9

Unemployment, productivity and growth

The modern macroeconomic model implies that the economy is converging on its natural rate at some speed determined by for example overlapping contracts or adjustment costs. Therefore the natural rates of output and unemployment become of central interest.

Much of the literature of the 'supply side' dwells on productivity and growth, but this neglects the important issue of unemployment which has been a particular problem in Europe. This has importance beyond the narrow issue of the number of people unemployed because of its social significance: politicians attach great importance to 'curing unemployment' because of its obvious unpopularity with voters. Unfortunately they tend to alight on measures that address the symptoms, not the disease; notably 'work-sharing', reducing participation (by for example early retirement or 'family policies' designed to keep women at home), reducing working hours, or indeed reducing productivity growth and the penetration of new technology. The reason they pick such policies is that the original disease, as we shall argue below, is due to their erecting 'social' support mechanisms that raise labour costs; it follows that cures based on 'labour market deregulation' (i.e. eliminating or bypassing such support) have no appeal to them. Instead they put their faith in measures that they think may mitigate the side-effects, in unemployment, of their (desirable) social policies.

This tendency of high unemployment to be accompanied by such policies is illustrated in Table 9.1. This shows at the end of the 1990s how low participation and low working hours tended to accompany the high unemployment in Germany, France and Italy. In Italy for example were the participation rate to be at the US level with no other changes unemployment would be around 30%. Table 9.2 following shows some evidence that these countries have also experienced a relative slowdown

	Unemployment (%) *	Participation+ Total (%)	(55–64	Working Hours**
US	4.6	66.4	57.2	1943
Japan	4.4	62.6	66.2	2014
UK	4.6	63.9	51.5	1826
Germany	10.6	55.0	42.6	1557
France	11.5	55.6	36.1	1612
Italy	12.3	47.2	28.3	1790

Sources

* (Economist) mid 1998 **1992, Manufacturing (US Bur. Lab. Stats, Washington DC)

+ Total: 1990 (US Bur. Lab. Stats, Washington DC); 55-64 Yr Olds: 1995 (OECD)

Table 9.1: Labour Market Performance

in productivity growth in the 1980s and 1990s from the earlier postwar period; this suggests that their productivity growth too may have been held back by such policies.

UNEMPLOYMENT

Our focus in this section is on the natural rate, not on the cyclical behaviour of unemployment. The latter has to be explained in the context of the business cycle models of earlier chapters. The natural rate is the equilibrium to which these cycles tend. Milton Friedman (1968) remarked in his AEA lecture in 1968 that it was the equilibrium 'ground out by the Walrasian system' of real demands and supplies. However, it never really occurred to macroeconomists to model it until much later; Friedman, Phelps (1970) and others using the natural rate concept effectively treated it as a natural constant. It was not until the early 1980s in the UK where unemployment rose above 10% with no apparent tendency to fall that models began to be formulated of a changing natural rate. The first effort was by Minford (1983); he took the classical labour supply set-up of earlier chapters and added the idea of a permanent unemployment benefit, payable without any check on work availability (a peculiarly European concept). The result was to tilt the labour supply curve so that the real wage offer never fell below the benefit. This had the effect of creating the 'real wage rigidity' identified for example by Bruno and Sachs (1985) in their account of the 1973–4 oil crisis (figure 9.1). Note too that with such benefits one can account also for the

cyclical behaviour of real wages and unemployment; real wages are procyclical, rising in the upswing and lifting people out of benefit, falling in the downswing so that people go on to benefit.

Hence unemployment tends to breed policies that inhibit participation and productivity growth. Our discussion therefore begins with unemployment. It goes on to the optimal size of government. It ends with growth itself.

	1960–1973	%		1979–1994	%
1	Japan	5.5	1	Ireland	2.6
2	Portugal	5.4	2	Finland	2.5
3	Ireland	4.6	3	Spain	1.7
4	Italy	4.4	4	Portugal	1.6
5	Finland	4.0	5	UK	1.5
6	Belgium	3.8	6	Denmark	1.3
7	France	3.7	7	France	1.3
8	Netherlands	3.4	8	Belgium	1.2
9	Spain	3.2	9	Japan	1.1
10	Austria	3.1	10	Netherlands	1.1
11	Germany	2.6	11	Sweden	1.0
12	UK	2.6	12	Austria	0.9
13	Greece	2.5	13	Italy	0.9
14	USA	2.5	14	Australia	0.8
15	Denmark	2.3	15	USA	0.5
16	Australia	2.2	16	Germany	0.4
17	Switzerland	2.1	17	Canada	-0.1
18	Norway	2.0	18	Norway	-0.1
19	Sweden	2.0	19	Switzerland	-0.2
20	Canada	1.9	20	Greece	-0.3

Source: OECD (1996) as cited in Crafts (1997)

Table 9.2: Total Factor Productivity (TFP) Growth in the Business Sector (% per annum)

In the figure one can see how the normal marginal product of labour schedule can interact with this distorted labour supply schedule to generate equilibrium unemployment. Should the benefit rise relative to productivity, unemployment will result. That is, people will voluntarily refuse to take available wage offers because benefits are preferable. They are 'unemployed' in the sense that they are not working but are 'available for work': thus in response to the usual survey questions they would be counted as wanting work (if at the 'right wage' but this is not generally included in the assessment) and some governments also would

count them as unemployed because they are in receipt of unemployment benefit. In any case the unemployment is recognizable as what causes social dissatisfaction.

The labour market model can be generalised to include the effects of union power, taxes of all sorts, and employer and employee national insurance contributions (which in Europe are largely taxes in nature). When placed within the general equilibrium of an open economy one obtains natural rates of output, real wages and the real exchange rate as well as employment and unemployment (see chapter 10). Later versions have proliferated; in the UK Layard and Nickell (1985) estimated a similar model, and Bean et al (1986) attempted to extend it to other European countries which began to experience rising unemployment UK-style during the late 1980s and 1990s. It turns out that in each country there are substantial idiosyncracies in the social support mechanisms, complicating effective modelling of the natural unemployment rate. Nevertheless a large amount of empirical work, both cross-section (Burda, 1988, was the first to exploit the variation across European countries and show the importance of long-duration benefits) and time-series evidence (Layard, Nickell and Jackman, 1991, survey much of it) seemed to confirm that these mechanisms, particularly the length of time benefits were available and their ease of eligibility, were responsible for persistently high unemployment in Europe. By the end of the 1990s a general consensus had appeared, embodied in the OECD secretariat, that 'labour market flexibility' was the key to reducing equilibrium unemployment.

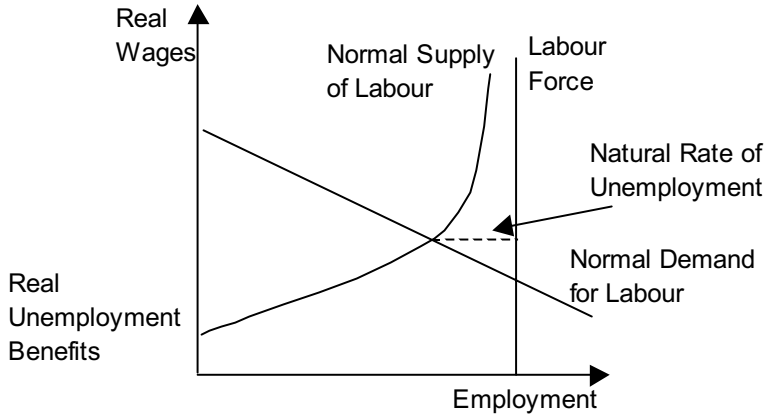

Figure 9.1: The natural rate of unemployment

Much of the traditional literature on unemployment emphasises search behaviour (e.g. Lancaster, 1979; Nickell, 1979). In the absence of a permanent unemployment benefit such behaviour would make sense; we could model a steady flow of job separations, with people searching for some average time determined in the usual search-optimising manner. This would give rise to an unemployment equilibrium of the rate of flow times the length of search; e.g. if 20% of the workforce separate each year and spend three months searching, this would yield an unemployment rate of 5% ($0.2 \times 0.25 = 0.05$). We can think of this as a 'frictional' rate of unemployment; plainly in a well-functioning economy the natural rate should be such a frictional rate. The very high and long-lasting levels of unemployment seen in Europe during the late 1980s and early 1990s are not well explained in these terms, however; these high natural rates are better explained in terms of the model above, in which the long-term unemployed cannot be said in any meaningful way to be 'searching'.

Thus a first set of policies to generate high activity should be those of labour market flexibility.

THE OPTIMAL ROLE OF GOVERNMENT

It is plain that government provides some useful services. These services (such as law and order and infrastructure) could be provided privately but it is more efficient in practice to provide them publicly; that is, for 'public goods' there is a direct saving of resources from eliminating the duplication, the transactions costs and the under-use from private provision. However, there is also a cost in public provision: that distorting taxes must be raised to pay for the service. Though lump-sum taxes without a distorting effect are possible, they are so unpopular that in practice governments do not raise them to any serious extent (when the UK government brought in the 'poll tax' in the late 1980s to replace the 'rate', a tax on property values, it contributed to the fall of Margaret Thatcher; subsequently the tax was withdrawn in favour of a banded property tax).

We can model these two sides of public spending in terms of the labour market and the production function: public spending raises productivity but causes a distortion in labour supply — figure 9.2. A helpful way of summarising the twin effects as government spending (G) rises as a fraction of GDP stems from the Laffer Curve (figure 9.3) which shows tax revenue as a function of the tax rate (tax revenue = public spending). At low levels of spending, the tax rate is low and the marginal distortion cost of taxation (which rises with the square of the tax rate

according to the standard consumer surplus formula) is correspondingly low, while the marginal benefit of government spending is high. With efficiency raised by the spending and low tax-distorting inefficiency, the revenue yield relative to the tax rate is high. As spending and the tax rate rises, this relative yield falls, as the marginal benefit of the spending falls and the marginal distorting cost rises. The optimal tax rate and size of government is given by T_0; as spending rises above this point, we move towards the revenue-maximising tax rate $T_{\max}$ where any further rise in the tax rate yields no extra revenue and so permits no extra spending. Thus whatever its motives no government can rationally operate to the right of this point.

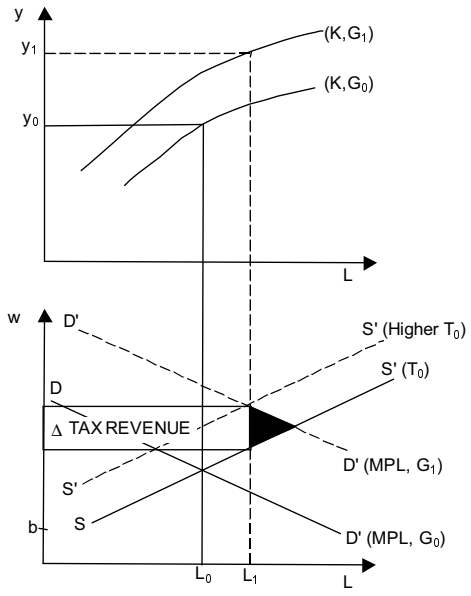

Figure 9.2: Public spending distorts the labour supply

This, useful as it is conceptually, tells us nothing in practice about where the optimal tax rate is. If we neglect very poor countries in Africa and elsewhere with poor infrastructure, there seem to be three main groups: Asian emerging-market countries with low tax rates (around 20%), good basic infrastructure but limited provision of welfare services and social insurance like unemployment benefit and public health care; an Anglo-Saxon group with medium tax rates (35-40%) and fairly extensive welfare services/social insurance; and a European group with

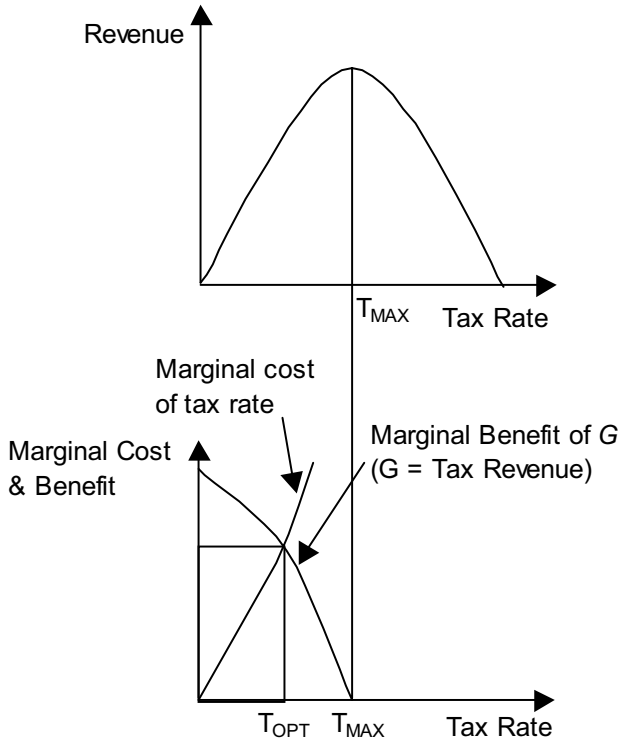

Figure 9.3: The Laffer curve

high tax rates (around 50%) and very extensive social insurance. The essential problem with the latter group is, as we saw in the last section, that generous social insurance distorts labour supply. Furthermore, the high marginal tax rates implied have substantial effects on work incentives for taxpayers on top rates at least; evidence from the US (Lindsey, 1987a, b; Feldstein, 1995) and the UK (Minford and Ashton, 1991) suggest that high earners' hours respond strongly to rising marginal rates so that higher-band tax revenues are likely to fall, putting them on the wrong side of the Laffer Curve (this is without including the effects of tax avoidance and evasion, and of migration or 'brain drain'). It is true that a degree of social insurance may make workers more willing to be flexible in job choice and location (for example the combination of no unemployment benefit and strong unions, as in Italy, may make it extremely difficult to close plants.) Nevertheless in a rich society most people would be willing to pay for higher than basic levels of health in-

surance, pensions and education; if the state provides these basic levels but no more, there is a basis for cutting tax rates to somewhere between the Anglo-Saxon and the Asian rates. Such a move has proved to be popular in the UK with pensions for example. If acceptable politically, it enables the economy to have a less distorting tax system with the reduction in government provision offset by higher private provision.

Government spending as % of GDP	
Anglo Saxon / Oriental	
USA	36.7*
Japan	36.7*
UK	43.5**
Continental European	
Germany	51.0**
France	54.3*
Italy	53.2**
* 1995 ** 1996	

Table 9.3: Public Expenditure Shares in GDP

GROWTH

Exogenous growth

Let us start by discussing a world with exogenous growth, the original standard framework of growth theory in which the size of the labour force and the progress of technology are both given by forces beyond the control of households or their governments (which respond to their wishes in some sense, let us assume).

Consider first the whole world economy. Represent its production possibilities in the simplest way as Cobb-Douglas:

$$y_t = A_t L_t^{\alpha} K_t^{1-\alpha} \tag{1}$$

For simplicity we will set depreciation to zero. Now, recalling that in equilibrium desired savings equal desired investment, we can follow Harrod and Domar to obtain the basic equation of growth equilibrium:

$$S = s(r)Y = I = k(r)\Delta Y = k(r)gY \tag{2}$$

where k is the capital-output ratio, $\frac{K_t}{Y_t}$; or

$$\frac{s(r)}{k(r)} = g \tag{3}$$

We can show that growth, g, is exogenously given by technological progress and the growth of the labour force; hence (3) will solve for the real interest rate, r:

$$r_t = (1-\alpha)\frac{K_t}{Y_t}; \text{that is, } k(r) = \frac{r_t}{1-\alpha} \tag{4}$$

$$w_t = \alpha \frac{L_t}{Y_t} \tag{5}$$

are the first-order conditions. Substituting for endogenous capital in the production function gives us:

$$Y_t = A_t^{\frac{1}{\alpha}} L_t \left(\frac{1-\alpha}{r_t}\right)^{1-\frac{1}{\alpha}} \tag{6}$$

Assuming that there is a steady state with a constant real interest rate and growth rate, then taking log first differences of (6) yields the growth rate as:

$$g = \frac{1}{\alpha} g_A + g_L \tag{7}$$

where $g_A(g_L)$ = growth of A (L).

From (4) this is the growth rate also of capital. With the real interest rate given by (3), (6) yields the level of output, (4) the level of capital, and (5) the real wage consistent with full employment of the labour force, L.

If we now consider an open economy facing a world capital market with given world real interest rate, then everything is the same except that now with r_t exogenous (3) is replaced by:

$$\frac{s(r)}{k(r) + \frac{NFI}{Y_t}} = g \tag{8}$$

which serves to determine NFI, net foreign investment (alias the current account surplus).

We have assumed implicitly that each country has its own technology. But we could add a mechanism of 'technological catch-up' whereby technological knowledge flows from high- to low-technology countries (via a variety of possible channels — e.g. licencing, corporate take-over, or multi-national company investment in low-wage countries using their own technology to exploit low wage costs). This catch-up would produce faster growth of A until it had caught up with best practice internationally. This 'convergence' is the focus of empirical work by Barro and Sala-i-Martin (for example, 1998) — note the caveats of Quah (1993).

Endogenous growth

One can investigate more complicated functional forms and also do empirical work on the 'sources of growth' (e.g. Denison, 1974) but essentially this was the long and the short of 'growth theory' under these exogeneity assumptions. It is against this background that one can consider 'endogenous growth'. The assumption in this case is that the growth rate is a matter of choice (whether by individual households or their governments). In some sense this seems quite right. There are huge differences in growth rates, both between countries at the same time and within the same country at different periods of history (Parente and Prescott, 1999, provide a clear overview of the 'stylised facts' of growth). These differences seem to be the result of choices within these countries.

Of course two questions arise. What proximate mechanism produces growth? And how do people formulate their choices (that in turn feed into the mechanism) in the light of it? These two questions are closely intertwined.

On the first question of mechanisms there is now a huge literature theorising on possible ones. One can perhaps single out three as front runners — though it must be stressed that empirical testing has lagged way behind the theory (not least because of the great difficulties of identification in this area where so many different mechanisms are at work, all of them related in both causal directions with growth) so that we are still largely in our armchairs on this issue.

The first is increasing returns to scale over sections of the production function — P. Romer (1986). Suppose one accepts that in nature at some comprehensive level of description there are constant returns essentially on logical grounds: if you double every single ingredient that is producing something then in principle you should double output since all you are doing is replication — putting the same thing side by side with itself must give you double. Nevertheless in practice not everything is included in the production function, there are always uncosted factors ('commons', resources that are uncharged for because they are not scarce in the given situation) and also as size changes so does the nature of the operation. For example in 'virgin territories' land is free; then the increasing penetration of people can reap increasing returns as thresholds of exploitability are passed. A similar thing appears to happen with all new technologies (Mansfield, 1968); they follow an S-shaped curve of productivity. In the early stages productivity grows slowly because the technique is poorly implementable with little learning and few users; as more users join and learning increases, productivity rises rapidly; finally as all its uses are exploited productivity growth tails off.

These ideas underpin specifications of the production function with increasing returns — most easily represented by making the technology parameter, A_t, depend on size of output. Assuming that the stock of labour is exogenous, then the increasing returns can be exploited by increasing the capital stock.

A second main route is to model A_t as accumulated knowledge, with knowledge production an industry in its own right (the R&D sector).

The third, closely related, route is to include human capital (skills of the workforce as opposed to pure technological knowledge) in the production function (Lucas, 1988). One can then treat it as investment requiring, like physical capital, savings to create it (though in this case not recorded financial savings but rather the substitution of 'creative' for non-creative leisure), in which case the model's behaviour is essentially like that of the Solow model; but because it downgrades the contribution of 'pure labour' in favour of human capital it implies that saving has a bigger effect on growth and so can account more easily for growth differences between countries (D. Romer, 1996, section 3.11). Or we can attribute human capital to learning-by-doing, so that it increases with the level of output say (more precisely with the accumulation of output experience). As with increasing returns one can think of this as a way by which size raises the technology parameter, A_t.

Having discussed mechanisms, we turn to the second, crucial question of how choices are formulated: if people could predict exactly how their and other people's investments would interact and could coordinate these choices, then one could envisage a country's (a social planner's) strategy to exploit ('internalise') these increasing returns. If on the other hand choices are uncoordinated and each regards the investments of others as given and unpredictable, then the increasing returns are 'external' to individual choice; people will preserve the same first-order condition as above but increasing returns will come from them happening to invest together for reasons of say perceived improvement in technology. It is more normal (and clearly more realistic) to make this latter assumption that people act singly so that these effects, through either mechanism, are external. We make this assumption initially in order to illustrate the workings of the typical endogenous growth model.

In what follows we shall formally use the open economy assumption and treat the real interest rate as exogenously set in world markets. (One can also think of the interest rate as reacting in a closed economy, the world say, to clear the market for savings and investment; in this case r_t will have a varying steady state value, provided there is a steady state, as growth varies.) This departs from the frequently-met assumption of a fixed savings rate; but it is both more realistic and simpler to handle

and in any case the essential properties of the models are unaffected.

We give two examples, using the model as already set up but adding an explicit equation for A_t. Our second will illustrate the knowledge-production model. The first illustrates the increasing returns and the learning-by-doing human capital models: we represent both mechanisms by the simple device of making technology a function of size

$$A_t(Y_t) = \exp^{\pi t} Y_{t-1}^{\gamma} \tag{9}$$

where π and γ are positive constants. The lag is there to bring out some simple dynamics. If we now substitute into the production function both this and the optimal capital stock from (4) we obtain:

$$Y_t = (\exp \frac{\pi}{\alpha} t) Y_{t-1}^{\gamma/\alpha} L_t \left(\frac{r_t}{1-\alpha} \right)^{\frac{1-\alpha}{\alpha}} \tag{10}$$

implying that:

$$g_t = \frac{\pi}{\alpha} + \frac{\gamma}{\alpha} g_{t-1} + g_L \tag{11}$$

If $\gamma \geq \alpha$, then this will be an explosive difference equation and growth explodes correspondingly; no steady state exists until presumably at some point γ drops to below α. If and when $\gamma \prec \alpha$, then the model converges on steady state growth which is:

$$g = \frac{\alpha}{\alpha - \gamma} \left(\frac{1}{\alpha} \pi + g_L \right) \tag{12}$$

and the corresponding output is:

$$y_t = \left(\exp \frac{\pi}{\alpha - \gamma} t \right) L_t^{\frac{\alpha}{\alpha-\gamma}} [\frac{1-\alpha}{r_t}]^{\frac{1-\alpha}{\alpha-\gamma}} \tag{13}$$

What we see here is two exciting results. First, that growth can 'take off' in an explosive burst, feeding on itself. Second, that even when it is not (or no longer) explosive, growth will settle down to a 'multiplier' on the exogenous sources of growth. From a policy viewpoint any government action that could promote such exogenous sources of growth would be prima facie desirable, since the private consumption cost would presumably be exceeded by the 'multiplied' effect of the action (and certainly would be far exceeded if explosive growth is triggered). For example suppose government-financed training increased human capital, inserting a multiplicative term h_t into (9). Then the level of output would rise by $h_t^{\frac{1}{\alpha-\gamma}}$; so provided the tax cost is less than this it would be desirable, abstracting from distributional issues. Similar arguments

could be applied to public infrastructure spending that contributed directly to the profitability of investment (so raising A_t). Examples could be extended easily to many aspects of public spending — e.g. on health, policing, social care. Via their contributions to human capital or the productivity of private capital they could generate large multiplied benefits. This discussion follows familiar long-standing discussions of public spending whenever an 'externality' is identified. The difficulties with the line of argument are also familiarly those of identifying the benefits with any degree of certainty. Here we have only the haziest idea even of the functional forms that might embody these externalities let alone the size of the parameters; empirical work has barely begun to generate plausible estimates.

The second example we consider is that of knowledge accumulation via an R&D industry; it has essentially the same sort of implications. We follow D. Romer's (1996) simplification of models due to P. Romer (1990), Grossman and Helpman (1991), and Aghion and Howitt (1992). Now let A_t be produced by some fixed fraction, a_L, of the labour force (we ignore capital for simplicity) according to

$$\frac{\partial A_t}{\partial t} = a_L L_t A_t^{\theta} \tag{14}$$

Substituting capital demand into our production function gives us:

$$Y_t = A_t^{1/\alpha}(1-\alpha_L)L_t\left(\frac{r_t}{1-\alpha}\right)^{1/\alpha} \tag{15}$$

(where Y_t is the output available for consumption and investment, excluding R&D) from which:

$$g = \frac{1}{\alpha}g_A + g_L \tag{16}$$

as in the Solow case. The difference is now that g_A is endogenous.

(14) is a first-order differential equation in A_t which is explosive if $\theta \geq 1$. Hence in this example as in the first we may have explosive bursts of growth until θ falls below 1. Once $\theta \prec 1$, we have:

$$g_{A,t} = \frac{\frac{\partial A_t}{\partial t}}{A_t} = a_L L_t A_t^{\theta-1} \tag{17}$$

so that

$$\frac{\partial \ln g_{A,t}}{\partial t} = g_L + (\theta-1)g_{A,t} \tag{18}$$

In the steady state where $\frac{\partial \ln g_{A,t}}{\partial t} = 0$, this implies

$$g_A = \frac{g_L}{1-\theta} \tag{19}$$

so that steady state growth of output is as before a multliplier of exogenous growth factors:

$$g = \left[1 + \frac{1}{\alpha(1-\theta)}\right] g_L \tag{20}$$

The policy implications are analogous with respect to intervention in R&D. If somehow resources can be diverted to this industry, by a rise in a_L for example, then the immediate loss in output is soon more than made up for by the rise in A_t, possibly an explosive one for a time. Nevertheless, such seductive implications must be qualified by our empirical ignorance of the parameters as well as of the mechanisms generating effective R&D.

These two examples must suffice to illustrate the proliferation of models with features of this type. The general implication of these models is that with uncoordinated private agents there are potentially massive externalities in activities generating 'growth agents' such as knowledge, human capital, and agglomeration and other sources of increasing returns.

Suppose instead that private choices are coordinated in some way. This could happen in different ways. Government coordination is one; as it involves detailed knowledge of the potential gains from new technological applications and investments, this is not a main candidate except for rather basic elements of a joint strategy such as infrastructure. Plainly however in any coordination the government is likely to have some role to play, if only in agreeing to get out of the way (e.g. in monopoly regulation). Probably the main way in which coordination might occur is intra-industry joint ventures; there are many examples of such collaboration between competitors (such as in the airline industry to develop internet booking systems or in the telecommunications industry to develop the new generation of mobile phones and handheld computers). One should also not discount popular coordination, now more achievable via the internet.

Assuming such coordination, one can think of a representative household (like a social planner) optimising its intertemporal utility by choosing a particular growth strategy given all these sources of self-reinforcing growth. This clearly produces a highly complex private optimising problem in which all the opportunities and constraints are internalised; of course if the economy could offer explosive growth, this will imply a massive free lunch and a coordinated jump to a hugely richer world where

convergence once more has returned and normal maximization can be resumed. The role for government in this set-up is different from the externality case just considered. Here government has no business spending any resources since there are no ('external') opportunities not already exploited by the private sector/government coordination. In these circumstances government regulations, taxes and other interventions would inhibit the private sector from exploiting available opportunities. In crude terms, where there are large incentives to exploit potential new technologies, the private sector will take larger risks and invest more resources than where taxes are high and regulations are stringent. Interestingly, Parente and Prescott concluded that some such x-factor of the degree of non-intervention promised the best hope of explaining the stylised facts of growth.

This emphasises the importance of social institutions and policy frameworks, within which in general households take decentralised decisions in their own private interests and yet may have an effective way of internalising some externalities. The idea that somehow societies automatically internalise all externalities flies in the face of the obvious evidence of huge differences in the success of different societies in achieving growth. There is plenty of evidence that institutions evolve over time instead of being the direct object of social choice (Sugden, 1986). They are the result either of unprompted social interaction or of some political process. In the last section of this chapter we discuss what light 'political economy' can shed on success and failure in producing institutions that are good for the supply side of the economy.

THE POLITICAL ECONOMY OF THE SUPPLY SIDE

There is a massive literature on the creation and evolution of the institutions that favour or inhibit capitalist growth. North (1981) charted the way in which protestant dissent in the low countries and the UK produced the first industrial revolutions; Lal (1998) has gone further back to show how competition in Europe between nation states under the edicts of Papal Christendom gave capitalism its secure basis. In two important books, the late Mancur Olson (1965 and 1982) set out the mechanism by which vested interest groups could prevent the general good (in the second he argued that as nations become older they acquire more powerful vested interests as networks and clubs have longer to form and become entrenched); essentially they can exercise discipline over their members who have strong interests at stake, whereas the general public have too

little incentive individually to understand how their own interests are prejudiced by the action of these groups. Hence for politicians to mobilise opinion in favour of reform is costly and uncertain; whereas these groups can offer them rewards, both personal and political, for pushing forward their own agendas — an activity known as 'rent-seeking', in which existing rents are diverted instead of being augmented by productive action. This basic idea has led to a substantial applied research agenda (e.g. St. Paul, 1996, on the difficulties of modifying costly firing regulations in Europe, and Tullock et al., 2000, for a survey of US work).

However, there are examples of supply-side reforms being undertaken in spite of vested interest opposition. Three such are the wide-ranging reforms of the Thatcher conservatives over the 1980s and 1990s in the UK, and in the US the Carter deregulation of the 1970s and the Reagan tax reforms of the 1980s. On these occasions it proved possible for politicians to build a sufficient coalition in public opinion to support reform.

So there is a tension between the strengths of vested interests and the power of public opinion in asserting its general interests. A political economy of institutions should attempt to model this tension. In chapter 8 we already reviewed the political economy of macroeconomic policy; central to this were models of voting behaviour. It is natural to extend these to supply-side issues — which we can define as microeconomic issues with macroeconomic consequences.

Many detailed approaches are possible. Here we illustrate them by taking one possible model, that of the floating voter lying between 'capitalists' and 'workers' as in the model of Minford and Peel (1983) reviewed in chapter 8. The workers, it will be remembered, obtained their income stream from human capital, whose value was badly affected by unemployment but largely hedged against inflation; the capitalists obtained theirs from financial and physical capital which was largely unaffected by unemployment but vulnerable to inflation. We can see similar dichotomies of interests between these two groups in respect of supply-side issues; unemployment benefits will appeal to workers but be disliked by capitalists who will pay much of the bill in return for no reward, redistributive taxation will be the same, as will be such things as minimum wages, workers' rights and firing restrictions. Let us assume that the effects of an improvement in the general good of the economy is too small in normal circumstances to affect the voting behaviour of each group relative to its sectional (rent-seeking) interest; thus each group normally votes its selfish pocket. We can imagine a status quo in which the vested interests of each group of voters are represented respectively by unions and employers' associations; the floating voter is some weighted com-

bination of the two groups, which therefore votes a weighted average pocket. The question then is how shocks to the economy may alter the political equilibrium represented by this floating voter.

As hints towards the outcome, we may reflect on how — as noted at the start of this chapter — downward shifts in general economic prosperity have triggered increased intervention (more benefits, taxation and regulation). The Great Depression in the US famously unleashed both the Roosevelt New Deal interventions and massive protection. During the 1980s in continental Europe the rise of unemployment brought increased regulation of the labour market — for example reduced working hours — that reduced participation as well. At the same time we may also note that crises and very poor economic performance can trigger reform because voters suspend their normal voting patterns, so obviously atrocious has the general state of the economy become that it pays them more to restore its health than to gain a rent-seeking interest.

This sort of voting behaviour might suggest a model for change in the political equilibrium according to some indicator of general economic performance, say unemployment. We could assume that at very low rates of unemployment (good performance) the floating voters are predominantly capitalist, with little concern for unemployment (because prosperity has enhanced holdings of non-human capital and reduced the risk to human capital); at high but not catastrophic rates they are predominantly workers, with high concern (the risk to human capital has risen and holdings of non-human capital have been devalued); and that at catastrophic rates they switch from normal voting patterns to become concerned with maximising the general good. Suppose we focus on a representative supply-side issue, like the level and duration (overall 'generosity') of real unemployment benefits, B_t. This points to a model of change in B_t being a quadratic in the rate of unemployment, U_t, or say:

$$\Delta \ln B_t = \alpha(U_{t-1} - c) - \beta(U_{t-1})^2 \tag{21}$$

so that initially a rise in unemployment above some critical rate, c, would trigger demands for higher benefits; but as unemployment rose, the general good element would become more of a restraining factor, until ultimately voters demanded reform and benefits were cut. One could postulate similar mechanisms affecting other supply-side policies; for example the tax rate would tend to rise as benefit bills rose with intermediate unemployment, but be cut once the crisis had hit, while demands for regulations would tend to mirror demands for benefits.

If we combine this with a standard model of (long-term) unemployment, as set out earlier in this chapter:

$$\ln U_t = \sigma \ln B_t + U_0 \tag{22}$$

we obtain the interesting non-linear relationship:

$$\frac{\Delta U_t}{U_{t-1}} = \Delta \ln U_t = \sigma\alpha(U_{t-1} - c) - \sigma\beta(U_{t-1})^2 \tag{23}$$

or

$$U_t = (1 - \sigma c)U_{t-1} + \sigma\alpha(U_{t-1})^2 - \sigma\beta(U_{t-1})^3 \tag{24}$$

This is just an example of the sort of model one might use to simulate the tendency of the political equilibrium to add supply-side damage on top of a bad shock, perhaps from demand; producing a 'vicious circle'; but also of the phenomenon of drastic reform prompted by disaster that causes vested interests to set their narrow aims aside. Depending on how rapidly the economy improves after such reform, a virtuous circle can result as unemployment drops sufficiently for demands for restored benefits to disappear. What we are suggesting here is that good macroeconomic management has a crucial role in supporting good supply-side policy; just as earlier we saw that poor supply-side policy may create pressures for inflationary macroeconomic policies. There are intimate linkages through political economy between the two sorts of policies; and these links have the capacity to create both vicious and virtuous circles of economic performance.

CONCLUSIONS

In this chapter we have extended our discussions of macroeconomics outside the area of monetary and fiscal policy and the 'demand side', in which the natural rates of output and unemployment are taken as given by exogenous supply factors; and we have focused on the determinants of these factors themselves. We began by setting out a theory relating persistent unemployment (dominated by a large number of long-term unemployed) to the interaction of generous long-duration unemployment benefits with taxes and other labour market distortions, like union powers. We then looked at the determinants of growth and productivity, in the 'new theory' of endogenous growth that has been built on the Solow model. Finally, we reviewed some evidence that, paralleling the links from poor supply-side performance to inflationary policies discussed in chapters 5 and 8, there appear to be links from severe business cycle shocks to poor supply-side policies, the most notable example being the Great Depression. We suggested that political economy models could account for these links too, embodying the tension between voting along vested interest lines and voting, perhaps under conditions of crisis, along

lines dictated by general welfare. These models should be able to account for the phenomenon of vicious and virtuous circles in economies' behaviour generated by these linkages.