. Table 8 reports the results of such a regression for mean TFP growth over 1969–79 and 1980–86 for the TFP measures. In each case the estimate of $\bar{B}$ is near zero and totally insignificant suggesting that technical progress is indeed labour-augmenting. This suggests that in trying to understand the sources of the productivity revival one should focus on factors likely to enhance the efficiency of labour rather than capital.

3.3 EXPLANATIONS FOR THE PRODUCTIVITY REBOUND

Muellbauer (1986) cites five main hypotheses for the acceleration in productivity growth after 1980. Two of these have already been implicitly addressed and dismissed: the effects of labour hoarding and the mismeasurement of capital due to early retirements. The three other hypotheses are:

(i) A Schumpeterian "gale of innovation" due to the spread of the microchip and the introduction of computerised technology;
(ii) A "batting-average" effect whereby the deep recession of 1980–81 led to the closure of the least efficient plants, thus raising the average productivity of those who remained in business;
(iii) An improvement in industrial relations as a result of the weakening of the union movement.

To these three hypotheses we might add two others:

(iv) A "kick-in-the-pants" effect whereby a tightening of product market conditions and increased threat of takeover led to the elimination of managerial slack;
(v) Increased effort by workers and managers resulting from cuts in income taxes.

Three of these explanations have in common that the severity of the 1980–81 recession was itself a primary cause of the productivity boom. The most telling way to test this hypothesis is to examine the consequences of the even greater recession of 1929–31. Between 1933 and 1936

Table 8 TECHNICAL PROGRESS IS LABOUR-AUGMENTING

Dependent Variable	μS_N	$(1-\mu S_N)$	$\bar{R}^2$
(1) $\hat{X}_1$(1969–79)	0.0209	−0.0123	0.116
	(4.78)	(0.77)	
(2) $\hat{X}_1$(1980–86)	0.0387	−0.0076	0.243
	(9.73)	(0.05)	
(3) $\hat{X}_2$(1969–79)	0.0250	0.084	0.028
	(7.49)	(0.73)	
(4) $\hat{X}_2$(1980–86)	0.0375	−0.020	0.232
	(8.17)	(0.95)	

Notes: White *t*-statistics in parentheses.
Rows (1) -- (2) use basic TFP measure.
Rows (3) -- (4) use alternative capital stock measure

manufacturing productivity grew 4.7% per annum; some 1.7 percentage points faster than it had prior to 1929, but over 1936–38 productivity actually fell slightly. We conclude that the Great Depression did not deliver a productivity breakthrough in Britain. This seems to hold a fortiori for other countries during the interwar period. Finally and more recently, there are a number of European economies which experienced deep recessions in the Eighties, but did not experience a spurt in productivity growth. However, while there seems to be no necessary link between deep recessions and subsequent rapid productivity growth, it is nevertheless still possible that any, or all, of the five mechanisms may have played a role in Britain's productivity revival.

There may be something to the "gale of innovation" explanation although it is inevitably difficult to quantify. The *New Earnings Survey* shows that the relative wages of computer personnel and those in information technology have risen more than most during the Thatcher years, which is at least consistent with the "microchip" hypotheses. On the other hand to the extent that such new technology is embodied in capital one would expect its adoption to be associated with a burst of investment, yet investment in plant and machinery remained very depressed until 1984. To be sure, there are some industries where the adoption of new technology has totally altered the character of production. Yet often this technology had been available for some time, and it was only a change in the climate of industrial relations which permitted its introduction. The introduction of direct computerised typesetting and the consequent elimination of the "hot metal" printworkers in the newspaper industry is a classic example. Finally one would surely have expected such a microchip-led spurt of productivity growth to be a worldwide phenomenon, yet as the international comparisons made clear, an acceleration in productivity growth during the Eighties is a primarily British phenomenon.

The second hypothesis, the batting average-effect, looks increasingly less plausible as time passes. This produces a once-and-for-all change in the level of productivity, and should thus have come to a halt after 1982 as the economy entered the recovery phase. So it is difficult to explain the continued rapid productivity growth of the last few years with this hypothesis. Furthermore Oulton (1987) shows that while the level of productivity is in general higher in large plants, the 1980–81 recession was associated with a shift in employment *away* from large plants. Consequently there was, if anything, a reverse batting average-effect in which the high productivity producers were eliminated.

Let us now turn to the fourth hypothesis, the kick-in-the-pants effect. When managerial effort cannot be accurately monitored, inefficiencies are likely to arise. These are likely to be greater when the threat of

bankruptcy or takeover is low. Governments during the Sixties and Seventies showed themselves willing to finance the operating deficits of the nationalised industries and to subsidise declining private firms and industries. Whatever the merits of this from a social point of view, it is likely to have reduced pressure on managers. Mrs. Thatcher's government slashed industrial subsidies, and set the nationalised industries the target of breaking even with the ultimate aim of returning them to the private sector. Furthermore the removal of exchange controls and increasing capital market integration has made firms more open to takeover than before.

It is virtually impossible to quantify the importance of this channel. Some rather weak evidence against its significance is provided by Table 8, for if improved management were the key, then one might expect capital productivity as well as labour productivity to have improved. Yet the table suggests that even after 1979 most of the TFP growth seems to have been labour-augmenting in nature. One should not push this too far, however, because managerial inefficiencies might well be mostly manifested in the way labour is deployed. Furthermore, to some extent increased managerial efficiency is simply the counterpart of the reduction in union power that underlies the "industrial relations" hypothesis.

The tax-cut argument must also hinge on increased managerial effort, for the reduction in marginal tax rates at average earnings levels has been fairly modest, even to the present (see Dilnot et al. 1987). By contrast the top rate of tax has been halved from 83% in 1979 to 40% today. As we shall see, the before-tax incomes of high earners have at the same time risen, which some have taken as an indication that effort is highly responsive to marginal tax rates (Minford and Ashton 1988). However, the findings of Holland (1977) suggest that even for managers and the professions, the responsiveness of effort to changes in taxes is negligible (see also Dilnot and Kell 1988). Cuts in marginal tax rates at the upper end of the earnings distribution may have stimulated entrepreneurship—the rate of new business formation in 1987 was some 40% higher than in 1979—but that can scarcely have had a measurable effect on the productivity figures which are dominated by firms that were already in existence in 1979.

Any explanation of the productivity rebound must therefore focus on the role of labour, and there is little doubt that the third hypothesis, a change in the climate of industrial relations, is a strong candidate (e.g., Metcalf 1988, and the many references therein; Layard and Nickell 1989). However, there is less agreement on the precise channel and whether changes in structure due to legislation or changes in the economic environment should take the credit.

The legal measures to reduce the power of unions were discussed above

in Section 2. It is easy to see that the recession of 1980–81 is also likely to have reduced the relative bargaining strength of unions. On one hand increased unemployment raises the prospective cost to the worker of layoff or redundancy. On the other hand the ability of management to meet high wage demands will have been limited by increased product market pressures arising from falling demand generally and in the tradeables sector by the appreciation of sterling. The difference, of course, is that this weakening in the relative position of unions would not be expected to persist as the economy recovered. By contrast the reduction in union power wrought by politico-legal changes might well be more permanent.

3.4 MODELLING THE PRODUCTIVITY REBOUND: THE IMPORTANCE OF MULTI-UNIONISM

While it is easy to document possible reasons for a reduction in union power, it is, from a theoretical perspective, less clear how this can explain events, for as we saw in Section 2.1.4., one would expect a reduction in union power to be associated with a *fall* in own-product wages. Yet even the real wages of unskilled workers have been rising in the last decade.

The discussion of Section 2.1.4 also suggests one solution. There we showed that, in a unionised economy, the presence of an incomes policy would result in lower unemployment, real wages and productivity than would be delivered under free collective bargaining. The demise of the Social Contract during the "Winter of Discontent" in early 1979 signalled the end of centralised incomes policies and allowed wage bargainers to move to a privately efficient point involving higher productivity and higher wages. The difficulty with this thesis is that while it could help to explain the rapid productivity growth, rising real wages, and falling employment observed during 1980–82, it is a little difficult to believe that the rapid productivity growth since then is simply the consequence of the unwinding of incomes policies. Furthermore, what is involved is a movement along a given production frontier, while the calculations in Section 3.3 suggested that what is required is an outward shift of that frontier in the guise of labour-augmenting technical progress.[2] So it

2. With bargaining over wages and employment, a change in union power, or the removal of the constraints imposed by incomes policies, would lead to a change in μ. If, however, μ is held constant as in the calculations underlying $\hat{X}_1$ and $\hat{X}_2$, this would be interpreted instead as a change in TFP growth. Measured TFP growth $\hat{X}$ is then given by:

$$\hat{X} = \hat{X}^* + (\mu' - \mu)S_N(\hat{N} - \hat{K})$$

where $\hat{X}^*$ is true total factor productivity growth and μ' is the new ratio of price to marginal cost. If the capital-labour ratio is rising at 3% per annum one would need $(\mu' - \mu) \approx -0.5$ to produce a spurious acceleration in TFP growth of one percentage point. Hence it requires a very large fall in μ to rationalise the data.

seems that an increase in the efficiency with which labour is used must be a central part of any explanation of the productivity rebound.

The only authors that we are aware of who tackle this issue seriously are Jackman, Layard, and Nickell (1989, ch. 5). They suggest that the Seventies were characterised by bargaining over both wages and effort. By contrast, in the Eighties they argue that the restoration of the right-to-manage took effort out of the province of negotiation. In their model effort and wages are both higher in general equilibrium when effort is not an object of the bargain, while unemployment is unchanged. The problem with this line of argument, however, is that it does not explain *why* effort should have ceased to be an object of negotiation in the Eighties, since from the point of view of the firm and the union, it is in their mutual interest to negotiate over as wide a set of variables as possible. Yet the argument is important in focussing on the importance of changes in efficiency, because the industrial relations evidence quoted by Metcalf (1988) suggests that a major ingredient of the productivity revival has been an end to overmanning, demarcation, and similar restrictive practices. The theoretical conundrum is to explain: first, how these could ever have been rational to begin with and second, why other countries with similar, or higher unionisation rates were not equally affected.

A key ingredient is, we believe, the preponderance of multi-union firms and internecine divisions within single unions. For historical reasons much of the British trade union movement is organised along craft rather than firm or industry lines. Table 9, drawn from the 1984 *Workplace Industrial Relations Survey,* reports the prevalence of multi-unionism for both manual and non-manual workers. Furthermore it is not just the

Table 9 MULTI-UNIONISM IN 1980 AND 1984 (ALL ESTABLISHMENTS, %)

	Manual Workers		*Non-Manual Workers*	
	1980	1984	1980	1984
Number of unions				
1	65	65	43	39
2 or more	35	35	57	61
Number of bargaining units				
1	77	82	57	61
2 or more	20	18	42	37
Unknown	2	1	1	2

Source: Millward and Stevens (1986).

prevalence of multiple bargaining units within the firm that is notable. Shop stewards typically have a considerable degree of autonomy (e.g., Flanagan, Soskice, and Ulman 1983, p. 364).

In our view it is this unique complexity of British union organisation that helps to explain the Thatcher productivity "miracle." Independent of any extra transaction costs arising from the need for management to deal with a number of unions or work force representatives, agreements between management and one group of workers may create externalities for another group. In particular, in isolation a group of workers may perceive restrictive practices as good for the employment of its members, while from the perspective of the firm and its work force as a whole, they lower productivity and discourage employment.

In an appendix we make this idea more precise in a model that combines elements of the union and policy coordination literatures. Typically, although for reasons not well understood, unions negotiate over manning levels rather than employment directly, which is left to the discretion of management (see Oswald and Turnbull 1985). An overmanning requirement has two effects on employment. First, it raises employment directly by increasing labour requirements for given output and production techniques; second, it raises the cost of labour in efficiency units leading to a reduction in the level of output and substitution away from that sort of labour to other sorts of labour or more capital intensive forms of production. The first effect dominates if, and only if, the elasticity of demand for the type of labour governed by the overmanning requirement is less than unity.

When the work force is fragmented into a number of bargaining units representing labour types that are not close substitutes for each other, this condition is more likely to be fulfilled. If this is the case, a union acting in isolation will perceive overmanning arrangements as a way of protecting jobs, and one which does them less harm than lowering wages. However, this results in a fall in the marginal product of other types of labour, so reducing the demand for those types at given wages and with given manning arrangements. The result is an inefficient equilibrium with low wages and low productivity.

How does this help to explain the productivity "miracle"? If the unions acted as one, this would internalise the externalities imposed on other types of labour by overmanning requirements; indeed in the model of the appendix, the coordinated equilibrium involves no overmanning whatsoever. However, this is *not* what we believe has happened, for as Table 9 shows, the extent of multi-unionism hardly changed between 1980 and 1984. (There has been a growth in single union deals but their number is still small; see Bassett 1986.) There has

not been a major change in the underlying structure. However, a reduction in union power, whether wrought by the recession or legislation, has the effect of reducing the degree of overmanning and thus shifts the non-cooperative equilibrium *toward* the cooperative one. Furthermore, in general equilibrium it turns out that the resulting increase in efficiency and productivity is actually associated with an *increase* in real wages (provided some conditions on tastes and technology are satisfied), despite the fall in union power.

3.5 EMPIRICAL EVIDENCE

The thesis developed above suggests that productivity gains are likely to have been greatest in firms with multiple bargaining units, and where there is scope for individual shop stewards to defend sectional interests even where there is only one union. Direct information on the prevalence of multiple bargaining units can be extracted from the *Workplace Industrial Relations Survey.* However, this does not cover the second aspect, the degree of shop steward independence within single unions. Since job diversity is likely to be greater in large plants, one would also expect the acceleration in TFP growth to have been most pronounced in large plants. Furthermore, as noted by Millward and Stevens (1986), there is a very strong relationship between establishment size and the prevalence of multiple bargaining units. Eighty-five percent of establishments with fewer than a hundred employees were covered by a single bargaining unit, while for establishments with a thousand or more employees the proportion is only 46%. Given the limited degrees of freedom available we therefore choose to use a measure of average plant size as a single control for both the presence of multiple bargaining units and the degree of individual steward autonomy in our empirical work.

Table 10 reports the results of tests of the hypothesis that the differences in TFP growth across industries are correlated with plant size. The regressand is the change[3] in average TFP growth between 1974–79 and 1980–86 for each of the two-digit manufacturing industries in Table 7 (some of the regressors are not available outside manufacturing); results are reported for both the TFP measures. The independent variables are

3. In its basic form the model predicts that uncoordinated bargaining with multiple bargaining units should reduce the *level* of productivity below what would be achieved with a single union. This suggests that the dependent variable should be the level of the rate of TFP growth between, say, 1979 and 1986, rather than the change in the rate of TFP growth. In fact when the rate of TFP growth 1974–79 is included as a regressor, it attracts a small coefficient of around −0.1 and is invariably insignificant, suggesting that the difference formulation is indeed appropriate. The most likely interpretation is that the presence of lagged TFP growth controls for inter-industry differences in TFP growth not captured by the other regressors.

the share of employment in the industry accounted for by establishments of more than five hundred employees (our plant size variable), the proportion of manual workers in the industry covered by a collective agreement, and a demand shock variable.

We have employed two proxies for the last variable. The first is the percentage fall in employment in the industry between 1979 and 1982 (measured as a negative number). Metcalf (1988) and Layard and Nickell (1989) both employ this variable in their investigations of the productivity revival. Metcalf interprets this as a "fear factor"—which could be the result of a weakening of unions as well as tightening product market conditions. Layard and Nickell, however, associate this specifically with the impact of the 1980–81 recession. This is problematic if the increase in productivity was the result of the legislation to weaken unions. This is not adequately controlled for in the rest of the equation. In that case the coefficient on the employment shock variable will be biased downward, leading one to overestimate the importance of the recession in generating the productivity revival. We have therefore also used the percentage fall in output in the industry over the same period as an alternative demand shock variable. Since this variable will, if anything, be positively correlated with the equation error it should enable us to bound the effect of the recession. The top half of Table 10 reports results using the employment fall as an explanatory variable, while the bottom half reports results using the output fall.

Despite the small sample size, the results are surprisingly good. The

Table 10 SOURCES OF ACCELERATION IN TFP GROWTH, 1980–86 ON 1973–79

Dependent Variable	*Constant*	*Collective Agreement*	*Shakeout*	*Proportion of Large Firms*	$\bar{R}^2$
(1) $\Delta\hat{X}_1$	−0.0762	0.0840	−0.0802	0.0567	0.72
	(1.97)	(1.48)	(2.43)	(2.98)	
(2) $\Delta\hat{X}_2$	−0.0810	0.0829	−0.1113	0.0439	0.81
	(2.79)	(1.95)	(4.50)	(3.08)	
(3) $\Delta\hat{X}_1$	−0.0724	0.0889	−0.0499	0.0628	0.66
	(1.68)	(1.40)	(1.60)	(2.74)	
(4) $\Delta\hat{X}_2$	−0.0761	0.0861	−0.0806	0.0559	0.71
	(2.15)	(1.66)	(3.16)	(2.98)	

Note: Rows 1–2 use the percentage fall in employment between 1979 and 1982 as the demand shock variable. Rows 3–4 use the percentage fall in output between 1979 and 1982 as the demand shock variable.
Rows 1 and 3 use the basic TFP measure.
Rows 2 and 4 use the alternative capital stock measure.

equations explain a high degree of the cross-section variation in total TFP growth rates, and in all four regressions the explanatory variables have the anticipated signs and, in the case of the shock and firm size variables are usually highly significant. The shock variable remains important even when the output rather than the employment fall is used. Furthermore, when the first two regressions are estimated by Instrumental Variables using the output fall as an instrument for the potentially endogenous employment fall, the point estimates of the coefficients are virtually identical. This suggests that the employment fall is *not* picking up any effect from anti-union legislation.

Focussing attention on the final set of estimates, we see that a 10% fall in output between 1979 and 1982 was associated with a 0.8 percentage point increase in TFP growth, while firms with more than 500 employees on average experienced a 0.6 percentage point increase in TFP growth. Finally a 10% increase in union coverage is associated with a 0.9 percentage point increase in TFP growth. These results are certainly consistent with our basic hypothesis.

How do these results compare with other studies? Both Metcalf, and Layard and Nickell using three-digit industry level data find the employment shock significant, although neither find any relationship between productivity growth and unionisation.[4] Layard and Nickell do, however, report evidence from a panel of firms which suggests that unionisation matters. Neither Metcalf nor Layard and Nickell include a variable like plant size so their results do not shed light on the particular hypothesis under investigation here.

There are, however, a wealth of studies investigating Britain's relatively poor productivity performance prior to the Thatcher revolution which do shed light on the industrial relations explanation of the productivity miracle. Davies and Caves (1987) compare productivity in UK and U.S. three-digit manufacturing industries in 1967–68 and 1977, and find that relative productivity performance is often especially bad in large plants, which they ascribe to either poor industrial relations or bad management. Pratten (1976) finds that of the 27% productivity differential in 1972 between German and UK plants of the same international company, some 12 percentage points are directly attributed to restrictive practices, overmanning, and industrial disputes. (Since these will also discourage capital formation the total effect on productivity will be even greater.) Finally a major study by Prais (1981) of ten industries during the

4. Metcalf uses the level rather than the change in productivity growth over 1980–85 as the dependent variable. This greatly weakens the effect of the union variables by failing to control for underlying differences in productivity growth rates across industries (see footnote 3). Layard and Nickell's results, however, do not suffer from this problem.

Sixties and Seventies found that overmanning and restrictive practices were a major constraint in six of them and that large plants especially suffered from industrial relations difficulties. However, Prais also found that in the other four industries, inadequate training and skills were the chief factor retarding productivity, which has important implications for the sustainability of the productivity revival.

3.6 CAN THE PRODUCTIVITY MIRACLE CONTINUE?

Our estimates in Section 3.1 suggested that prior to the election of Mrs. Thatcher, the UK was converging to a level of productivity some 30–35% below its main industrial partners. It may be that Britain has at last turned the corner and begun to eliminate that differential, holding out the prospect of continued rapid productivity growth and rising real incomes for some time to come. Such an optimistic assessment is premature, however.

To begin with it is not obvious how durable are the productivity gains of the last few years. To the extent that the decline in union power is a cyclical phenomenon reflecting high levels of unemployment, rather than the result of legislative changes, economic growth and declining unemployment may put a halt to the continued elimination of overmanning. Indeed the simple one-shot game in the appendix suggests that the productivity gains of the last few years might even be reversed as the uncoordinated equilibrium starts to shift away from the cooperative equilibrium. We think this is unlikely, for once workers have experienced the higher income generated by a more efficient, productive economy they are unlikely to want to revert to the status quo ante, and it may be easier to maintain an already established equilibrium necessitating a degree of cooperation than to establish a cooperative equilibrium in the first place. But the new equilibrium may be fragile, and it may prove difficult to coordinate further moves toward a fully efficient equilibrium without changes in organisational structure. Yet as noted above the extent of multi-unionism has changed little. Except for the legislative changes embodied in the Employment Acts, there does not appear to have been any marked changes in underlying structure which are likely to foster continued erosion of the productivity differential between the UK and its competitors.

Second, even if this assessment is too pessimistic, the studies by Prais (1981), Daly, Hitchens, and Wagner (1985), and Steedman and Wagner (1987) suggest that a lack of technical skills is increasingly important as a factor leading to poor relative productivity performance. Steedman (1987) and Prais and Wagner (1988) elaborate on this and show that, despite government initiatives, the gap between the vocational skill lev-

els of British workers and their French and German counterparts seems to be widening rather than closing. At the end of the day, even if the productivity revival does not run out of steam on its own, a lack of human capital is very likely to bring it to a halt.

4. *Income Distribution*

While there may have been real gains under the Thatcher regime, they have so far not been shared widely, for the Thatcher years have coincided with a remarkable widening of the income distribution in the UK, reversing a long-established trend. This is true not only after taxes, but also of raw pre-tax earnings, which is rather more surprising. This widening occurred both within and between occupations. Perhaps the most significant divergence was between white and blue collar workers (Table 11, row 1), but there has been an important increase in earnings dispersion within each grouping as shown by the last four rows of Table 11.

Who in particular prospered? Within the non-manual occupation, the *New Earnings Survey* shows a very striking increase by business and administration professionals (some 22 relative points between 1979 and 1988). Within this broad category the most successful occupations have been finance specialists, managers and executives, and accountants—in general those concerned with the running of private business. But all the higher-status non-manual occupations showed increases in both relative earnings and employment.

The increase in dispersion is quite general throughout all occupations except for government employees. There also seems to be a positive correlation across occupations between growth of relative earnings and the dispersion of earnings within the occupation. However earnings dispersion increased absolutely even for manual workers, for whom both relative earnings and employment fell.

Table 11 CHANGES IN THE DISTRIBUTION OF EARNINGS

	1969	*1979*	*1988*
Non-manual males relative to manual males	1.34	1.22	1.43
Upper decile as proportion[a] of median, manual males	1.47	1.39	1.48
Lower decile as proportion[a] of median, manual males	0.73	0.73	0.69
Upper decile as proportion of median non-manual males	1.91	1.69	1.80
Lower decile as proportion of median non-manual males	0.61	0.63	0.58

Note: (a) Refers to straight-time earnings. Other rows employ weekly earnings.
Source: New Earnings Survey (various).

An obvious question is whether this increase in the dispersion of pre-tax earnings is part of a global phenomenon, or whether it is peculiar to the UK, and hence possibly a consequence of government policy. The paper by Frank Levy in this volume shows a remarkably similar widening, for instance, of the earnings distribution in the U.S. during the Eighties. While there are some similarities with behaviour in other industrialised countries, it is clear that Britain is something of an outlier. Thus the OECD (1987) concludes that whereas the manual/non-manual differential narrowed by around 5–10% in most OECD countries during the Seventies (with the notable exception of Germany where the opposite occurred), since then it has been mostly static or else risen only slightly. The size of the British increase is clearly quite exceptional. These remarks apply equally well to managerial staff in particular (OECD, op. cit., chart 3.3). While time series data on the dispersion of manual wages is not readily available across countries, the skilled/unskilled differential for manual workers displays a similar pattern, with only the UK among the European countries showing a very pronounced widening in the Eighties (OECD, op. cit., chart 3.4).

So what has caused this increase in earnings dispersion? One possibility is the operation of a strong substitution effect toward increased labour supply resulting from reductions in income taxes. One of Mrs. Thatcher's first acts was to reduce drastically the top rates of income taxes, and this has been followed in recent years by cuts in the basic rate (down to 25% from 33% in 1979). Despite this, personal income tax receipts have actually increased from 17.4% of GDP in 1979 to 18% in 1987, which might look like evidence of a movement down the inefficient part of a Laffer curve. Given the concentration of the tax cuts at the top end of the income distribution, one would expect to see greater increases in labour supply at the top end and therefore an increase in the spread of weekly earnings. However, if all that is involved is an increase in the supply of hours one would also expect to see a *narrowing* of the dispersion of hourly wages. The second and third rows of Table 11 relating to movements within manual occupations employ hourly wage rates and thus contradict the hypothesis. Information on hours worked for non-manuals is not available (and indeed it is not clear that it would be meaningful for many occupations if it were), so it is possible that the behaviour of differentials within non-manuals, as well as the non-manual/manual differential (which also uses weekly earnings for manuals), is simply a consequence of changes in relative hours. On the whole we think this is unlikely, however. It is possible that the behaviour of all the differentials, including those within the manual group, reflects increased effort where pay is performance related, but for the reasons set

out in Section 3.3, increased effort at higher incomes is unlikely to be the explanation. The available evidence just does not suggest that the elasticity of the supply of effort is sufficiently large for the relevant groups. Having said that, we should note that striking similarity with the U.S., which has also experienced a reduction in the progressivity of the tax system. Were the same phenomenon to happen in other tax-cutting countries (Sweden?) then one would be led to put more weight on this explanation. As the Ian Fleming character Auric Goldfinger remarked, "Once is happenstance, twice is coincidence, but three times, Mr. Bond, is enemy action."

We believe rather that two other factors have been in operation. The first is the unwinding of the incomes policy. As we noted in Section 2, incomes policies were in operation for around 60% of the time between 1961 and 1979. Many of these policies were of the fixed sum, rather than fixed percentage, variety and thus automatically gave higher percentage increases to lower paid workers (such provisions were often essential in gaining TUC assent). Consequently, the narrowing of earnings differentials prior to 1979 is hardly surprising. Furthermore, the OECD (1987) attribute much of the narrowing that occurred in other European countries over this period to the operation of incomes policies.

The second factor is a by-product of our explanation of the productivity rebound. We attributed much of this to the ending of overmanning and restrictive practices. This not only raises the efficiency of the labour directly concerned, but will also raise the marginal product of other factors (provided they are cooperant). Consequently one would expect to see the earnings of capital, managers, skilled workers, and so forth also rising. In the appendix we show that a reduction in union power which leads to the end of overmanning not only raises the wages of the unionised workers in general equilibrium, but is also likely to lead to an increase in the relative wages of other sorts of labour, i.e., the latter are the major beneficiaries of the elimination of inefficient practices.

Given the increased participation of married women in the labour force, it is perhaps more useful to focus on what is happening to households rather than individuals when it comes to considering the welfare implications of developments in the income distribution. Table 12 compares the household income distribution before and after the operation of the tax and benefit system. Final incomes are now significantly less equal than before Mrs. Thatcher took office in 1979: it is as if the top quintile of households has imposed a tithe of 1% of the national cake on each of the lower quintiles. The Gini coefficient for final incomes has risen from 32% to 36%. Paradoxically, because of bracket-drift, the highest quintile could legitimately claim that it is taxed at a higher rate on

original income than in 1979: final household income is now 82% of original income as against 84% in 1979. Looked at from a different perspective, the tax and benefit system has transformed a seven point increase in the Gini coefficient for original incomes between 1979 and 1986 into a four point increase in the coefficient for final incomes.

So much for household shares; what of spending power? Adjusting the shares in Table 12 for changes in real GDP and household size, we find that real final income per head grew between 1979 and 1986 by 24%, 11%, and 10% for the top three quintiles. However for the lower two quintiles real income actually *fell* by 4% and 12% respectively. Now this increase in income inequality need not indicate that lifetime inequality has increased, for what matters is permanent rather than current income. It is possible that the increased inequality in Table 12 merely reflects the fact that unemployment is presently at a high level, or that the variability of (household) earnings over the life cycle has increased. We can examine this hypothesis by looking at consumption rather than income, since this should be related to expectations of lifetime earnings. Looking therefore at the distribution of real household expenditure rather than income (using the *Family Expenditure Survey*) we find that the lowest decile and quartile grew by only 3% and 6% respectively between

Table 12 DISTRIBUTION OF ORIGINAL AND FINAL INCOME

	1975	*1979*	*1986*
Original Income			
Quintile Group			
Bottom	0.8	0.5	0.3
2nd	10	9	6
3rd	19	19	16
4th	26	27	27
Top	44	45	51
Gini Coefficient	43	45	52
Final Income			
Quintile Group			
Bottom	7.1	7.1	6.3
2nd	13	12	11
3rd	18	18	17
4th	24	24	24
Top	38	38	42
Gini coefficient	31	32	36

Note: "Final Income" includes such benefits in kind as the National Health Service and the state education system.
Source: Economic Trends, December 1988.

1979 and 1986. For the lowest decile, real expenditure fell by 9% for one-adult households, and by 6% for single-pensioner households. Poor families with children suffered particularly: real expenditure for single-adult households with children fell by 16% at the lowest decile (and by 23% at the lowest quartile). Real expenditure for the standard one man, one woman, two children-household fell by 4% at the lowest decile. Not everyone has prospered in Mrs. Thatcher's Britain.

5. *Conclusions*

There are many aspects of the Thatcher revolution we have left untouched, but most of the important macroeconomic events of the last decade can in our view be traced to the fundamental switch away from neo-corporatist solutions to Britain's economic problems. Has Mrs. Thatcher been a Pareto-improvement? The verdict must depend on what would have happened without her. Some would argue that successful corporatist policies would have allowed a lower unemployment rate and a more painless disinflationary process. Under such policies the income distribution would almost certainly not have widened in the way it has. Whether they would have also led to the productivity revival is more debatable.

Supporters of the government argue—with good reason—that these policies had been tried and found wanting. The basic structure of the British economy was simply not conducive to Scandinavian-style solutions. There really was no alternative. If the successes of the Thatcher years—the reduction in inflation and improvement in productivity are continued into the foreseeable future, then the costs in terms of the increased unemployment and poverty of the last decade will probably turn out to be worthwhile. If the productivity revival comes to a halt and unemployment remains high, then the issue is less clear cut.

Appendix: A Model with Multiple Unions

The demand curve facing the firm is given by $P=\delta Y^{-\epsilon}$, where notation is as in Section 2.1.4 unless otherwise specified and firm subscripts are omitted for brevity. Two types of labour, each with their own union, are used to produce output via a well-behaved, CRS technology $Y=F(A_1N_1,A_2N_2)$, where N_i is employment of type i labour, and A_i represents an "over-manning" coefficient that is the subject of bargaining ($0<A_i<1$). The idea is that management and union can negotiate to have more men on a machine than is strictly necessary to operate it. Union utility is given by

the utilitarian form $N_iV(W_i)+(M_i-N_i)\tilde{V}$, where M_i is the total membership of each union, and for simplicity $V(W) = \frac{W^\gamma}{\gamma}$.

The key assumptions are that while bargaining can take place over wages and manning levels, bargaining over employment directly is not feasible, and that there is no layoff pay. Together these ensure that, under some circumstances, it may be optimal to negotiate manning agreements involving the employment of totally surplus labour.

The profit maximising employment levels, for given A_i, W_i, then satisfy the usual marginal productivity conditions

$$\frac{\partial F}{\partial N_i} \equiv F_i = W_i/A_iP(1-\epsilon) \qquad (i=1,2) \quad \text{(A1)}$$

Straightforward algebra establishes that:

$$\partial n_i/\partial w_i = -[S_i+(1-S_i)\sigma\epsilon]/\epsilon = -\eta_i, \text{ say} \quad \text{(A2a)}$$

$$\partial n_i/\partial a_i = \eta_i-1 \quad \text{(A2b)}$$

$$\partial n_i/\partial a_j = -\partial n_i/\partial w_j = S_j(1-\sigma\epsilon)/\epsilon = \varphi_j, \text{ say} \quad (i\neq j) \quad \text{(A2c)}$$

where $S_i=F_iN_i/F$ is the "competitive share" of labour type i, $\sigma=F_1F_2/F_{12}F$ is the elasticity of substitution, and lower-case letters denote logarithms.

Management negotiates with each union in turn over wages and manning treating the outcome of the other bargain as given. Along a union indifference curve we know that, for union i:

$$da_i/dw_i = [WV_i'/(V_i-\tilde{V}_i)-\eta_i]/(1-\eta_i) = 1 + [\gamma V_i/(V_i-\tilde{V}_i)-1]/(1-\eta_i) \quad \text{(A3)}$$

and hence

$$d^2a_i/dw_i^2 = \gamma V_i'\tilde{V}_i/(V_i-\tilde{V}_i)^2(\eta_i-1) \gtrless 0 \text{ as } (\eta_i-1) \gtrless 0. \quad \text{(A4)}$$

Management is indifferent between any combination of wages and manning levels that leaves the efficiency cost of labour, W_i/A_i, unchanged. Hence the firm's isoprofit lines have $da_i/dw_i=1$.

There are two possible scenarios depending on whether $\eta_i \gtrless 1$. A low elasticity of labour demand ($\eta_i<1$) is the only case where an interior solution with overmanning can exist. The contract curve then satisfies:

$$V_i(W_i)=\tilde{V}_i(1-\gamma) \quad \text{(A5)}$$

which is independent of the manning level. Shifts in bargaining power, for given $\tilde{V}_i$, affect only manning arrangements and not the wage. This is, of course, an artifact of the particular specification of preferences. With a high elasticity of labour demand ($\eta_i>1$), equation (A5) constitutes a set of minima rather than maxima. It follows that the equilibrium outcome of the bargain must then involve no overmanning.

In order to examine both the partial equilibrium within the firm, and the general equilibrium in the whole economy, it is helpful to choose a particular bargaining solution. For instance suppose wages solve a generalised Nash bargain, where $M_i\tilde{V}_i$ is the status quo point for the union:

$$\text{Max } [V(W_i)-\tilde{V}_i]^{\beta} N_i^{\beta}[\delta F(A_1N_1,A_2N_2)^{1-\epsilon} - W_1N_1 - W_2N_2] \quad \text{(A6)}$$

for $i=1,2$. Then for an interior solution, the bargaining outcome is characterised by the contract curve (A5) and the division of the rents condition:

$$\beta\gamma V_i/(V_i-\tilde{V}_i) - \beta\eta_i - W_iN_i/\Pi = 0. \quad \text{(A7)}$$

For a boundary solution with $A_i=1$ only the latter condition is required.

Henceforth focus on the case where $\eta_i<1$ and there is an interior solution with overmanning. We know that for given $\tilde{V}_i$, the wage is determined by (A5) independently of manning levels. Hence the best response of each bargaining unit to the manning level chosen by the other bargaining unit is given by:

$$\bar{W}_iN_i = \beta(1-\eta_i)[\delta F(A_1N_1,A_2N_2)^{1-\epsilon} - \bar{W}_1N_1-\bar{W}_2N_2] \quad \text{(A8)}$$

where the bars are added to emphasise that the negotiated wage is independent of the manning level. Consequently along the optimal response for bargaining unit 1 we have:

$$da_1/da_2 = -\beta\bar{W}_2N_2/(1+\beta)\bar{W}_1N_1 + \varphi 1/(1+\beta)(1-\eta_1) \quad \text{(A9)}$$

and similarly for bargaining unit 2, mutatis mutandis. The sign of the right-hand side of this equation depends on the particular parameter values, but the important thing is that a reduction in union power (or a negative demand shock) shifts the response function in the direction of reduced overmanning. Specifically suppose that the production function is symmetric (in the sense that $F(N_1,N_2)=F(N_2,N_1)$) and both sorts of labour face the same outside opportunities. Then, for $i=1,2$, we have in intra-firm equilibrium:

$$da_i/d\beta = -1/2\beta^2(1-\eta) < 0 \quad \text{(A10a)}$$

$$da_i/d\delta = -[1+2\beta(1-\eta)]/2\beta\delta(1-\eta) < 0 \quad \text{(A10b)}$$

where $\eta=\eta_1=\eta_2$ is the common labour demand elasticity.

It may seem that although the model can explain the productivity rebound, it cannot simultaneously explain the increase in wages. However, it must be remembered that, in general, equilibrium $\tilde{V}_i$ is endogenous. Assuming type i labour receives the same wage in all firms and that $\tilde{V}_i=(1-u_i)V(W_i)+u_iV(B)$ where u_i is the unemployment rate for type i labour, we know from (A5) that:

$$u_i = \gamma/(1-\rho_i\gamma) \quad \text{(A11)}$$

where Π_i is the replacement ratio for type i labour. A natural benchmark is when this is fixed, e.g., because benefits are indexed to earnings. Changes in relative bargaining strength then have no effect on unemployment and only affect wages and productivity. For a common reduction in relative bargaining strength across all firms we obtain:

$$dw/d\beta = da/d\beta = 1/\beta[(1-\epsilon)-2\beta\epsilon(1-\eta)] \quad \text{(A12)}$$

Hence a reduction in union power leads to a rise in wages and productivity if and only if $2\beta\epsilon(1-\eta)>(1-\epsilon)$. Furthermore, for this benchmark case, productivity improvements are *fully* reflected in real wages, in contrast to the partial equilibrium result.

Now suppose that instead of bargaining independently with management, the two unions got together and bargained over wages and manning levels simultaneously. To keep things simple assume again that the production function is symmetric and that the "superunion" weights the welfare of the two types of labour equally. This symmetry ensures that we need only consider symmetric solutions with $W_1=W_2=W$ and $A_1=A_2=A$. In that case the superunion's indifference curve has elasticity

$$da/dw = 1 + [\gamma V/(V-\tilde{V})-1]/(1-\eta-\varphi). \quad \text{(A3)}$$

Generically this is the same as (A3). However, since $\eta+\varphi=1/\epsilon>1$ there is necessarily no overmanning in the cooperative equilibrium.

A straightforward extension, relevant to Section 4, is to introduce a third, non-unionised factor of production. This could be capital or could be highly skilled or managerial labour. Provided this factor is a substitute for the two sorts of unionised labour, the reduction in overmanning that

accompanies a reduction in union power will tend to be associated with an increase in the return to that factor if it is in fixed supply.

For instance consider the special case where the elasticity of substitution between the three inputs is the same. Then the elasticities of labour demand with respect to wages and the overmanning coefficients continue to be described by equations (A2) (A_3=1 if the third factor is non-unionised). Now consider a reduction in union power. In a general equilibrium where the replacement ratio for unionised labour is kept constant, an increase in productivity and real wages for both types of union labor results (provided certain conditions on the parameters are fulfilled). However, if W_{12} is the equilibrium wage for unionised labour and W_3 is the payment to the third factor it is easily shown that:

$$dw_3/dw_{12} = (S_1+S_2)(1-\sigma\epsilon)/[(S_1+S_2)(1-\sigma\epsilon)-(1-\sigma)]. \quad \text{(A13)}$$

Hence for a small elasticity of substitution a reduction in union power is not only associated with an increase in the real wages of unionised labour, but also a shift in differentials in favour of the third factor.

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Comment

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Thatcherism has one feature in common with Reaganism. Whatever the verdict of historians about the ultimate wisdom of the economic policies for the nations involved, the policies have been a boon for economic science, providing natural experiments in the impact of changing macroeconomic policies and philosophies.

The paper by Bean and Symons provides a useful and provocative survey of major recent developments in the British economy. In evaluating the Thatcher experiment, I will focus on two particular issues of the 1980s: the inflation-unemployment experience and the trends in productivity and output.

Inflation and Unemployment

Observers of recent inflation and unemployment, in Britain as well as continental Europe, have been struck by the rising trends in unemployment along with the apparent stickiness of wage inflation in the latter half of the 1980s. The experience is devastating to modern rational-expectations theories or models which assume that the economy moves quickly toward its long-run equilibrium. Moreover, it provides little comfort to conventional modern natural-rate Phillips-curve theory, which cannot explain why inflation does not continue to decline with rates of unemployment that are presumably well above the natural rates.

With respect to new classical theories, economic policies in the U. S. and the U. K. after 1979 provided good laboratories to test the credibility hypothesis, which states that credible and publicly stated policies to curb inflation would lead to a more rapid and less costly reduction in inflation than would traditional approaches. Tests for the United States

indicate that the structural wage-price equations were remarkably stable during the monetary experiment from 1979 to 1982.

An analogous test is presented by Bean and Symons in Table 3, where they calculate "sacrifice ratios" for the U.K. and other countries. At the outset, it should be noted that these tests are not comparable with other calculations (such as those of R. J. Gordon), for they take the benchmark unemployment rate as the *actual* unemployment rates in 1980 rather than the *natural* unemployment rates over the period; for the United States, this approach underestimates the sacrifice ratio by a factor of approximately two. In addition, they examine the unemployment-sacrifice ratio rather than the output-sacrifice ratio.

Setting aside analytical difficulties, the numerical results are hardly comforting to the credibility hypothesis. The U. K. sacrifice ratio ranks third out of seven even though most would agree that the U. K. had the most draconian anti-inflation policies of any of the countries. It is interesting to note as well that the country with the most deeply imbedded hostility to inflation, Germany, has the highest sacrifice ratio—a finding that is inconsistent with the well-known Lucas international evidence on inflation and unemployment.

It should be noted that modern neo-Keynesian natural-rate Phillips-curve theories have great difficulties in explaining wage-price movements over the 1980s in the U. K. and in much of Europe. Attempts to find stable Phillips curves have proven elusive, except perhaps for Japan and the U. S.[1]

This crisis has produced a wide variety of approaches. The most popular approach is to allow for "hysteresis" in the natural rate of unemployment—that is, to allow the natural rate to track the actual unemployment rate. The paper by Bean and Symons follows this tradition and includes a number of variables that might plausibly affect the natural rate. As I read their results (presented implicitly in Figure 1 and Table 4), the natural rate in Britain rose from under 2 percent before 1970 to a peak of 13 percent in the early 1980s and since then has fallen to around 7 percent.

The general line of reasoning of the hysteresis approach is troubling. There seems little reason to question the fact that standard Phillips curves appear highly unstable in Britain and other European countries during the 1980s. The most straightforward reaction to that fact would be to conclude that the underlying Phillips curve mechanism is mis-

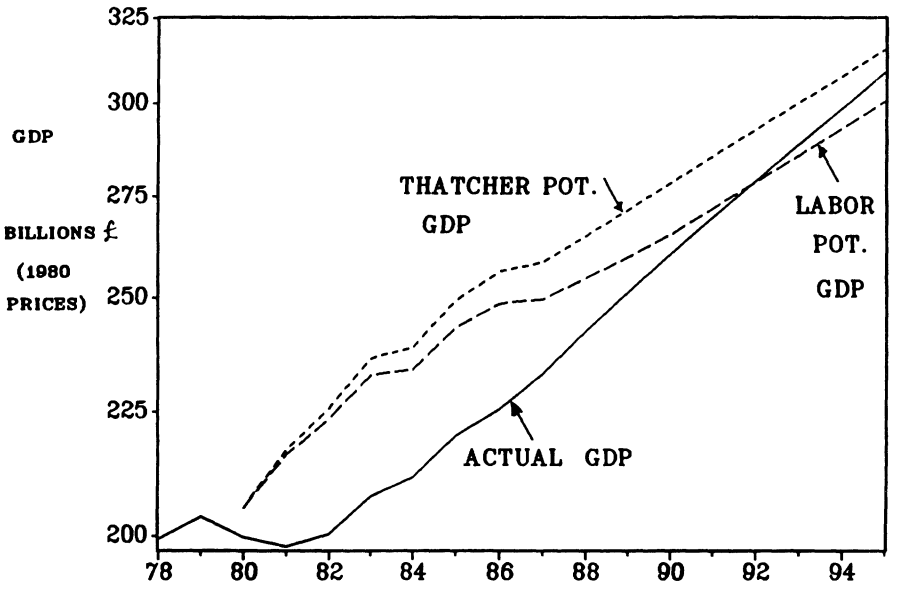
1. A study outlining the difficulties of standard Phillips curves and showing the drift in the implicit natural rate of unemployment is David T. Coe, "Nominal Wages, the NAIRU, and Wage Flexibility," *OECD Economic Studies*, No. 5, Autumn 1985, pp. 87–126.

specified. Natural-rate theories have little appeal if the natural unemployment rate is as variable as the actual unemployment rate.

The usual approach, however, is to attempt to model the natural rate as a function of a number of variables that could plausibly affect the labor market. I find the argument presented in Bean and Symons even less convincing than the hysteresis models developed in other studies. One difficulty lies in the basic relation, equation (2), or in the actual equation estimated (p. 31). It is misleading to label this a reduced form, for the equation is not derived from a set of structural equations. Moreover, it seems misspecified in omitting any wage and price variables. Most significantly, it completely omits any variables that could be instruments for the aggregate demand.

The results are also unconvincing. The results of the U. K. equation (p. 31) are inconsistent with the pooled cross-section results (on p. 33). The crucial union density variable has different signs in the two equations. Another variable which seems ad hoc is the aging variable (*POP*), which represents the proportion of the population born after 1930 and who are, according to Bean and Symons, "more willing to risk unemployment as fewer workers are able to recall the experience of mass unemployment during the interwar years." Does this variable show up in unemploy-

Figure 1 POTENTIAL OUTPUT (LABOR AND THATCHER) AND ACTUAL OUTPUT



ment rates of different cohorts? Why do those unemployed since 1980 not begin to develop unemployment-aversion as well?

In addition, there is some ambiguity about whether the tax variables are influencing the demand or supply side. Finally, it seems inappropriate to assume that the demand effects can be captured by a stationary error term and by the lagged unemployment rate. The Thatcher years changed the pattern of policy from Stop-Go-Stop-Go to Stop-Stop-Stop-Stop; if policy affects aggregate demand, this implies that either the autoregressive structure of the errors or the coefficient on the lagged unemployment rate would change during the Thatcher years.

In the end, I believe that the equations are capturing a change in the unemployment-wage-price structure that is associated with a depression economy. After all, depressions are qualitatively different from normal times. Perhaps labor markets, along with price and wage behavior, behave differently during periods of extended slack; perhaps our models simply will not extrapolate into depression epochs. One reason for the change in structure might be a downward rigidity of the nominal wage rate, which bends the long-run (or at least the medium-run) Phillips curve at very low inflation rates. Another possible regime shift is the mass migration of workers from the labor force. I am selling no particular theory of regime change; rather, I am suggesting that we cannot use "good-time" models to understand the dynamics of wages, prices, and unemployment in bad times.

The other fascinating fact about the Thatcher regime is the improvement in productivity during the 1980s. To begin with, there is little dispute about the fact that the U.K. succeeded in reversing its lagging productivity growth better than most other industrial countries. On the whole, I agree with the interpretation in the Bean-Symons paper. I had always been struck by the fact that Britain was the only exception to the convergence hypothesis among large countries, as I remarked in my 1982 study.[2] If in fact Mrs. T was able to break the cartels, unions, university tenure systems, and other groups that were preventing Britain from converging toward the technological frontier, then we should join in a chorus of "She's a jolly good lady."

While this line of reasoning is plausible, I do not find the authors' empirical evidence supports their hypothesis. The authors emphasize the role of multiple unions as an important factor in inhibiting efficient reorganizations. While the argument seems plausible on its face, we are unable to judge the quantitative significance of British-style unions.

2. William D. Nordhaus, "Economic Policy in the Face of Declining Productivity Growth," *European Economic Review*, 1982.

Surely, the change in multiple unions shown in Table 9 is insufficient to cause the widespread productivity gains. The only direct evidence is presented in Table 10, which indicates that unions are favorable to TFP growth. Would not Thatcherism have *lowered* TFP through its union-busting campaign?

While much has been made of the startling gains to productivity in Britain, we might ask whether the game was worth the candle. Say that we agree with the Olsen hypothesis that it was necessary to break the chains of labor and business cartels in Britain; say that this required a blood-letting depression such as we have witnessed; and say that Mrs. T was just the person to draw the blood. We can still weigh costs and benefits.

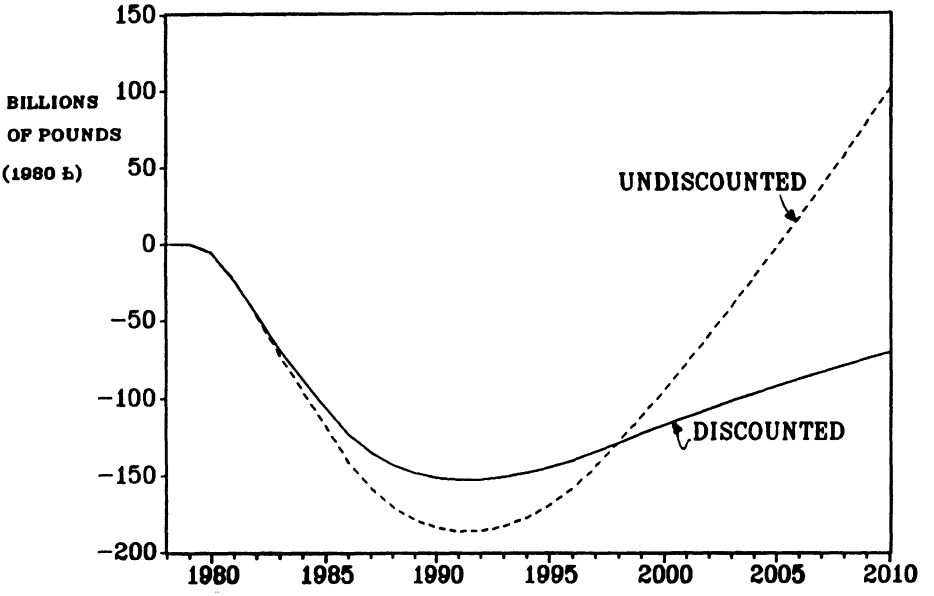
Figure 1 gives a simple account of the dilemma. We show in that figure British potential output under Thatcher (calculated from actual GDP assuming an Okun's Law coefficient of 2 and a potential unemployment rate of 4 percent). We assume that Mrs. T's policies were able to raise British productivity growth by .5 percent per year for a decade.[3] The alternative path of potential output is shown in Figure 1 as "Labor Potential GDP." Finally, we show the actual path of output through the forecast for 1989 and bring actual output back to potential output over the coming decade.

Figure 2 shows the cumulative losses and gains from this calculation. If we do not discount future output, then the gains from the higher productivity growth will offset the losses from the depression sometime in the first decade of the next century. If we discount the future output gains at 6 percent per annum, then the losses of the 1980s will never be regained.

This calculation of the gains and losses from Thatcherism is obviously dependent upon the precise assumptions about future productivity growth. But is does remind us that whatever productivity gains have been achieved in Britain did not come cheaply. Put differently, even though *productivity growth* may have been higher in the 1980s under Mrs. T, *output* was probably lower than it would otherwise have been. And it is useful to note that the Cheerful Economics of Mr. R in America managed to raise productivity growth sharply without the same prolonged depression that still haunts Britain.

3. The assumption about the productivity rebound is crucial to the figure. This number is obtained by assuming that one-half of the rebound in British productivity from 1973–79 to 1979–87 (see Bean and Symons, Table 5) is due to the Thatcher reforms. Alternatively, if it is assumed that the differential growth between the U.K. and other countries is halved (see the equation on p. 36), then the productivity acceleration is about .5 percent per annum.

Figure 2 CUMULATIVE GAINS OR LOSSES FROM THATCHERISM



The authors remind us that the stated purpose of Thatcherism was to reduce inflation. Given the heavy output losses shown in Figure 2, I am reminded of some words of James Tobin, who was reflecting upon the postwar experience in the United States:

The whole purpose of the economy is production of goods or services for consumption now or in the future. I think the burden of proof should always be on those who would produce less rather than more, on those who would leave idle men or machines or land that could be used. It is amazing how many reasons can be found to justify such waste: fear of inflation, balance-of-payments deficits, unbalanced budgets, excessive national debt. . . . Too often the means are accorded precedence over the ends.[4]

In the end, putting aside the non-economic issues such as the evils of socialism, we can judge the Thatcher period by whether the austerity of the period beginning in 1980 (and not yet ended in 1989) will raise British national income and output. Given the steep economic losses of the 1980s, it will be many years before a higher productivity growth will provide sufficient gains to offset the cumulative losses. Perhaps Britain

4. James Tobin, *National Economic Policy: Essays*, pp. vii–viii.

will never recover the losses of the 1980s. All this serves as a reminder that depressions and class wars resemble conventional wars and strikes in being negative-sum games in which the losses of the suffering generation are never recouped.

Comment

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The paper by Charles Bean and James Symons provides one of the most statistically balanced and thought provoking analyses of what has been achieved in Mrs. Thatcher's first ten years. Some matters of emphasis are of course open to criticism. Thus when Bean and Symons write:

The most obvious failure [of the Thatcher years] has been the level of unemployment . . .[p. 21] The unemployment rate, which peaked at 11.8% in 1985, has reached levels second only to those experienced during the Great Depression (p. 15).

they fail to put the complete 10-year unemployment record into perspective.

Official United Kingdom unemployment fell from 11.8% in 1985 to 11.1% in 1986, 10.0% in 1987, 8.1% in 1988, and 7.5% in May 1989. United Kingdom unemployment is therefore now lower than in France, Italy, and most of the other EC economies. It is a little surprising that their table which puts "the UK's unemployment experience in international context" [Table 3 on p. 23] should quote comparative data only for 1985 when United Kingdom unemployment peaked at 11.8% instead of a later year when it was relatively low by West European standards. The 11.8% at which unemployment peaked was very far below the 21.3% unemployment of 1931.

It is widely agreed that the rapid rate of fall of United Kingdom unemployment owes something to increased strictness in the administration of unemployment benefit rules with the result that some of the recorded fall reflects the removal of names from the register as a consequence of administrative action; but there is a variety of evidence which points to increasing tightness in the labour market over much of the United Kingdom, so a very significant fall in unemployment has unquestionably occurred.

But this has been quite recent. The growth of the United Kingdom

economy accelerated sharply in 1986 to a rate between 4% and 5% per annum (according to the output measure of GNP which has proved the most accurate), and that is the principal reason why unemployment has fallen so sharply. Manufacturing productivity has also advanced very rapidly in these two years (by 16%), which reflects the improvement in the United Kingdom's overall supply side performance.

The superior growth and unemployment performance in 1986–88 has been partly due to an unsustainably rapid growth of demand. During 1988, real United Kingdom consumption grew by 6.5% and real investment by 10% to produce a growth of real domestic demand of over 7.5% of which about 3% had to be met from overseas, and this has produced a £12 billion deterioration in the current account of the balance of payments. At the same time the underlying rates of wage and price inflation have accelerated and the government has had to take corrective action to slow the growth of demand. This may produce a cyclical peak in 1989 or 1990 (not 1988 as Bean and Symons suggest because 1989 output is so far running some 4% above 1988 levels) so that statistics for a complete cycle from the 1979 peak to a further peak in 1989 or 1990 will in due course become available. This genuine 10–11 year cycle is likely to include further above average growth in 1988–90 and show faster overall annual growth rates than the Bean and Symons statistics which include all the negative data from the 1979–81 recession but not yet all the positive data from the subsequent boom.

There is of course a considerable possibility that the United Kingdom authorities will be able to achieve a slowdown in the growth of demand to a sustainable rate in 1989–90 without actually creating a cyclical downturn, and this will be easier to achieve if the acceleration of growth in 1986–88 contains a significant element that stems from sustainable supply side improvements. Bean and Symons document the extent to which marginal rates of United Kingdom taxation on high personal incomes were reduced in 1980 and on corporate profits in 1983 and any beneficial effects on supply from these will be quite significantly lagged, so it is not implausible that the main favourable effects only came through after 1985. There was also extensive deregulation to assist small businesses, which have grown very rapidly. Bean and Symons themselves, in the most interesting part of their paper, attach considerable weight to the favorable influence on labour productivity of trade union legislation that reduced restrictive practices and union power. There has been a reinforcing consideration which helps to explain why many private sector trade unionists have entirely voluntarily cooperated with management to an increasing degree in the 1980s.

In the pre-Thatcher cycle between the cyclical peaks of 1973 and 1979

the real net of tax earnings of the average worker increased at an annual rate of only 0.9% per annum while the net pre-tax rate of return on capital of non-North Sea companies fell from 8.9% to 5.6%. From 1979 to 1988 the net of tax earnings of the average worker rose at the far faster annual rate of 3.0% with the result that the real incomes of those in work rose by approximately one-third in Mrs. Thatcher's first nine-and-a-half years. At the same time the pre-tax net rate of return of non-North Sea companies rose from 5.6% in 1979 to 10.2% in 1987 (which has probably risen by a further fifth since). A consequence of the rapid productivity recovery which Bean and Symons began to track has therefore been that workers in work and companies have been able to enjoy very rapid simultaneous increases in both wages and profits. The near stagnation of wages and the decline of real rates of return on capital in 1973–79 encouraged zero sum behaviour by trade unions where one group of workers was mainly able to gain extra real incomes at the expense of profits or of other workers via the exercise of the short-term power to disrupt production. As the Thatcher boom in which real wages and profits have both risen rapidly developed, the conditions for positive sum behaviour have gradually emerged and labour relations have now moved toward a situation where all parties realise that they stand to gain far more from sustained increases in production and productivity than from relative income shifts achieved via threats to disrupt the productive process. The unwillingness of most workers in the private sector to support strike action may well owe something to the large gains they have been able to achieve via cooperation to achieve continual advances in productivity and improvements in international competitiveness. Bean and Symons recognise the importance of this line of argument and they add, "Once workers have experienced the higher incomes generated by a more efficient, productive economy, they are unlikely to want to revert to the status quo ante."

It is widely perceived that there have also been considerable gains in the quality of management, but Bean and Symons remark (p. 42):

. . . if improved management were the key, then one might expect capital productivity as well as labour productivity to have improved. Yet the table [8. on p. 40] suggests that even after 1979 most of the TFP [Total Factor Productivity] growth seems to have been labour-augmenting in nature.

They rightly say that "one should not push this too far," and especially since the extent to which productivity growth is capital-augmenting is extremely difficult to measure. This is partly because technical progress which is capital-augmenting ex ante will lead to a consequent substitu-

tion of capital for labour so that much of what occurs ex post will be indistinguishable from the consequences of labour-augmenting technical progress. This will be precisely the case if the elasticity of substitution between labour and capital is unity, and if it is closer to 0.6 or 0.7 as is widely supposed, subsequent substitutions will still disguise most of the precise effects of capital augmentation. The difficulties are of course compounded by the distortions which influence the relation between marginal products and factor returns in most industries. For these reasons, and because the statistical findings which Bean and Symons use to reject capital-augmenting technical progress (in Table 8) are rather tenuous, the suggestion that productivity advances in the United Kingdom have been exclusively labour augmenting need not be accepted. The official data show real investment net of capital consumption in manufacturing industry totalling a mere £64 millions or less than 0.1% of the capital stock in the four years 1984, 1985, 1986, and 1987. The output of manufacturing industry rose 13% in these four years, and to be able to produce 13% more with negligible recorded net investment is compatible with the presence of a good deal of capital-augmenting technical progress. If this has indeed been present on a considerable scale, the hypothesis that assets have been more efficiently managed in a wide range of industries ceases to be unacceptable; it may be added that extremely cooperative trade unions have allowed managers to manage these assets far more effectively than in the 1970s.

This Comment has focused on the microeconomic aspects of Bean and Symons' account. So far as the macroeconomic management of the economy is concerned, the government has succeeded in reducing price inflation from the more than 10% rates of the 1970s to an underlying 4% to 5% from 1982 onward, but it has so far failed to arrive at a consistent macroeconomic framework for the guidance of policy. Virtually every target announced has had to be quite rapidly modified, for essentially pragmatic reasons. In 1988–89 the United Kingdom has a budget surplus of between 3% and 4% of GNP (when the most recently enunciated principle to guide budgetary policy called for a balanced budget). Despite this and negligible public expenditure growth, the expansion of real demand accelerated to an unsustainable 7.5%. Precise monetary targets have not had a direct influence on policy since about 1985, quite largely because only the demand function for the narrowest measure of the money supply MO has shown any stability. In practice the government has endeavoured to maintain a stable inflation rate via well judged movements in short-term interest rates that have a considerable impact on the exchange rate which in turn influences the inflation rate. This pragmatic approach came adrift in 1987–88 when interest rates and there-

fore the exchange rate were set too low to stabilise inflation and the rate of growth of real demand. The United Kingdom has nonetheless enjoyed eight years of uninterrupted growth since 1981 and considerable stability in inflation. The government has judged that this together with supply side-oriented reductions in personal and company taxation provide the best available environment for companies and their workers to take long term decisions which can be expected to promote growth and international competitiveness.

If substantial supply side improvements have begun to come through from about 1985 onwards as this Comment suggests, then these are probably the most important outcomes of the policies of Mrs. Thatcher's governments. It is moreover entirely plausible that the buoyancy of investment and consumption that has followed from supply side successes and the consequent growth of new small businesses has had a positive impact on aggregate demand that even a budget surplus of more than 3% of the national income has so far failed to restrain.

Discussion

Charles Bean replied to Nordhaus that the regressions were intended as reduced forms, so that there was no need to include aggregate demand explicitly, and that even so results are similar if the change in GDP is included in the regression. He also suggested that the change in productivity was not due to a move away from multi-unionism, but that a decrease in union power meant that the distortions from multi-unionism were less important. In response to Eltis, Bean noted that they only had data through 1987, and that the recent increase in output can be attributed almost wholly to increases in consumption.

Robert Gordon questioned Nordhaus's cost-benefit analysis of the Thatcher years. He indicated that the comparison depends on the comparability of the US economy in the 1930's with the economy in the postwar and on the comparability of the postwar US and UK economies, neither or which he found convincing. He noted that inflation showed little persistence in the prewar period, while it is very persistent in the postwar, and that the US appears to have a stable natural rate of unemployment, unlike in the UK.

Robert Hall questioned why the move to free markets is associated with adverse changes in income distribution, contrary to the classical view. He speculated that reducing inflation has costs which offset the structural benefits of free markets. Matthew Shapiro responded that

most of the changes in income distribution were due to changes in tax rates that accompanied the move to free markets, though Bean noted that in the UK even the pretax income distribution has widened.

John Campbell questioned that relation between market power and multi-unionism. He noted that the integration of the European market in 1992 may lower the amount of monopoly power and thus lead to a more US-style union sector. Bean agreed with this view.

William Brainard thought it was inappropriate to examine British disinflation independent of the world disinflation. Olivier Blanchard asked whether the decrease in manning restrictions should have a once-and-for-all effect on productivity, or whether they were preventing British catch-up in the world economy and thus would have a permanent effect. Bean replied that he thought the removal of manning restrictions had a once-and-for-all effect.

Eltis questioned whether the recent output increase was really due to consumption. He noted that while consumer spending is up, corporate and government saving have increased a well. William Nordhaus defended his indictment of Thatcher policy. If the hysteresis view of unemployment is incorrect, then Thatcher produced a depression to lower inflation. If the hysteresis view is correct, then deflationary policy has very long-lasting effects. Robert Hall suggested that the authors use their data to identify the bias in technological change. The bias can be uncovered, he suggested, by examine the relation between the Solow residual in Table 15 and the shares of capital and labor.