No Credit for Transition:
European institutions and German unemployment

John Driffill
Birkbeck College, University of London
and CEPR

Marcus Miller
Department of Economics and CSGR
University of Warwick
and CEPR

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Abstract
The Stability and Growth Pact, adopted by members of the European Union, imposes tight limits on government deficits. But since the collapse of Communism, Europe has been faced with the problems of economies in transition: and reunified Germany - the leading economy of the EU - combines a prosperous western state and an eastern economy in the process of transition. In a model where unions play a key role in wage bargaining and transition imposes a substantial burden on the national budget, we analyze the implications of balancing the budget for the path of unemployment. Where high but temporary costs are financed by raising taxes on employment to satisfy the Stability and Growth Pact, then the title is a misnomer: relative to a policy of "tax smoothing", the pact increases unemployment and slows growth. In designing fiscal rules for Europe, the benefits of tax smoothing must be weighed in the balance along with the virtues of fiscal discipline.

Keywords: Transition, Germany, EMU, instability, fiscal rules, unemployment.

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Address for correspondence:
John Driffill, School of Economics, Mathematics and Statistics, Birkbeck College, 7-15 Gresse Street, London W1T 1LL. Phone +44 20 7631 6417, fax +44 20 7631 6416, e-mail jdriffill@econ.bbk.ac.uk.
Marcus Miller, Department of Economics, University of Warwick, Coventry CV4 7AL. Phone +44 1203 523049, fax +44 1203 523032, e-mail ecsax@warwick.ac.uk

Introduction and Overview

To ensure fiscal discipline in the European Union, member countries have adopted the "Stability and Growth Pact" which imposes tight limits on government deficits. Since the collapse of Communism, however, Europe has been faced with the problems of economies in transition: and reunified Germany -- the leading economy of the EU -- combines a prosperous western state and an eastern economy in a costly process of transition. Could this be a case where restricting fiscal policy has unintended and undesirable consequences?

The fiscal rules of the Stability and Growth Pact (SGP) make no special allowance for the public investment in infrastructure and the social safety net for workers in transition[1]. With no further recourse to capital markets, current workers and businesses must bear the costs of such spending in the form of higher taxes. If transitional costs are inherently temporary, however, matching taxes and expenditure in this fashion violates the canons of tax smoothing designed to minimize fluctuations in employment. Wartime spending may be the classic example where borrowing is more efficient than raising taxes, Barro (1979), but the same principles apply in peace time: recourse to borrowing in international capital markets was a key feature of nineteenth century American development, for example.

[1] It is argued that if Germany were treated as a special case, others would claim similar treatment. This is to miss the point that what is special is not the country *per se* but the costs of the emergence from decades of communism. Note that, although the SGP allows deficits to exceed 3% of GDP in "exceptional circumstances", facing the costs of economic transition does not count among these "exceptional circumstances". This implies that such costs -- costs of investment in public infrastructure, transfer payments for workers in transition -- have to be met from current taxation.

In this paper we focus on Germany, which has had to cope with the economic transition of the Eastern part of the country from Communist planning to the market economy.[2] Since unification, Germany has been responsible for handling 8 million workers in transition. Despite pressure -- some of it coming from the German government -- to relax the provisions of the SGP, and despite the decision of the European Union in May 1999 to allow Italy to breach the SGP deficit limits, there is at the time of writing no such relaxation in prospect for Germany[3].

To analyze the implications of balancing the budget for the path of unemployment in Germany we employ a model in which unions play a key role in wage bargaining. In this context, we find that, if high but temporary costs are financed by raising taxes on employment, as under the Stability and Growth Pact, then the latter is a misnomer. Relative to a policy of "tax smoothing" the pact increases unemployment and slows growth.

Evidence of a highly significant and very large effect of labour taxes on the unemployment rate for countries in continental Europe is provided by Daveri and Tabellini (2000). (Their estimate of the impact of labour taxes on unemployment is about one third: i.e., a one-percentage point

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[2] In Central Europe, transition was marked by a U-shaped drop in output, which pushed unemployment rates above 10% and even higher and Aghion and Blanchard (1994) have analysed the economic forces that may have been responsible for the increased unemployment. While the aim of these authors has been to explain events in Poland, Hungary and other Central European states, we contend that they are also relevant for Germany where handling the transition has been the major domestic problem since Unification

[3] Indeed, in January 2002 Germany struggled to keep its projected 2002 deficit under the 3% limit and had to prevent automatic stabilizers from operating in the recession in order to do so. The European Commission debated how strongly to word a warning to Germany of the danger of breaching SGP limits ("Dilemma for eurozone enforcer as Germany struggles with deficit," Financial Times, 21 January 2002).

increase in the labour tax rate produces a third of a percent rise in the unemployment rate.) Detailed accounts of German labour markets and unemployment are to be found in Carlin and Soskice (1997), Siebert (1997), and earlier papers by Sinn and Sinn (1992) and Akerlof et al (1991). Analyses based on an econometric model are available in Barrell et al (1996) and Hughes-Hallett et al (1996).

Because this paper focuses on a specific aspect of the German situation, how restricting public borrowing affects the speed and stability of the reconstruction process, no explicit treatment is given here of an number of important issues which are dealt with in the references given above. These include capital investment, migration of workers from eastern to western Germany, or migration of jobs from Germany to countries to the East (Poland, the Czech Republic, Hungary, etc.).

To analyse the supply side, we adopt a bargaining framework with decentralised unions. Before transition, unemployment is in equilibrium when wages are low enough to induce firms to hire workers at the rate that jobs break-up. During transition, the rate of inflows into unemployment increases markedly. This increases the pool (and duration) of unemployment, reduces the bargained wage, and by this means speeds up hiring. However, higher unemployment also raises the burden of unemployment benefits and labour taxes used to finance them, which makes hiring less attractive to firms and slows the outflow from unemployment. Two key questions are whether the balance of these forces stabilises unemployment during transition; and, if so, at what level.

We first illustrate a relatively benign scenario where unemployment rises during transition, but

the rise is limited to a maximum of about 4 percentage points. We also find that, for plausible variations in parameter values, there could be a "vicious circle" in which rising unemployment increases taxes more than it reduces the bargained wage, so unemployment will keep on rising until the transition is over. (Higher rates of unemployment benefits and hysteresis effects make this scenario more likely.) We show that this cannot happen if there is appropriate "tax smoothing", i.e., where deficits increase during transition and fiscal sustainability is achieved by a small rise in the permanent rate of tax.[4] The objection that tax smoothing removes incentives to reform labour markets is considered later in the paper. Before specifying the bargaining model in detail, we present some evidence of the fiscal burden imposed by the process of transition in Germany.

Unemployment and the fiscal burden of transition in Germany

Employment fell very fast in the East after unification, from 8 million in 1991 to 6.25 million in 1992, and it has stayed below 6.5 million from then onwards.[5] Unemployment in the East shot up, to over 15% by 1992q2. As shown in table 1, unemployment in April of each year, measured as a percentage of the active population, subsequently reached a plateau of around 19 percent where it has remained since 1997. In the West, unemployment measured on the same basis rose steadily from 1992 to a peak of 11.0 percent in 1997. Since then there has been some

[4] The optimality of tax smoothing emerges from many widely-used intertemporal allocation models. See for example Blanchard and Fischer (1989), chapter 11, section 11.3, or Barro (1979).

[5] There has been no increase since 1995 and employment remained below 6 million in 2000. Note that some of the employment in the East is supported by large subsidies and represents employment in government funded schemes. The most dramatic falls in employment occurred in manufacturing industry, in which employment in the East fell from around 3 million before unification to just over 1 million afterwards, bolstered subsequently by subsidies and employment creating schemes.

recovery in West German labour markets so that by April 2001 unemployment was back to where it was in 1993.

Table 1. Unemployment rates in Germany

	1993	1994	1995	1996	1997	1998	1999	2000	2001
West	8.2	9.2	9.3	10.1	11.0	10.5	9.9	8.7	8.4
East	15.8	16.0	14.9	16.7	19.5	19.5	19.0	19.2	19.1
Germany								10.8	10.5

Sources: Federal Statistical Office of Germany. Figures for April of each year. Unemployment is measured as a percentage of the active population (dependent civilian employment). West is former territory of the Federal Republic. East is New Länder and Berlin-East.

The transfer payments to the East which initially amounted to over 50 percent of Eastern GDP have stabilised at around one third, as table 2 shows. Expressed as a percentage of Western GDP, these transfers have cost between 4 and 5 percent throughout the 1990s, and look set to continue on a similar scale for some time[6] .

Table 2. Transfers to East Germany

	1991	1992	1993	1994	1995	1996	1997	1998	1999
DM bn	106	114	128	126	140	140	136	141	n/a
% of GDP of West Germany	4.2	4.8	5.4	5.2	4.7	4.5	4.4	4.1	4.4
% of GDP of East Germany	51.5	42.9	39.6	34.4	35.2	33.9	32	n/a	33

Source: OECD Country Reports on Germany, August 1998, table 9, page 60, and May 2001.

Meanwhile, German public debt rose from about 40 percent of GDP at the end of 1991 to the 60 percent limit of the Maastricht treaty by the end of 1996. As table 3 shows, with deficits limited

[6]High subsidies to East Germany were forecast to continue into the current decade (OECD, 1997, page 14). The problems of ensuring that growth and prosperity in East Germany become self-sustaining, and do not permanently depend upon subsidies from the West have been discussed by Hughes-Hallett and Ma (1993) and Boltho *et al* (1997) among others.

by the provisions of Maastricht and the SGP, debt has stabilised around that level since then.

Table 3. German government debt and deficits

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
public debt, % GDP	40.3	43.0	46.9	49.3	57.0	59.8	60.3	60.7	61.0	60.7
net government lending, % GDP	-3.2	-2.8	-3.5	-2.6	-3.3	-3.4	-2.6	-1.7	-1.1	-1.0

Source: *Public Finances in EMU -- 2000*, European Commission, May 2000, tables A.1.3 and A.2.2. Debt figures for end of year. The figures for 2000 are Commission estimates. Net government lending is the negative of the deficit as a percentage of GDP.

Rising rates of social security contributions, partly the result of rising unemployment, have presented serious problems. In a survey reported by the 1997 OECD study, East German firms listed as their two foremost problems excessively high personnel costs and social security contributions that were rising too rapidly. Carlin and Soskice (1997) pointed out that unemployment benefits that exceeded 60% of former net earnings are available for 32 months, and subsequently unemployment assistance of over 50% of former net earnings is provided indefinitely. They calculate that, allowing for the reduction in personal taxes paid by those receiving benefits as a result of their reduced incomes, the effective net replacement rate for people on these benefits is between 70% and 80%; and, for people receiving social assistance rather than unemployment-related benefits, it is between 50% and 60%.

While high costs of social security contributions remain a problem, unit labour costs in East Germany are converging on those in the West. In 1996, for example, East German wages were 73% of those in the West, but productivity was 52%. By 2000, when East German wages had risen to around 77% of Western levels, productivity had risen to 68%, and unit labour costs in the East were 111.5% of those in the West (OECD, 2001).

The natural rate of unemployment in Germany: a bargaining model

Wage determination in Germany is dominated by the role of unions and employers federations in collective bargaining, which leads us to use a simplified bargaining model for wage determination. Interestingly enough, this leads to an equation for wages very similar to that of Shapiro and Stiglitz's (1984) model of efficiency wages, in which there are no unions. This formal similarity explains why the results we obtain below, for a country with strong unions, resembles those obtained by Aghion and Blanchard (1994) for transition in countries without strong unions.

We first consider the labour market in steady state, with a constant level of unemployment, and a steady flow of workers through the unemployment pool. (Before unification and the start of the transition process, this represents a steady state for the West German labour market. After the completion of the transition process, the labour market that is eventually in steady state is that of unified Germany.) Inflows into unemployment, arising from the break-ups of existing jobs and new entries into the labour market, are matched by hirings and exits from the labour market, due, for example, to retirement. We consider a world of constant returns to scale and for simplicity think of each firm as having only one job which produces output y from which the employer pays tax z and the worker receives wage w. Workers' utility is taken to depend on the expected present discounted value of being employed or unemployed as the case may be. Workers allow for the probability of shifting between states (employed, unemployed) when evaluating employment or unemployment.

Consider the value to a worker of being employed at wage w, when all jobs in the economy pay the same wage, real unemployment benefits are b, the hiring rate $h = H/U$, the exogenous rate of

break-up of existing jobs d, the interest rate equals r, and the effort level is e. Define this value as V_e. Over the interval of time $(t,t+dt)$, the employed worker receives wages wdt and expends effort edt. At the end of the interval she remains employed with probability $(1-ddt)$ and the present value of being employed is $(1-rdt)V_e$. She becomes unemployed with probability ddt with a present value $(1-rdt)V_u$. Then V_e satisfies the following arbitrage equation

(1) $V_e = (w-e)dt + (1-rdt)(V_e(1-ddt) + V_u\, ddt)$

in which V_u is the value of being unemployed.

The unemployed worker receives benefits bdt in the interval $(t,t+dt)$ and at the end of the interval remains unemployed with probability $(1-hdt)$ and becomes employed with probability hdt. Hence V_u satisfies

(2) $V_u = bdt + (1-rdt)(hdtV_e + (1-hdt)\, V_u)$

Multiplying out the terms on the right-hand side of (1), gathering up terms in V_e, ignoring terms in dt^2 since we consider the limit as $dt \to 0$, and dividing through by dt gives

$$(r+d)V_e = w - e + dV_u$$

The intuition for this expression, familiar from the analysis in Shapiro and Stiglitz (1984) for example, is that in equilibrium the total return from being in the employed state, rV_e, is equal to the flow return (the wage less the effort expended in earning it, $w - e$) plus the expected capital gain on moving to the unemployed state $d(V_u - V_e)$. Multiplying out the terms on the right-hand side of (2), and gathering up terms in V_u, once again ignoring terms in dt^2 and dividing through by dt gives

$$(r+h)V_u = b + hV_e.$$

Combining these expressions and solving for V_u gives

$$rV_u = b + (w - e - b)\frac{h}{r + d + h}$$

Consider now bargaining over wages between an individual worker and firm. For the economy as a whole, we denote the average wage as $\bar{w}$ and the value of being unemployed as $\bar{V}_u$. For the individual worker and firm, when they bargain over the wage, the value of unemployment will depend on the economy-wide average wage and not on the wage in the particular firm in which bargaining is being carried out. The value of employment in the individual firm at wage *w* is then

$$V_e = (w - e)dt + (1 - rdt)(V_e(1 - ddt) + ddt\bar{V}_u)$$

or

$$rV_e = r\frac{w - e}{r + d} + \frac{rd}{r + d}\bar{V}_u$$

and the difference in the value of being employed over the value of being unemployed for the worker is

$$rV_e - r\bar{V}_u = \frac{r}{r + d}(w - e - r\bar{V}_u)$$

Suppose that bargaining maximises the generalised Nash product

$$L = (rV_e - r\bar{V}_u)^a (y - z - w)^{1-a}.$$

Thus the worker is concerned with the excess of the value of being employed in the firm over the value of being unemployed. Implicitly, the disagreement payoff for the worker is the value of unemployment. The firm is concerned to maximise the surplus generated by having a job filled. For the firm, the disagreement payoff is a zero surplus. As vacancies are assumed to be

filled immediately, firms do not need to consider the present value of having a filled job. Their problem is a succession of one-period problems. The exponent a reflects the relative bargaining power of worker and firm. Then the bargained wage will reflect the level of benefits and effort, and also the hiring rate. It also reflects the level of taxes. Higher taxes lead to a lower wage (though not so much lower as to absorb all the taxes).

The maximisation implies

$$\frac{aL}{w-e-r\overline{V}_u}-\frac{(1-a)L}{y-z-w}=0$$

at an interior solution, or

$$\begin{aligned} w &= a(y-z)+(1-a)(e+r\overline{V}_u) \\ &= a(y-z)+(1-a)(e+b+(\overline{w}-e-b)\frac{h}{r+d+h}) \end{aligned}$$

In equilibrium when the wage in each firm equals the average wage, that is with $w = \overline{w}$, we obtain an expression for the bargained wage:

$$w=a(y-z)\left[1+\frac{(1-a)h}{r+d+ah}\right]+(1-a)(e+b)\left[1-\frac{ah}{r+d+ah}\right]$$

which is increasing in the hiring rate *h*.

Having developed a model for the level of real wages, we now turn to other aspects of the labour market, along the lines of Aghion and Blanchard (1994). The rate of hiring is assumed to depend on the profitability of new jobs, viz*., H = a(y-z-w)*, where *y* is the output produced from a new job, and *z* is the tax on employment (including both taxes and other non-wage costs such as employers' social security contributions).[7] Taxes are used to finance unemployment benefits:

[7]The important thing here is that the rate of job creation is increasing in the profitability of

there is no borrowing allowed. Thus $bU = z(1-U)$. This reflects the constraints imposed by the Stability and Growth Pact and ensures long run fiscal sustainability. It is of course stronger than necessary to achieve sustainability, which requires only equality of present values of taxes and spending less initial debt, an issue we return to when we consider tax smoothing. The growth of unemployment reflects the difference between inflows, which are due to jobs breaking up randomly at a rate d, and outflows, which are due to hirings, H.

The equations of this model are thus

(3) $$w = a(y-z)\left[1+\frac{(1-a)h}{r+d+ah}\right]+(1-a)(e+b)\left[1-\frac{ah}{r+d+ah}\right]$$

(4) $bU = z(1-U)$

(5) $dU/dt = d(1-U) - H$

and

(6) $H = a(y - z - w)$ for $(y - z - w) > 0$, zero otherwise.

Hirings H can be expressed as a function of unemployment U and the parameters of the model, as follows. Using (3) to substitute for w in (6), and after some simplification, we have

$$H = a(1-a)(y-e-z-b)\frac{r+d}{r+d+ah}$$

We now use (4) to express z as a function of b and U. That is $z = bU/(1-U)$. Inserting this expression for z in the above expression for H, and noting that $h = H/U$, we have:

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new jobs in Germany. The position of this function is affected implicitly by the competing possibilities of setting up new employment in Eastern Europe, although not treated explicitly here.

(7) $$H\left(r+d+a\frac{H}{U}\right)=a\left(y-e-\frac{b}{1-U}\right)(r+d)(1-a)$$

This describes a curve, shown as OF in figure 1. Note that the right-hand side of (7) tends to $a(y-e-b)(r+d)(1-a) > 0$ as U tends to zero. The left-hand side would tend to infinity as U trended to zero if H were to tend to a finite positive value at the same time. Therefore, for equation (7) to hold as U tends to zero, H must tend towards zero too. Thus the curve describing (7) is asymptotic to (0,0), reaches a peak for some positive level of unemployment, and falls back to zero for some higher level (<1). The locus for $dU/dt = 0$ is labelled PP in the figure. It intersects the vertical axis at $H=d$, and intersects the hiring locus at points A and B.

The stable equilibrium at A defines the natural rate of unemployment. In this model unemployment is involuntary in the sense that each worker would strictly prefer to be employed rather than to be unemployed, and the natural rate is sub-optimal. Moreover, the bargaining model implies that the equilibrium rate of unemployment is very sensitive to the ratio of benefits to net wages, i.e., the replacement rate, as our numerical simulations will show.

There is another, unstable, stationary state at B. But its existence is an artefact of imposing too tight a condition for fiscal sustainability (in the shape of period-by-period budget balance) as the following argument shows. Suppose the economy starts from the bad equilibrium at B. The government could achieve fiscal sustainability by imposing a constant tax rate $\bar{z}$ that would yield enough revenue in present value to cover benefits along the adjustment path and in the eventual steady state. The hiring curve equation (7) then becomes

(7') $$H\left(r+d+a\frac{H}{U}\right)=a(y-\bar{z}-e-b)(r+d)(1-a)$$

which is shown as OL in figure 2. It is clear that $\bar{z}$ will be much less than the tax rate needed to cover benefits at the bad equilibrium but somewhat greater than that needed to cover benefits at the natural rate U_N, viz., $bU_B/(1-U_B) >> z > bU_N/(1-U_N)$. The hiring curve (7') is now increasing in U for all positive values of U.

It is clear that there is now only one equilibrium, the stable equilibrium at U_N' ($> U_N$). The reason why there has been this slight increase in the natural rate is that taxes are higher than required to cover current benefits because of accumulated deficits, i.e., there is a form of hysteresis in the natural rate.

Transitional problems

Consider how the preceding analysis needs to be modified to take account of transition, i.e., to incorporate the supply side effects of German unification. Following Aghion and Blanchard (1994), we now take N to be employment in old, unreconstructed East German enterprises, E to be employment in West Germany or new enterprises in East Germany, and U to be unemployment in Germany as a whole, such that $U + E + N = 1$. We assume that the rise of wages in East Germany towards levels in West Germany, ahead of the rise in productivity in East Germany, has been causing old East German firms to shed jobs and make people unemployed at some constant rate, at least until wages have equalised and the process has come to an end.[8]

[Note that our arguments will reconcile the negative profitability of jobs there (at least on

[8]Of course, this would mean that the developments in wages, determined by other aspects of the model, affected the flow of workers into the pool of unemployed, and this is a link we have not introduced into our formal analysis.

average), with positive (gross) creation of new jobs in East Germany. East Germany contains both "new" high-productivity jobs and old low-productivity jobs. On average, productivity lags wages, but it is the excess of wages over productivity in low productivity "old" jobs which gives rise to the excess rate of shedding (*S*) in transition, while productivity in "new" jobs exceeds wages and stimulates the flow of gross hirings (*H*).]

Suppose this process of job-shedding causes a flow of workers into unemployment at a rate *S* in addition to the normal break-up of jobs at the rate d. (It would clearly be possible to make other assumptions, such as that the rate of job shedding in the East was proportional to the number of such jobs remaining, see Blanchard (1997) pages 122-4.)

The change in the unemployment rate is the inflow due to job shedding in the East plus the inflow generated by the breakup of existing jobs in both East and West, less the hirings into new jobs (in either East or West). Thus (5) above is now replaced by

(5') $dU/dt = S + d(1-U) - H$

How does this modification affect the analysis? Equation (7) is unchanged, but the additional inflows into unemployment S causes the *dU/dt=0* locus to shift upwards from PP to TT in figure 1. Providing that the inflow into unemployment (*S*) is not too high, there may still be two stationary states of the system, shown as A' and B'. The increased flows into unemployment imply that, during the transition, the stable equilibrium rate of unemployment rises from U_N to U_T. Consider for example transition beginning with unemployment at the pre-existing natural rate. Given the dynamics of the system, unemployment would rise towards U_T as long as labour shedding was taking place. After the end of the process of transition, the *dU/dt=0* locus shifts back to its original position and unemployment returns gradually to U_N -- i.e., there is no

hysteresis in unemployment as taxes cover benefits all times and no debt is accumulated.

The account presumes that taxes are raised to cover benefit costs. However, the data in tables 2 and 3 suggest that, in the period up to 1996, the German government was in fact willing to fund the cost of transition by borrowing. Transfers to the east were on average 4% of GDP, which -- if funded by borrowing, and allowing for nominal GDP growth -- would have raised debt by less than 4% per annum: as can be seen from table 3, the debt-to-GDP ratio actually grew by 4 percentage points per year on average between 1991 and 1996, more than accommodating the costs of funding transition. Note that since then the deficit has been cut and the debt to GDP ratio stabilised as required to satisfy the Maastricht criteria and the subsequent SGP.

Financing economic transition, which involves a temporary rise in public spending, is a particularly strong case for 'tax smoothing', i.e., moving away from period-by-period budget balance while still ensuring sustainability by (for example) choosing a constant tax rate to satisfy the government's inter-temporal budget constraint. The implications for unemployment of such tax smoothing – the policy apparently followed until 1996 -- are examined in figure 2. In this figure, the hiring curve that emerges under tax smoothing is depicted as the curve OL. The smoothed tax rate $\bar{z}$ is chosen so that over the infinite horizon the government's debt is bounded. Thus the debt accumulated during the transition period is held constant thereafter, the interest on it being met in the post-transition period by the government's surplus of tax revenue over current spending. With this tax rate $\bar{z}$, the steady state under transition is at point C'. When the budget is continuously balanced the steady state during transition is at A'. Clearly $U_{A'}$ is greater than $U_{C'}$. The reason is that function OL crosses OF between A and A' because the tax rate at the stationary point C' in transition with the constant tax rate is inevitably lower than the

tax rate at the stationary point A' when taxes match current benefits, and thus, profits are higher at C'.

Figure 2 may be used to analyse the consequences of the switch of policy in 1996, when budget balance causing the hiring function to switch from OL to OF. Consider, for example, how unemployment will respond, starting at the level U_S, where OL and OF intersect below TT. Unemployment will continue to increase, but faster and further under the balanced budget than otherwise. The data in table 1, which show unemployment higher in the late 1990s, are not inconsistent with this interpretation.

The case for tax smoothing is even stronger if there exists a vicious circle, in which rising unemployment forces up non-wage labour costs, increasing unemployment still further. This arises when the TT locus fails to intersect the hiring locus OF (see figure 3) and, without tax smoothing, unemployment would rise with no natural upper limit throughout the transition process[9] -- i.e., $dU/dt > 0$ so long as $S > 0$. With tax smoothing, however, there is an upper bound C' to the level of unemployment during the transition process, which exists no matter how large the rate of shedding S.

[9]For a prolonged transition, this could in principle lead to an irreversibility. Consider for example the case in which unemployment in the transition has risen above U_B. At the end of the transition, unemployment would then continue to rise as the system collapsed under the weight of growing taxes. While this is unlikely to occur in the German case, it does illustrate in extreme form the risks of balancing the budget in each period in a model with multiple equilibria.

Calibrating the Model

Parameter Values

We calibrate the model using the following parameter values. The real interest rate r is set at 5%. The rate at which jobs break up, d, is set at 10%, implying that jobs last an average ten years. Output per head, y, is normalised to 1. The unemployment benefit rate b is set so as to give a replacement rate (b/w) of roughly 60%, which is a conservative average figure for Germany, and a value $b=0.55$ has this effect. Effort (e) is set at 0.12. Given the values of the other parameters, a has been set equal to 2.25, and the relative strength of unions in bargaining a has been set to 0.375. This generates equilibrium unemployment of 6.91%, which approximately equals the average level of unemployment in Germany over the decade before unification, taken here to be the natural rate.

Thus in terms of figure 1, the intercept of the PP schedule is 0.10 and it crosses the OF schedule at U=6.91% giving an equilibrium hiring rate of 9.31% of the labour force. (These flows arise entirely out of the break-up of jobs.) The wage in equilibrium is 0.918, and the tax rate needed to cover unemployment benefits is only 4.08%.

Unemployment in Transition

What happens in the transition process? If labour shedding adds an inflow into unemployment (S) of 2% of the labour force per annum, the equilibrium unemployment rate rises from 6.91% to 11.55% as indicated by point A' in figure 1. So unemployment will rise towards that rate as long as shedding continues. But note that if unemployment goes up to 11.55%, the tax rate needed to finance benefits goes up from 4.08% to 7.18%. It increases sharply, as the elasticity of z with respect to U is $1/(1-U) > 1$. (Note that if the rate of shedding was as high as 3.5% of

the labour force there would be no equilibrium unemployment rate during the transition process, the vicious circle scenario corresponding to figure 3, where the hiring rate along OF at no point matches the inflow into unemployment TT.)

Tax Smoothing

The numerical effects of tax smoothing are given in figure 2, assuming S=0.02. The constant tax rate which would cover the present value of benefits would be slightly above the balanced-budget tax rate in the absence of transition (that at A), but less than the steady-state tax rate in a "permanent transition" process, i.e., that at A'. For the constant tax rate we use a value of $\bar{z}$ = 0.055, which leads to the hiring function OL[10]. Unemployment rises towards C' during the transition process, so the upper bound on unemployment in transition with tax smoothing is 10.75%, and it falls to C thereafter. (Note that the post-transition steady state unemployment rate at C has increased marginally to 7.3%.)

In the case of the vicious circle, there is no upper bound to the rise in unemployment during the period of rapid job shedding. But with tax smoothing, unemployment in the transition phase rises towards the level at C' (setting a maximum level of unemployment in the transition phase at just under 14 percent, as figure 3 shows.)

Effects of Supply Side Reform

The model of labour markets used here gives a prominent role to unemployment benefits,

[10]To be broadly consistent with the 4.6 point rise in the equilibrium unemployment rate during transition shown in the figure, the tax rate used to generate OL is increased so as to cover cumulated benefit expenditures on an extra 4.6 points of unemployment for a period of 12 years.

particularly given the high replacement rate and long duration of benefits in Germany. The converse of that is that modest reductions in the rate of benefits have a major effect on the economy and the transition paths. Benefit cuts have a direct effect of cutting the burden on the social security system and tax rates, and they have an indirect effect via a reduction in the bargained wage for a given unemployment rate. These effects speed up job creation and reduce unemployment, both in the transition phase and in the long run steady state, as can be illustrated using the calibrated model.

Table 4. Cuts in Unemployment Benefits
Panel A

unemployment benefit rate (b)	Steady-state unemployment rate	real after-tax wage rate (w)	replacement rate (b/w)	tax rate (z) needed to cover unemployment benefits
0.55	0.0691	0.918	0.599	0.041
0.53	0.0630	0.923	0.574	0.0356
0.50	0.0559	0.928	0.539	0.0296

In these simulations, the only form of government expenditure is on unemployment benefits. The parameters are chosen as in follows: a=2.25; y=1; r=0.05; δ = 0.10; e=0.12. This gives similar unemployment outcomes as in figures 1-4.

Table 4, Panel B

unemployment benefit rate (b)	Steady-state unemployment rate	real after-tax wage rate (w)	replacement rate (b/w)	tax rate (z) needed to cover unemployment benefits and other government expenditures
0.29	0.0818	0.498	0.583	0.462
0.27	0.0722	0.507	0.533	0.452
0.25	0.0652	0.513	0.487	0.445
0.23	0.0597	0.518	0.444	0.440

In these simulations, government expenditure per member of the labour force equal to 40% of full-employment GDP has been included. Gross output per person employed remains at y=1, the benefit level has been reduced to retain a net replacement rate of 50-60%, and the effort level needed to produce output has been reduced also to e=0. Other parameters remain unchanged: r=0.05; δ=0.10; a=2.25

In table 4, panel A, when the benefit rate is cut from 0.55 to 0.50 (measured as a fraction of gross output per person employed), the net wage rises from 0.918 to 0.928, the replacement rate falls from 59.9% to 53.9%, the tax rate needed to finance benefits falls from 4.1% to 2.96%, and the steady state unemployment rate falls from 6.91% to 5.59%. This implies a sensitivity of unemployment to replacement rates which may be somewhat larger than that found in practice, but it underlines the importance of benefits in a bargaining model.

We also include some illustrative calculations, which allow for the substantial element of government expenditure which is independent of unemployment benefits, equal to 40% of GDP -- a conservative estimate for Germany, but close to the OECD average. As taxes have to finance this and unemployment benefits, the parameter values are adjusted as follows. We cut the effort *e* needed to produce output to e=0, and we cut the unemployment benefit parameter *b* to 0.29*,* so that when net wages account for less than 60% of output per person, and when unemployment is roughly 8%-9% in steady state, benefits are 50-60% of the net real wage. As reported above in table 4, panel B, cuts in the benefits parameter (*b*) from 29% to 23% of gross output per worker lead to a rise in the net wage from 0.498 to 0.518, a fall in the net replacement rate from 58.3% to 44.4, a fall in unemployment from 8.18 to 5.97%, and a fall in tax rates from 49.8% to 44.0%.

These simulations underline the importance played by benefits as the determinant of the fall-back income level for workers who might be forced out an existing job. The logic of this analysis points clearly to the need for reform of the benefit system to speed up and cut the costs of transition. In practice, effective reforms need not be such blunt instruments as cutting benefit

rates. As has been observed in many countries, a shorter duration of benefits, and more rigorous administration of benefits with stiffer tests of availability for work and evidence of active search may have similar effects.

Further developments of the analytical framework that we use here are sketched the Appendix.

Incentives to reform labour markets

Some observers have argued that labour market reform is necessary for the success of EMU. Philippe Trainar, of the French Ministry of Finance, for example, in a paper largely devoted to praising the merits of the Pact (in von Hagen, 1997) adds "don't forget that its success, not only political but also technical, depends on the ability of member states to implement efficient employment policies". Those who believe that an unemployment crisis is needed to trigger labour market reform argue that if EMU, with its attendant fiscal rules, produces such a crisis, this will prompt the necessary reforms. This might be true if, for example, high transitional unemployment were to precipitate a shift in bargaining power towards firms and/or a marked reduction in benefit replacement ratios. In the model of wage bargaining constructed here, reducing the bargaining power of unions (a) and/or cutting the benefit level (b) would reduce the equilibrium wage rate and unemployment rate.

If, however, there is an element of hysteresis in unemployment -- through the long-term unemployed losing skills, for example -- the no-borrowing constraint may actually make the problem worse rather than better in the long run. Can this be shown in the model? If the loss of skills of the long-term unemployed is crudely represented as a lowering of the hiring function, i.e., a drop in the value of a from 2.25 to 1.5, then the outcome may be as in figure 4, where the

fall in *a* pulls the hiring function OF' below TT. This means that there is no upper bound during transition and that the natural rate post-transition rises from U_N to U'_N, a rise of roughly 5 percentage points.

What then might be the appropriate supply-side policy for transition? The costs and benefits of tax smoothing are indicated in table 5 below for two different scenarios: first with a low and constant natural rate and then with a higher natural rate -- and possible hysteresis. The first column spells out what we have seen in figure 2, namely that tax smoothing will check the bulge in unemployment during transition. If the pre- and post-transition equilibrium unemployment is low, so there is no need for any substantial labour market reform, the argument that a crisis in unemployment is needed to enforce change does not apply. Tax smoothing seems a sensible policy in this case.

Table 5. Fiscal Policy and Supply Side Reforms: Two Scenarios

	low natural rate	high natural rate (say 9%)
no tax smoothing	temporarily high but bounded unemployment	danger of instability -- the vicious circle
tax smoothing	lowers upper bound to unemployment	no instability, but some rise in the long run natural rate of unemployment

If, as in column 2, the natural rate was high *ex ante*, a hair-shirt fiscal policy that threatened even higher unemployment during transition could be just the trigger that enforces necessary reform. Mounting unemployment could decisively shift the balance of bargaining power away from unions towards firms, and could force retrenchment upon the welfare state. But this is a high-risk strategy, first because cutting benefits in the face of high unemployment is not politically attractive; and second because it may encourage the wrong kinds of reform (such as

job-sharing and restrictions on the length of the work week.). There is also the added risk of "shooting ones-self in the foot" if failing to check high unemployment leads to hysteresis effects without securing labour market reform, as was illustrated in figure 4 above.

The signalling incentives the SGP generates for fiscal policy in an equilibrium political fiscal cycle model have been studied by Le Borgne (1998) who finds, broadly speaking, that they encourage "competent" governments to undertake more reform and "incompetent" governments to do less[11]. So it is not clear that the pact will provide the right incentives. Using a different framework, Sibert and Sutherland (2000) also find that EMU reduces incentives to reform labour market institutions[12].

If rising unemployment under the SGP rules fails to bring about its own solution by triggering reform, and threatens on the contrary to persist through hysteresis effects, this constitutes a strong case for a two-pronged strategy for the German government: first negotiating with its European partners the right to check unemployment by tax-smoothing and secondly securing support for supply-side reforms from its social partners in Germany.

[11] Le Borgne extends a model of electoral cycles in government spending and taxation due to Rogoff by including debt as well as deficits. The effect of SGP restrictions is to make it more difficult for competent governments to signal their differences from incompetent ones. This has attendant welfare costs.

[12] In Sibert and Sutherland's analysis the benefits of labour market reform take the form of reducing the natural rate of unemployment and thus reducing the equilibrium inflation rate under discretionary policy making. Thus the benefits to reform are lower under EMU when the European Central Bank has solved the country's inflation problem.

Conclusions

The fiscal criteria of the original Maastricht Treaty and the "budget-balancing" rules of the current Stability and Growth Pact (SGP) are designed to ensure that fiscal profligacy will not threaten the Euro. This is a worthy objective, but we note that these particular fiscal rules do not allow for efficient financing of government spending which is unevenly distributed over time. Specifically we argue that the temporarily high government spending entailed by German unification -- and the ensuing transition from command to market economy – is best financed by tax smoothing and the fiscal rules should take this into account. It is, moreover, widely agreed that the SGP needs to take more adequate account of cyclical fluctuations, i.e. allow more room for fiscal stabilisers to work.

In light of these considerations, it is not surprising that Germany is finding it difficult -- if not politically impossible -- to abide by the current rules of the pact. Efforts to block their rigid application (by getting the Finance Minister to overrule early-warnings of deficit over-runs, for example) are threatening to undermine the credibility of the mechanism itself. (Similar issues may arise in the British context, where current government plans to double net public investment as a share of GNP in order to improve public infrastructure and the Chancellor "wants to finance most of the finance by borrowing, arguing that this is fairer than funding through taxation since it spreads the cost of works that will benefit people for many years to come", The Economist, February 9th, 2002, p. 27.) We believe that credibility of the Euro would be better served by fiscal rules that take more adequate account of the impact of business cycles and the needs for tax smoothing.

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Appendix

Possible extensions of the model

Benefits related to wages

Our analysis has already illustrated how sensitive outcomes are to policy changes in benefit levels. If the analysis is modified so that benefit levels are tied to wage rates, but policy can alter the replacement ratio, the sensitivity of outcomes to policy changes is greatly magnified. Consider what happens when the benefit rate b is made proportional to the wage, with $b = kw$, for $k < 1$, where k is the net replacement rate. An increase in k then has the same effect on the benefit rate at the initial equilibrium wage rate (w_0) as some fixed increase in b. That is, consider a change $dk = w_0 db$. Then the effect of the increase in k on unemployment (with b varying along with w) exceeds the effect of a fixed change in b (with k varying along with w).

Forward-looking hiring decisions

An obvious extension to the bargaining model used in the paper would be to allow for forward looking behaviour in the hiring decision. Aghion and Blanchard (1994) do this on the grounds that "even if current profits are high, many private firms, and especially foreign direct investors, will not invest if they expect conditions to deteriorate and profits to shrink in the future....", and *mutatis mutandis*. At first sight it may appear that this would undermine the argument that tax smoothing would aid transition, since both the government and the firm would be concerned about the same present value of taxes, whatever their timing. However, it is clear that firms will discount the future at a higher rate, because of idiosyncratic (but nevertheless undiversifiable) risks, such as those posed by labour turnover, combined with hiring, training, and firing costs. We have assumed a normal rate of labour turnover of δ (which at 10% far exceeds the real

interest rate of 5%) which will set a lower limit to the additional discount rate applied by firms to future profits. Thus forward-looking hiring will not undermine the dangers of transition or the benefits of tax smoothing.

Capital Accumulation and Growth

Our analysis has had to sacrifice explicit analysis of the role of capital accumulation in order to focus on other aspects of transition. Others, such as Canova and Ravn (2000), have given capital an important explicit role, but have abstracted from labour market imperfections. Daveri and Tabellini (2000) include dynamics of capital accumulation but do not focus on transition. Clearly a full analysis needs to embrace both aspects.

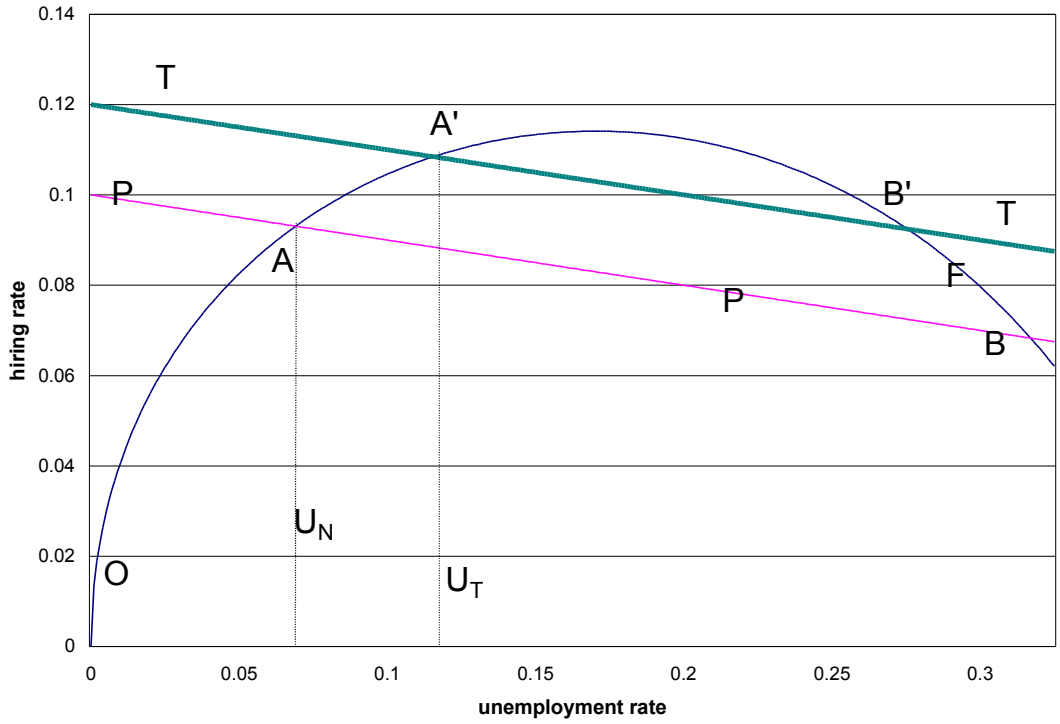

Figure 1. The Natural Rate of Unemployment and the Process of Transition.
Parameter values: a = 2.25; y = 1, e = 0.12; r = 0.05, d = 0.10; b = 0.55; a = 0.375.

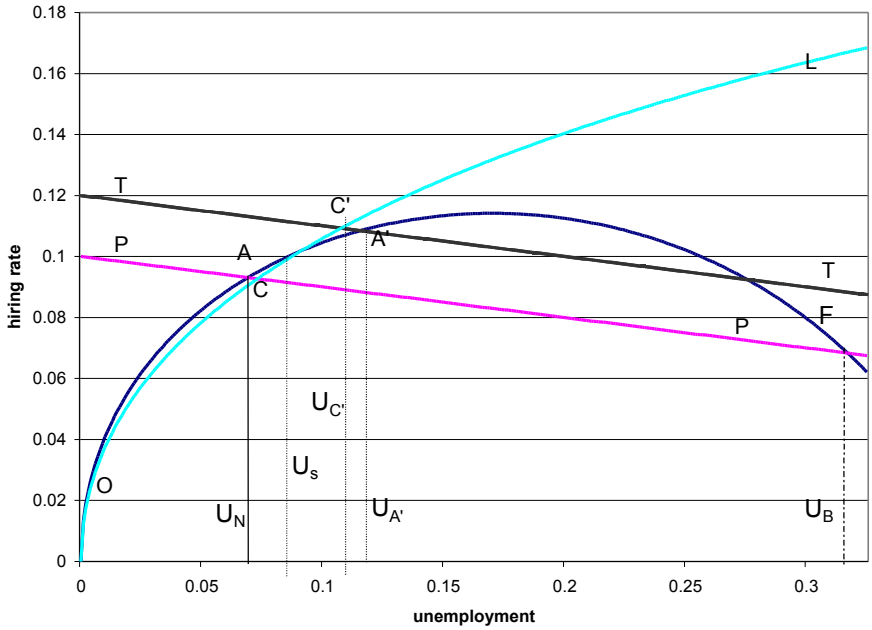

Figure 2. Transition and Tax Smoothing.
Parameter values: same as Figure 1, plus $\bar{z}$ = 0.055.

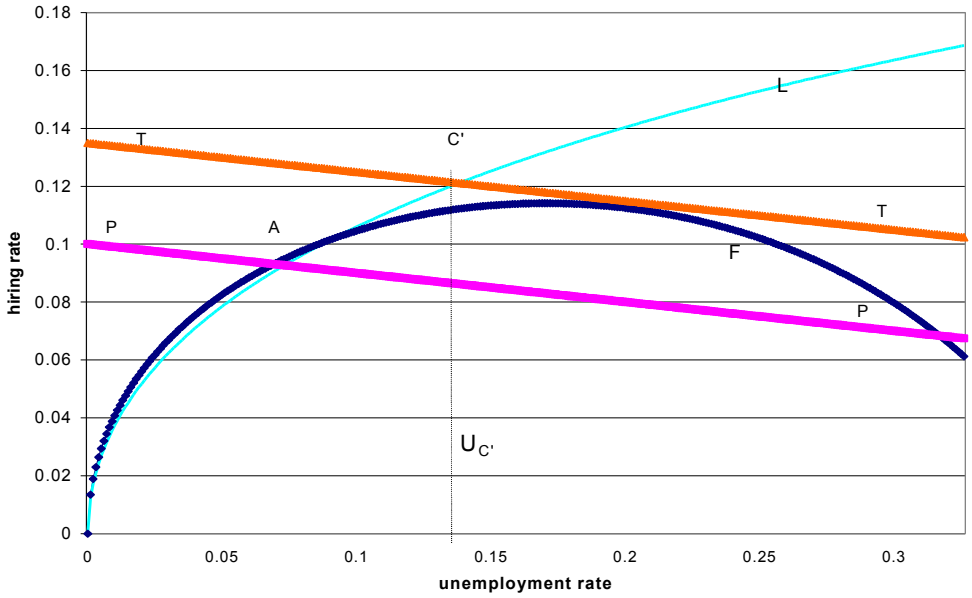

Figure 3. The Vicious Circle. Unstable transition with rapid job-shedding and possible tax smoothing. Parameter values: as in Figure 1, except S = 0.035, $\bar{z}$ =0.055.

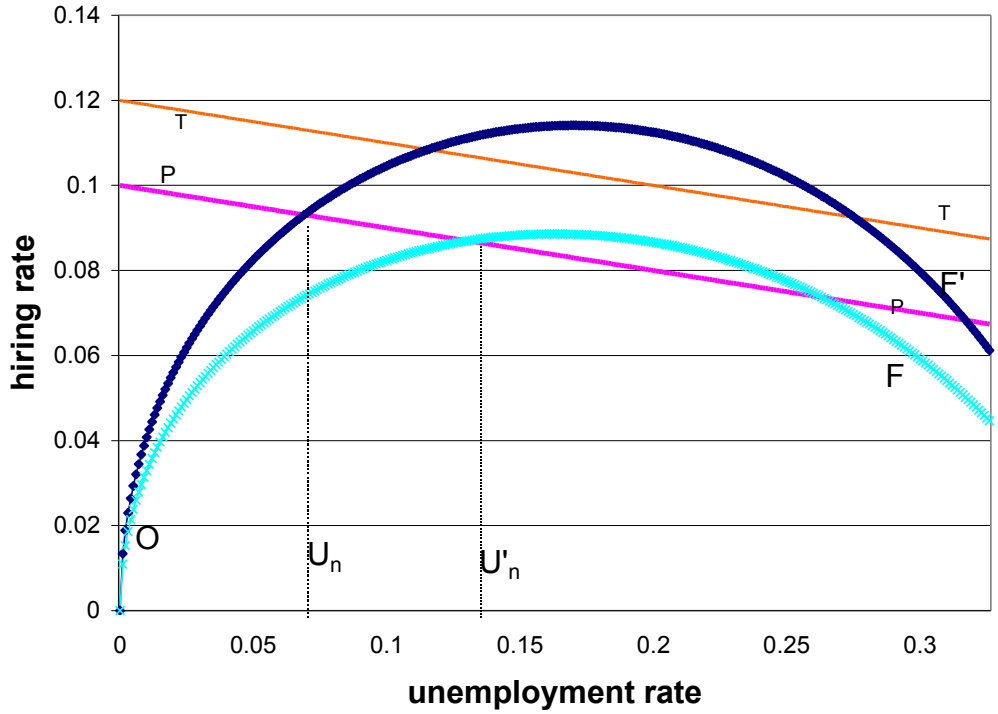

Figure 4. Hysteresis. A period of high unemployment which caused a fall in the subsequent hiring rate (a) would lead to a rise in the equilibrium unemployment rate. A fall in a from 2.25 to 1.5 causes the hiring function OF to shift to OF' and the equilibrium unemployment rate to rise from U_n to U'_n.