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CLASSICAL UNEMPLOYMENT, ACCOMMODATION POLICIES
AND THE ADJUSTMENT OF REAL WAGES

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Lars Calmfors and Henrik Horn

INSTITUTE FOR INTERNATIONAL ECONOMIC STUDIES
Stockholm University

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Institute for International Economic Studies
S-106 91 Stockholm
Sweden

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Lars Calmfors and Henrik Horn

Institute for International Economic Studies
University of Stockholm

Abstract

The paper develops a model of wage formation and stabilization policy in economies with centralized wage setting and strong trade unions. The aim is to explain the present stagflation with heavy unemployment and large government deficits. The analysis gives a theoretical underpinning to the assertion that accommodation policies may cause wage inflation and in the end reduce employment. Various methods of accomplishing a real wage adjustment are discussed: (1) a policy of complete non-accommodation; (2) continued accommodation policies but with lower employment targets (3) social contracts; and (4) tax-based incomes policies (TIP).

CLASSICAL UNEMPLOYMENT, ACCOMMODATION POLICIES
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During the last decade most European economies have experienced heavy unemployment and large government budget deficits. It is a common view that the unemployment is mainly classical, i.e. resulting from a real wage that is set above the full-employment level.¹ The aim of this paper is to develop a model that gives one possible explanation of why such a stagflationary situation has developed and to discuss various ways of achieving a downward adjustment of real wages.

A too high real wage may be a temporary phenomenon. With supply shocks that reduce the real wage consistent with full employment, downward stickiness of money wages may for a long time contribute to an excessive real wage. This calls for monetary expansion and devaluation of the currency, since the ensuing inflation will bring down the actual real wage (cf e.g. Sachs (1982)).

Another possibility is that a too high real wage is a permanent phenomenon that cannot be inflated away, except temporarily before wage agreements are revised. One common hypothesis set forth by e.g. the McCracken report (1977), Sachs (1979), Söderström and Viotti (1979) and Lindbeck (1983) is that government employment policies have been a major factor behind the post-war trend towards lower profit shares in the European OECD countries.² These employment policies have been unconditional in the sense that they have not only counteracted temporary demand disturbances but have also kept up employment in the case of wage disturbances.

Our focus is on this second possibility. We analyze how employment policies, by accommodating real wage increases, in fact are likely to reduce incentives for wage restraint. The emphasis is on the long-run

structural consequences of such accommodation policies, whereas short-run stabilization aspects related to temporary demand disturbances are neglected.

The analysis aims primarily at explaining macroeconomic developments in some of the smaller European economies, such as Sweden, Denmark, Norway, Finland, Belgium, the Netherlands and Austria. There the pursuit of full-employment targets has been especially strong during the sixties and seventies.

In order to catch the high degree of centralization in wage formation in these economies, we assume that all wage earners are organized in one all encompassing trade union. In order to stress the interaction between the trade union and the government we also adopt the so called monopoly union approach, originally developed by Dunlop (1944) and more recently used by Layard (1982), Oswald (1982) and Sampson (1983), according to which the trade union unilaterally sets the real wage but leaves the employment decision to firms.³ As in Söderström & Viotti (1978), Calmfors (1982) and Sampson (1983), employment policies are assumed to take the form of direct increases in public sector employment, which conforms to actual developments in these economies.

The paper is structured as follows. Section 1 presents the basic model. Section 2 analyzes the effects on the real wage and employment of government employment policies under different assumptions about trade union perceptions. Section 3 discusses various methods of achieving a real wage adjustment that permits a return to macroeconomic equilibrium.

1. The Model

Consider an economy with a private and a government sector. Both sectors use labor, which is variable, homogeneous and mobile between sectors. All other factors are fixed. The marginal productivity of

labor is assumed to be positive and decreasing in both uses. There are two types of individuals: capitalists and workers. Workers are either employed or unemployed. Workers receive only labor income when employed and only a government-paid unemployment benefit when unemployed. Capitalists receive all profits in the private sector as their only income.

The private sector consists of perfectly competitive firms that maximize profits given the price of private goods (which is set at unity), the wage rate and a lump-sum tax. Provided that firms maximize profits individually, we have a conventional labor demand function $N = N(w)$ with $N_w < 0$, where w is the real (product) wage. For convenience we assume that $N_{ww} = 0$.

The output of the government sector is distributed to all individuals free of charge, in equal quantities. These services are produced with a unitary labor input requirement per unit of output; hence, the number of government sector employees G refers both to the input and the output of the sector.

Workers in the government sector are paid the same wage as in the private sector. The government also pays out a fixed (untaxed) unemployment benefit b to those unemployed (the total number of workers M less those employed E). Lump-sum taxes are paid both by employed workers and capitalists. Capitalists together pay T^C . Each employed worker pays τ and total taxes on workers are therefore τE . The difference between government outlays and total tax incomes gives the government budget deficit:

$$D = wG + b(M-E) - T^C - \tau E. \quad (1)$$

An individual derives utility from consumption of both private and

government goods. The utility function is identical across individuals and additively separable in the two goods. Labor in itself is no source of utility or disutility. The number of hours each individual works is institutionally fixed, so that when employment (in hours) is below the market-clearing level, it is rationed in such a way that an individual is either employed or unemployed. Therefore the probabilities of being employed and unemployed equal the shares of employed and unemployed in the total labor force respectively. Workers spend all their income on private consumption. The private consumption c of an employed worker therefore equals after-tax income $w - \tau$ and that of an unemployed worker the unemployment benefit b . We impose the restriction that $w - \tau > b$ always, since otherwise all workers will prefer to be unemployed. Letting V denote the utility function for consumption of private goods, and Z the corresponding function for (per capita) consumption of public services, the expected utility of an individual worker is

$$\begin{aligned} U &= \frac{E}{M} [V(c) + Z(G)] + \frac{M - E}{M} [V(b) + Z(G)] = \\ &= \frac{E}{M} [V(w - \tau) + Z(G)] + \frac{M - E}{M} [V(b) + Z(G)] \end{aligned} \quad (2)$$

with $V_c > 0$, $V_{cc} < 0$, $Z_G > 0$, and $Z_{GG} < 0$.

The same trade union organizes all workers. Like Oswald (1982) and Sampson (1983) we assume that the union acts as a monopolist in the labor market, and sets the wage so as to maximize the unweighted sum of expected utilities of workers. The trade union thus maximizes expression (2), which we can write in the general form $U = U(w - \tau, G, E)$, for constant M and b .⁴

The trade union's utility function can (given τ and G) be represented by a set of indifference curves in the wage-employment plane as in Figure

1.⁵ As shown by Oswald (1982) and Calmfors (1982), they must be convex provided that the V function has the usual properites.

The total demand for labor is equal to the sum of private and government demand: $E = N(w) + G$. Given G , we can also draw a labor-demand schedule $\underline{EE}$ in Fig. 1. The schedule is kinked where the wage becomes so high that all demand for labor from the private sector disappears, and only the demand from the government sector remains.

If the trade union takes τ and G as exogenous and thus as independent of its own actions, it solves its maximization problem by equating the marginal rate of substitution between wage and employment with the slope of the labor demand curve. If indeed government demand for labor would remain unaffected by any wage increase, the trade union would obviously choose an infinitely high wage rate driving the private sector out of existence. We rule out this case and restrict the analysis to cases where both sector produce.⁶ Furthermore, we consider only interior solutions, even though corner solutions in principle are possible. In Fig. 1 the optimum is thus given by the tangency point I.

In the following a specific time structure is imposed. We assume that the trade union has to set the wage for the next period in advance on the basis of imperfect information: it has to form expectations about government policy parameters. The government, however, is free to act whenever it likes. It can change its policy parameters also during the period of a wage contract. We assume that this advantage always makes it possible for the government to act on the basis of perfect information about the wage rate.

The government's behavior should ideally be derived from explicit optimization. However, there does not exist any satisfactory formalization of government preferences, although attempts have been made e.g.

by Gylfason and Lindbeck (1982) and Hersoug (1983). Instead of postulating an ad hoc preference function, we state directly a reaction function that in our view fits well with actual behavior of most European governments.

The government is assumed to set a target $\tilde{G}$ for the size of the government sector. But government employment is varied around this target for employment reasons. If total employment threatens to deviate from the target $\tilde{E}$, employment in the government sector is expanded above or reduced below $\tilde{G}$. Following Calmfors (1982), Calmfors & Horn (1983) and Driffill (1983) we assume a simple "leaning-against-the-wind" policy rule, according to which a certain fraction of the unemployment that would emerge without employment policies is eliminated:

$$G = \tilde{G} + \gamma(\tilde{E} - \underline{E}) \text{ where } \underline{E} = \underline{E}(w, \tilde{G}) = N(w) + \tilde{G} \quad (3)$$

$\underline{E}$ is the employment level that would result without employment policies, when government employment is fixed at $\tilde{G}$. The stipulated policy rule hence gives a simple representation of employment policies, where the parameter $0 \leq \gamma \leq 1$ measures the degree of "activism".

Equation (3) and $E = N(w) + G$ imply:

$$E = \gamma\tilde{E} + (1 - \gamma)[N(w) + \tilde{G}] = \gamma\tilde{E} + (1 - \gamma)\underline{E}(w, \tilde{G}). \quad (4)$$

Actual employment E thus becomes a weighted average of the government employment goal $\tilde{E}$ and the employment $\underline{E}$ that would arise without government interventions.

The government policy rule is illustrated diagrammatically in Fig. 1 by the EE -line. The policy rule makes employment less sensitive to changes in the real wage and thus pivots the original employment curve $\underline{EE}$ around the point at which $\underline{E} = \tilde{E}$.

Finally a word about the interpretation of the model. The model is neoclassical in the sense that the real wage uniquely determines output in the private sector. Since all incomes are assumed to be consumed, total private consumption amounts to $Q + wG + b - T^C - \tau E$, which differs from output of the private good Q if there is a government budget deficit or surplus.

There are two possible interpretations of this. We can regard our model as a model of a small open economy, with private goods corresponding to tradables and government goods to non-tradables. The counterpart of a budget deficit is then a trade balance deficit, with net imports of foreign tradables making up for any excess demand for domestic tradables. The government - as opposed to the private sector is then assumed to have the opportunity of issuing debt abroad as in Helpman (1977), Calmfors (1978) or Rødseth (1979). The second interpretation is to regard our model as describing a closed economy. In a real model such as ours one then has to assume that the government runs a buffer stock of private goods, which is decreased or increased depending upon whether the government budget shows a deficit or a surplus. With both interpretations, market equilibrium in the market for a private goods is ensured.

2. The Effect of Employment Policies

We shall discuss the effects of government accommodation policies under three sets of assumptions about trade union behavior: (1) the trade union does not foresee the employment policy rule; (2) the trade union has learnt about the government policy rule but is myopic and does not take future periods into account; and (3) the trade union perceives the government policy rule and makes a full-fledged inter-temporal optimization.

2.1 The "Incomplete Information Case"

We start with the case where the trade union does not perceive the government policy rule but instead takes the level of government employment as exogenous. Suppose that the government announces that government employment will be set at its target value $\tilde{G}$, but that it does not disclose the employment policy rule. Suppose furthermore that the tax on employed workers τ and the unemployment benefit b are constant and known to the trade union. The trade union then optimizes just as if all policy variables were exogenous and the policy rule did not exist. It chooses the wage rate w_I that equates the marginal rate of substitution with the slope of the employment curve for a level of government employment equal to $\tilde{G}$ (the EE -line in Fig. 1).

Whether or not this situation represents an equilibrium depends upon whether the resulting employment level coincides with the government employment target or not. Assume that it does, i.e. assume that the government accepts the employment level chosen by the trade union. There is then no need for further policy action according to the policy rule and point I will be an equilibrium. Since the policy rule is not perceived by the trade union, it does not affect the equilibrium of the economy. The trade union's expectations about government policy parameters are fulfilled (albeit for the wrong reason), and the equilibrium is therefore denoted an "Incomplete Information" (II) equilibrium.

If instead the employment chosen by the trade union does not coincide with the employment target of the government, the employment policy rule will come into play. If the government regards employment as too low, it will expand the government sector. This will cause the trade union to choose a higher wage which in turn will induce new policy reactions etc. But also in this case there exists an II-equilibrium as

shown by Calmfors and Horn (1983). It will be characterized by larger government employment than $\tilde{G}$ and hence both the wage and total employment will be larger than without an employment stabilization rule.

Below we shall restrict the analysis to the first case when the employment target of the government coincides with the employment level that would have been chosen by the trade union in the absence of an employment policy rule. The conclusions on the effects of perceiving the employment policy rule, however, apply also to the case when the employment targets differ.

2.2 The Stackelberg Case with a Myopic Trade Union

Assume now that the trade union has learnt about the employment policy rule and takes it into account when optimizing. In general the outcome now depends upon how the trade union evaluates a present government budget deficit or surplus. In this section we assume that the planning horizon of the union covers only the present period and that the union therefore neglects future effects of present government deficits.

In terms of Fig. 1 the trade union now optimizes against the steeper employment curve EE, which takes the endogenous employment responses of the government into account. Moreover, we now also have to draw a new set of indifference curves that take into account that government output and thus consumption of the government good depends upon the wage. These curves will be flatter than the indifference curves drawn for a given level of government output. The reason is that since an increase in the wage triggers off an increase in government production, a larger decline in employment is required for utility to remain unchanged than when output is regarded as given.⁸ Both the steepening of the labor

demand curve and the flattening of the indifference curves tend to raise the wage rate. The new equilibrium corresponds to a Stackelberg equilibrium, being the result of the union's (the leader's) optimization against the government's (the follower's) reaction function.

The higher wage means that employment is lower in the Stackelberg equilibrium than in the II-equilibrium. By reducing the "price" of wage increases in terms of lost employment, the employment stabilization rule induces the trade union to raise the wage. If government employment policies make up for only part of the loss in private employment, total employment must fall. To avoid this, the government would have to even out all variations of employment from its target $\tilde{E}$, i.e. set $\gamma = 1$ (in which case the EE-curve would become vertical). But with the assumptions made so far, such a policy would be unfeasible, since the rational union would then raise the wage without limit.

It is also easy to see that the Stackelberg equilibrium must entail a deterioration of the government budget position as compared to the II-case. This follows for three reasons: (1) the wage rate has increased from w_I to w_S , which increases the wage bill for a given government employment level; (2) government employment has increased by $E_S - E_I$; (3) total employment falls from E_I to E_S , which decrease tax incomes and increases the costs for unemployment benefits.

2.3 The Stackelberg Case with Intertemporal Optimization

The analysis above did not take any future welfare losses from a present government deficit into account. Such losses will arise if a budget deficit today is matched by lower government expenditure or higher taxes in the future that negatively affect future after-tax wages and employment possibilities for the members of the union.

With a longer planning horizon the above analysis holds exactly

only if the trade union does not at all realize that present budget deficits constitute a burden for the future, or if it believes that this burden can be completely shifted on to future generations that the present one does not care about or on to the capitalists.

Let us now consider the opposite extreme of a complete intertemporal optimization, where the trade union takes the full burden of a present budget deficit into account. Assume that there are two periods and that the trade union's intertemporal preferences can be represented by an additively separable utility function

$$B = U(v - \tau^1, G^1, E^1) + \frac{1}{1 + \delta} U(w - \tau^2, G^2, E^2), \quad (5)$$

where v and w are the wages in periods 1 and 2, respectively, δ is the rate of time preference and superscripts denote the time period to which the variables pertain.

It is in this case simplest to make the open-economy interpretation and assume that the government can cover a deficit through foreign borrowing at a given world rate of interest r . The intertemporal budget constraint of the government is then

$$(1 + r)D^1 + D^2 = 0 \quad (6)$$

where D_t is the budget deficit in period t as given by (2).

The optimization problem of the trade union now is to choose the wage rates in the two periods (v and w) that maximize the utility function (5) subject to the employment equations

$$E^1 = \gamma \tilde{E}^1 + (1 - \gamma) \underline{E}(v, \tilde{G}^1) \quad (7)$$

and

$$E^2 = \gamma \tilde{E}^2 + (1 - \gamma) \underline{E}(w, \tilde{G}^2) \quad (8)$$

The outcome of the optimization depends upon how a first-period

government budget deficit is paid for in the second period. Leaving aside the case when it is financed by an increase in the tax on capitalists, there are four possibilities: (1) an increase in the tax on employed workers τ ; (2) a decrease in the unemployment benefit b ; (3) a reduction in the target for government employment $\tilde{G}$; or (4) a reduction of the employment target $\tilde{E}$.

In the appendix we analyze the case where the tax on employed workers is raised in the second period. But the general principles of the solution apply also to the other cases. To simplify, we assume that the government employment targets in both periods coincide with the employment levels that would have been chosen by the trade union in the absence of an employment policy rule.

What turns out to be crucial is how the government's target $\tilde{G}$ for the size of the government sector has been set. One can compute the values of government employment that are optimal for the trade union in the two periods given the intertemporal budget restriction and the employment equations. If the trade union perceives the policy rule, wage rates in both periods will increase relative to the II-equilibrium if the government's target for the size of the public sector is smaller in one period and not larger than the trade union optimum in the other. The intuition is simple. If the above conditions are met, the trade union makes a utility gain from an increase in government employment. A wage increase triggers off such an expansion of the government sector and hence an incentive is created to raise wages. Since the marginal utility of consumption is declining, it will always pay to increase the wage rate in both periods.

Myopia on part of the trade union is thus not necessary for the conclusion that a perceived employment policy rule may cause stagflation. The possibility exists also in a framework where the trade union

has to face the costs of the employment policies.⁹

2.4 Interpretation of the results

To what extent do our results catch vital aspects of reality? One interpretation is that the unproblematic case with unanticipated employment policies captures an essential aspect of the early postwar period when governments were quite succesful in pursuing employment targets without causing wage inflation. The case of a myopic trade union exploiting the government's willingness to accommodate real wage increases may correspond to the late sixties and to the seventies when there still was little awareness of the costs of government budget deficits. But one should expect the present deficit problems in many countries to lead to an increasing understanding about these problems. If so, the intertemporal model may become increasingly relevant. But, as we have shown, accommodation policies will also in such a framework cause a stagflationary situation, if the trade union favors a larger public sector than the government.

3. Methods of Restoring Equilibrium

The subsequent analysis starts from the assumption that the employment stabilization rule has caused the economy to end up in a situation like S in Fig. 1. We discuss four different policies that aim at restoring macroeconomic equilibrium: (1) non-accommodation without any attempts at employment stabilization; (2) continued accommodation policies but with a lower employment target; (3) a social contract; and (4) a tax-based incomes policy. The analysis could be performed within an intertemporal framework, but our points are most clearly illustrated in a one-period set-up. It is assumed that the government aims at increasing employment and reducing budget deficits; the ultimate goal being a return to the original equilibrium at I, where the government budget is supposed to balance.

3.1 Non-accommodation

A first possibility for the government is to stop accommodating the higher wage w_S and instead opt for a policy of strict non-accommodation. This amounts to setting $\gamma = 0$, so that the true reduced-form labor demand function becomes identical to the one that was perceived by the trade union in the II-case.

The problem with this policy is that an announcement of non-accommodation may not be credible. The union may simply not believe that an announced shift to a non-accommodation policy will take place. It may believe that the government is merely trying to talk the trade union into a lower wage rate, but that policy makers will in fact continue the earlier accommodation policy. If so, the trade union will not change its behavior but will continue to set the wage rate at w_S . This confronts the government with a difficult dilemma. It can follow its announced intentions and abandon the accommodation policy. Then the economy will end up at T with employment falling from E_S to E_T . But it is also conceivable that although the government prefers I to S , it may still prefer S to T when I cannot be reached. Then it might after all feel compelled to continue its earlier policy. But if this occurs, the trade union's disbelief in the announced policy intentions of the government is strengthened. This undermines the credibility of future policy declarations and tends to "lock in" the economy at the disequilibrium position at S . To convince the union that the government means serious business, there seems in such a case to be no other possibility than to accept a period of temporary unemployment if the non-accommodation policy is to succeed. Such a demonstration recession could then be seen as an investment in the reputation of the government.¹⁰

The worst outcome in this case is if the economy is caught in a "credibility trap" with heavy unemployment, where the government waits for the union to adjust and the union waits for the government to abandon the non-accommodation policy.¹¹ This could be avoided if the government could somehow precommit itself to the policy. If we make the open-economy interpretation of the model, this would e.g. be the case if the country had accumulated so much foreign debt that further borrowing abroad were to be made conditional on certain domestic policies.

3.2 An accommodation policy with a lower employment target

A second possibility is to continue accommodation policies but to lower the employment target around which the employment stabilization take place. Such a policy shifts the actual employment curve parallel to the left from EE to say E'E' in Fig. 2. If the trade union perceives this new policy rule, it will reduce the real wage, but employment will then also fall. If the employment target is reduced so that the size of the public sector is restored at the original level $\tilde{G}$ that prevailed at I, the new equilibrium is at B along the EE-line. But if the government budget was balanced at I, B still involves a government budget deficit; since employment is lower than at I, tax incomes are smaller and the costs for unemployment benefits larger. To restore budget balance, the employment line must be shifted even further to the left which reduces the equilibrium level of employment even further.

This policy of continued accommodation around a lower employment target meets in principle the same credibility problem as the non-accommodation policy above. If the trade union does not believe a policy announcement that the employment target has been lowered, it may continue to set the real wage w_s .

Comparing the equilibrium outcomes with perfect information of the non-accommodation policy and the accommodation policy with a lower employment target, the latter is clearly inferior for both the government and the trade union: employment is lower at E than at A and the trade union ends up with a lower utility level.

3.3 A social contract

An alternative to a non-accommodation policy is some kind of incomes policy. One route that is often discussed, especially in the smaller European economies, is the possibility of a social contract. In our model such a contract would mean a mutual agreement between the government and the trade union about the wage rate and the size of the government sector. We shall investigate whether there exists such a cooperative equilibrium. Since we do not specify a government utility function, we impose the restriction that such a social contract must both reduce the government budget deficit and bring employment closer to the government target as well as increase trade union utility.

We begin by considering a case where the marginal utility of consumption of government goods is zero (Fig. 3). As before the EE-line is the demand schedule when government policy responses are taken into account. The E'E'-line depicts the labor demand schedule that arises if government employment is held constant at the level that it has in the Stackelberg equilibrium. The government budget deficit is clearly reduced when we move south-east along the E'E'-curve: the decrease in the wage rate reduces the government wage bill and the increase in total employment reduces the costs for unemployment benefits and increases tax income. C, at which employment is at the target value $\bar{E}$, thus implies a smaller budget deficit than S. It is also easy to realize that a horizontal movement to the right from S causes an increase in the government budget deficit. Such a movement can occur

only if government employment is increased. The resulting expenditure increase must always be larger than the increase in tax revenue and reduction in the costs for unemployment benefits that follow from the increase in employment, as long as the after-tax wage $w - \tau$ exceeds the unemployment benefit b . Consequently, a budget deficit of the same size as at S must occur at a point like D lying somewhat between F and C . B^S_B passing through S and D is the locus of such points.¹² In a similar way the B^I_B -curve passing through I is the locus of points with a balanced government budget.

It is clear that the government would prefer to move from S to any other point in the SDIG area. Such a move reduces the budget deficit and/or increases employment. The trade union will prefer any other point to S that lies above the indifference curve passing through this point. Thus there exists a set of wage-employment combinations that are superior to the Stackelberg equilibrium S for both the government and the trade union (the cross-hatched area SDH). One such point is C . Instead of following the employment policy rule, the government could offer the trade union to maintain the same government employment as in S in exchange for a wage reduction to w_c , in which case the economy ends up at C . Such a social contract would benefit both parties. Trade union utility is increased because government employment is increased above the level it would have according to the policy rule. The government benefits because employment is increased and the budget deficit lowered.

Similar offers could be made with respect to any point within the SDH area and may even involve an increase in government employment above the level in S if the negative budget effects of this are outweighed by the budget effects of higher employment and a lower wage rate. A social contract of this type may hence succeed in bringing

employment back to its target value. But, it will not succeed in restoring a balanced budget (the B_B^I line does not pass through the cross-hatched area).

The analysis becomes somewhat more complicated if we assume that government goods have positive marginal utility. But, as shown in the appendix, the conclusion that there exist social contracts that benefit both the government and the union remains (even though the set of such contracts is smaller, the higher the marginal utility from consumption of government goods). It is also still the case that the social contract will not permit a balanced government budget to be restored, although it permits a return to the target level of employment.

3.4 A tax-based incomes policy

Another type of incomes policy is a tax-based incomes policy (TIP).¹³ An idea put forward in the US and British discussion has been to create incentives for wage restraint through a tax on employers: by introducing a tax on wages (wage increases) above a certain norm, it should be possible to achieve a downward adjustment of wages (wage increases) without the use of demand management policies (cf. Layard (1982) or Seidman (1978)). These proposals, however, presuppose decentralized wage setting in order to produce the desired results. They will not work in the case of centralized wage setting, as we shall show.

Consider first a case where firms have to pay tax at a rate t on that part of their wage bill that corresponds to wages in excess of the II-equilibrium wage w_I . The cost per worker then becomes $w + t(w - w_I)$ for $w > w_I$, and the private sector's labor demand function becomes

$$N = N[w(1 + t) - tw_I] \quad \text{for } w > w_I \quad (9)$$

If the government sticks to its policy rule for government employment, actual employment is given by:

$$E = \gamma \tilde{E} + (1 - \gamma) \left\{ N[w(1 + t) - tw_I] + \tilde{G} \right\} \quad (10)$$

The effect of the TIP is increase the sensitivity of employment to changes in the wage, i.e. to flatten the actual employment curve above I. If we consider the case with zero marginal utility for government goods, it is obvious that to create an incentive for the trade union to return to w_I again, the TIP must rotate the employment curve in Fig. 1 for $w > w_I$ so much that it coincides with the non-accommodation case (the actual employment curve is then given by the EITE-schedule). But, of course, nothing is gained by such an operation. The same transitional problems may arise as in the non-accommodation case. If the trade union does not believe in an announced TIP and continues to choose w_S in Fig. 1, the economy is again caught in a credibility trap at T. But the composition of employment will be different. Since the TIP raises the cost per worker, it lowers private sector employment and, though the policy rule of the government, increases government employment relative to the non-accommodation case.

To avoid the "non-accommodation consequences" of the TIP, one could consider to combine the tax on wages above a certain norm with a general tax rebate. This is indeed the proposal by Layard (1982). He suggest a general tax rebate s on the total wage bill, where s should be chosen so that the TIP is fiscally neutral. In our case this means that the rebate should be chosen so that $sw = t(w - w_I)$. The cost per worker for the firm then becomes $w + t(w - w_I) - sw = (1 + t - s)w - tw_I$. In a decentralized system with many trade unions bargaining with many firms, as analyzed by Layard, the individual trade union will take s as an exogenous variable that does not depend upon its own wage decision.

But such a tax-cum-rebate policy will work in a centralized setting only as long as the trade union does not perceive the link between the tax and the rebate. As soon as it does, it will realise that the cost per worker ex post always is $w + t(w - w_I) - sw = w$. The perceived labor demand schedule is then unchanged, and the trade union has therefore no incentive to change its behavior.

However, one could also conceive of another type of TIP that is directed at workers instead of employers. This is the form of TIP that has usually been suggested in countries with centralized wage bargaining (cf. Hansen (1958) for the earliest proposal). The idea of these proposals is to use variations in after-tax wages instead of in employment as a sanction against too high wages.

In our model, the tax t paid by workers could be made conditional on the wage chosen by the trade union. Suppose that a tax rule is introduced, according to which $\tau = \tau(w)$ for $w > w_I$ with $\tau_w > 0$. Through such a TIP, the government may create incentives for a wage adjustment at the same time as it continues to pursue employment policies.

Consider first the case when the trade union believes in the tax rule. When drawing the indifference curves we now have to take into account that the tax (as well as government output) varies as the wage varies. Indifference curves 1 and 2 in Fig. 4 are drawn for the constant tax level prevailing before the TIP is introduced, although account is taken of the variation in government output, as discussed earlier. If we also take the perceived effect of wages on taxes into account, the indifference curves become steeper for $w > w_I$. The reason is that a given wage increase now is associated with a smaller increase in the after-tax real wage than before. Consequently, employment must fall by less than before for a given wage increase if utility is to be unchanged.

Indifference curves 3 and 4 are such reduced-form indifference curves that take the TIP into account.

The government can now always choose a tax rule such that the trade union, if believing in it, again chooses the wage w_I , even though the employment rule remains in effect. The tax on workers must be at least so responsive to wages that the EE-line becomes a tangent to the indifference curve 4 in point I. It can, of course, also be more responsive. If the tax is raised in such a way that the after-tax wage $w - \tau$ is always reduced when the pre-tax wage w increases, as in Fig. 5, the indifference curves may become positively sloped for $w > w_I$ as shown by the curve 5 in Fig. 4 (since a pre-tax wage increase lowers the after-tax wage, an employment increase may be required if utility is to be kept unchanged¹⁴). The government could then, in principle, even peg employment at the target level $\tilde{E}$, i.e. set $\gamma = 1$, without causing infinite wage increases. Even with a vertical labor demand schedule, the optimal wage is still w_I with a positively sloped indifference curve above w_I (cf. Fig. 4).

The difference between a TIP directed at workers and a non-accommodation policy appears when credibility problems arise. If the trade union does not believe that the government will go along with the announced tax rule, it may still choose the wage w_S in Fig. 6. But in this case, this will not lead to an increase in unemployment. Instead the after-tax wage for those employed falls, and in this way an incentive is created for a wage adjustment in the next period.

A TIP directed at wage earners could thus avoid transitional unemployment. But this is not the only possible outcome. Suppose e.g. that the trade union believes that the government dares to follow

its tax rule only up to a certain point as illustrated in Fig. 6.

Suppose e.g. that the trade union believes that the government will dare to stick to its tax rule only up to the tax level corresponding to the wage w_S , and that it will keep the tax constant above this level. If so, there will be a discontinuity in the indifference curves at $w = w_S$. The curves become flatter above this level. The reason is that if utility is to be kept constant, a given decrease in employment needs to be compensated by a smaller pre-tax wage increase when the tax does not increase. In the case in the diagram the result will be that the economy ends up in B with a higher wage and lower employment than in S. If the government is believed to vary the tax rate only within a certain interval, a TIP may thus fail and result in a worse outcome.

4. Conclusions and Extensions

We have developed a model that gives a theoretical underpinning to the assertion that accommodation policies may cause wage inflation and in the end lower employment. If this is indeed the case, our analysis of various methods of adjustment leads to the following conclusions.

(1) Continued accommodation policies around a lower employment target are inferior to a policy of complete non-accommodation.

(2) A social contract is better than accommodation policies but will not restore full macroeconomic equilibrium.

(3) A return to macroeconomic equilibrium requires either a shift to a non-accommodation policy or to a tax-based incomes policy directed against wage earners.

A non-accommodation policy and a TIP directed against wage earners produce the same result in the long run. The difference lies in the

transitional problems if the policies do not "bite" in the short run: unemployment in the case of non-accommodation, lower after-tax real wages for employed workers in the case of a TIP. The choice between the two methods depends upon whether one wants to let the burden of adjustment fall on a minority of unemployment or on the majority of employed wage earners.

Our analysis can be developed in at least four directions.

(1) Explicit account could be taken of uncertainty and temporary unanticipated disturbances to allow a trade-off between average employment and its variability as suggested by e.g. Driffill (1983).

(2) One could try a richer modelling of government behavior based on some kind of utility maximization.

(3) Employers could be assigned a more important role in wage formation. One could e.g. investigate various Pareto-efficient bargaining outcomes, as suggested by McDonald and Solow (1982) and Oswald (1983), or incorporate strike costs e.g. along the lines of de Bruyne and van Rompuy (1982).

(4) One could attempt to model how the game between different trade unions, which has been analyzed by e.g. Oswald (1979) and Gylfason and Lindbeck (1982), is affected by government policies.

APPENDIX

A1: The intertemporal optimization problem

The intertemporal optimization problem in a two-period case is to maximize equation (5) subject to the intertemporal budget constraint (6) and the employment equations (7) and (8). In this example we shall assume that the tax on capitalists T^C , the unemployment benefit b , and the target level of government employment $\tilde{G}$ are the same in the two periods. The tax on employed workers τ is exogenous in the first period and endogenous in the second period when it is varied so as to achieve intertemporal budget balance. Then equations (6) and (7) allow us to rewrite the budget restriction (6) to:

$$\tau^2(v, w, \gamma) = \frac{1}{E^2} [(1+r)(v-b-\tau^1)G^1 + wG^2 - (1+r)(b-\tau^1)N^1 - bN^2 + (2+r)b(M-T^C)] \quad (A1)$$

The optimization leads to the following two first-order conditions:

$$\frac{\partial B}{\partial v} = B_v = U_c^1 - (U_G^1 + U_E^1)\gamma N_w + U_E^1 N_w - \frac{1}{1+\delta} U_c^2 \tau_v^2 = 0, \quad (A2)$$

$$\text{and } \frac{\partial B}{\partial w} = B_w = U_c^2 (1 - \tau_w^2) - (U_G^2 + U_E^2)\gamma N_w + U_E^2 N_w = 0. \quad (A3)$$

(A3) and (A4) specify the optimal wages v^* and w^* as functions of the exogenous parameters of the model.

Assume now that the trade union starts to perceive the government employment policy rule. This can be analyzed as an increase of γ from zero. Technically we differentiate (A2) and (A3) w.r.t. to w , v and γ and compute $\frac{dv}{d\gamma}$ and $\frac{dw}{d\gamma}$. Doing this and letting superscript 2 outside a paranthesis denote a square (otherwise it denotes time period 2), we derive

$$\frac{dv^*}{d\gamma} = (B_{vw}B_{w\gamma} - B_{v\gamma}B_{ww})\Delta^{-1} \quad (A4)$$

$$\text{and } \frac{dw^*}{d\gamma} = (B_{wv}B_{v\gamma} - B_{w\gamma}B_{vv})\Delta^{-1} \quad (A5)$$

$$\text{where } \Delta = B_{vv}B_{ww} - (B_{vw})^2$$

If we set $\gamma = 0$ initially and assume that $\tilde{E}_1 = \underline{E}_1$ as well as $\tilde{E}_2 = \underline{E}_2$, i.e. that the government and trade union employment goals coincide in both periods, we have

$$B_{vv} = U_{cc}^1 + 2U_{cE}^1 N_w + \frac{1}{1+\delta} U_{cc}^2 (\tau_v^2)^2 < 0 ,$$

$$B_{ww} = \frac{1}{(1+\delta)} U_{cc}^2 (1 - \tau_w^2)^2 + \frac{2}{1+\delta} U_{cE}^2 N_w < 0 ,$$

$$B_{vw} = -\frac{1}{1+\delta} U_{cc}^2 (1 - \tau_w^2) \tau_v^2 > 0 ,$$

$$B_{v\gamma} = - (U_G^1 + U_E^1 - \frac{1+r}{1+\delta} \frac{v-b-\tau_1^1}{E^2} U_c^2) N_w \begin{matrix} > \\ < \end{matrix} 0 \quad \text{where } v-b-\tau_1^1 > 0$$

$$\text{and } B_{w\gamma} = -\frac{1}{1+\delta} (U_G^2 + U_E^2 - \frac{w-b-\tau_2^2}{E^2} U_c^2) N_w \begin{matrix} > \\ < \end{matrix} 0 \quad \text{where } w-b-\tau_2^2 > 0.$$

That $\Delta > 0$, i.e. that the Hessian of B is strictly positive, is clear from observing that the third term in B_{vv} times the first term in B_{ww} equals the square of B_{vw} . To determine the signs of $dv^*/d\gamma$ and $dw^*/d\gamma$ we have, however, to examine $B_{v\gamma}$ and $B_{w\gamma}$ closer. It is then of help to compute the levels of government employment in the two periods that are optimal to the trade union. To do this we calculate

$$\frac{\partial B}{\partial G^1} = U_G^1 + U_E^1 - \frac{(1+r)}{(1+\delta)} \frac{(v-b-\tau_1^1)}{E^2} U_c^2 , \quad (A6)$$

$$\text{and } \frac{\partial B}{\partial G^2} = (1+\delta) (U_G^2 + U_E^2 - \frac{w-b-\tau_2^2}{E^2} U_c^2) . \quad (A7)$$

Let the solutions to $\partial B/\partial G^1 = 0$ and $\partial B/\partial G^2 = 0$ be denoted G^{1*} and G^{2*} , respectively. Since

$$\frac{\partial^2 B}{(\partial G^1)^2} = U_{GG}^1 + \frac{(1+r)^2}{1+\delta} \frac{(v-b-\tau^1)^2}{(E^2)^2} U_{cc}^2,$$

$$\frac{\partial^2 B}{(\partial G^2)^2} = \frac{1}{1+\delta} U_{GG}^2 + \frac{1}{1+\delta} \frac{(w-b-\tau^2)^2}{(E^2)^2} U_{cc}^2,$$

$$\text{and } \frac{\partial^2 B}{\partial G^1 \partial G^2} = \frac{1+r}{1+\delta} \frac{(v-b-\tau^1)(w-b-\tau^2)}{(E^2)^2} U_{cc}^2,$$

it can be shown that

$$\frac{\partial^2 B}{(\partial G^1)^2} \frac{\partial^2 B}{(\partial G^2)^2} - \left(\frac{\partial^2 B}{\partial G^1 \partial G^2} \right)^2 > 0,$$

G^{1*} and G^{2*} are the optimal values of respectively G^1 and G^2 for the union, given the wages v and w . It is easily seen that the signs of B_{vy} and B_{wy} are those of $\partial B / \partial G^1$ and $\partial B / \partial G^2$, respectively. Therefore, a sufficient but not necessary condition for $\frac{dv^*}{dy} > 0$ and $\frac{dw^*}{dy} > 0$ is that $G^1 \leq G^{1*}$ and $G^2 \leq G^{2*}$ with at least one inequality. If the public sector is smaller than what is optimal to the union in one period and not larger than optimal in the other, the perception of the accommodation policy will increase the union's optimal wage in both periods.

A2: A social contract with positive marginal utility of government goods

In this case, one has to distinguish between indifference curves drawn for a given level of government output and indifference curves drawn on the assumption that government output varies with the wage rate according to the government policy rule as discussed earlier. Indifference curve 1 in Fig. 7 which is tangent to the EE-curve is drawn with the government policy rule taken into account, whereas indifference curve 2 is drawn given the government output in the Stackelberg equilibrium S.

Now let us compare point C with point S. Government output is the same in both points. Point H* shows a wage-employment combination that

gives the same utility for the trade union as point S if the level of government output is the same. Since C lies above H^* it follows that C is superior to S for the trade union. It is also superior for the government since it involves both higher employment and a lower budget deficit.

When evaluating points with lower government output than along the $E'E'$ -line, one has to remember that as government output is reduced, the indifference curves of type 2 shift upwards. Let us e.g. compare H^* with S. To actually reach H^* , government employment and output must be reduced below the level in S. Hence H^* is always interior to S for the trade union. The set of cooperative solutions superior to S for both the government and the trade union is therefore smaller in this case than in the case in the text when marginal utility of government goods was zero. In the diagram it is represented by the cross-hatched area SDP (where P is situated somewhere along the CH^* -line).

Footnotes

1) Cf. e.g. Kouri (1982), Malinvaud (1982) or Nickell (1982).

2) The McCracken report (1977) formulates it in the following way:
 "During the course of the great post-war expansion those responsible for price setting and wage bargaining in many countries became so convinced that governments could, and would, maintain high levels of demand and employment that they increasingly behaved as if there was no way in which they could price themselves out of markets or out of jobs".

3) The assumptions that the trade union sets the wage and employers determine employment has been criticized on the ground that it does not lead to Pareto-efficient bargains (cf. McDonald and Solow (1982) and Oswald (1983)): by negotiating an agreement on both the wage and employment, both workers and employers could attain a higher welfare level. However, centralized bargaining in the economies mentioned does not take place in this way: only wages are determined centrally.

4) Without loss of generality we can set $M = 1$. Then

$$U = EV > 0; \quad U = EV < 0; \quad U_G = Z_G > 0$$

$$U_{GG} = Z_{GG} < 0; \quad U_E = V(c) - V(b) > 0 \text{ if } c > b$$

$$U_{EE} = U_{cG} = U_{GE} = 0; \quad \text{and} \quad U_{cE} = V_c > 0.$$

5) The slope of an indifference curve in the wage-employment plane is for a constant tax τ :

$$\left. \frac{dw}{dE} \right|_{du=0} = - \frac{V(w - \tau) - V(b)}{E V_c (w - \tau)} < 0$$

6) Implicitly we thus impose a restriction on the government's willingness to accommodate wage increases in the government sector.

7) This is not the case in the II-equilibrium, since then the trade union takes the values of the government policy parameters as exogenously given. Since there is no private saving in our model- it is only when the trade union expects the wage to affect the size of the government budget deficit that intertemporal considerations could play a role.

8) The slope of an indifference curve taking the response of government output into account is:

$$\left. \frac{dw}{dE} \right|_{du=0} = - \frac{V(w - \tau) - V(b)}{EV_c (w - \tau) - \gamma N_w Z_G} < 0.$$

It is flatter than the corresponding curve in the II-case for $\gamma > 0$, since then $-\gamma N_w Z_G > 0$.

9) Another way of introducing costs for the trade union is to let an expansion of the government sector be paid for by e.g. taxes on workers in the same period. (cf. Calmfors & Horn (1983) for an analysis of this case). Driffill (1983) instead assumes that the government adjusts its employment target $\bar{E}$ so as to ensure budget neutrality in any given period.

10) In the US policy discussion a similar argument has been made very forcefully by Fellner (1976, 1979).

11) Cf. also the "expectational impasse" analyzed by Phelps (1978) and Goldfeld (1982).

12) Formally the slope of the B_B^{SS} -line for constant D , b , T^C , and τ is:

$$\frac{dw}{dE} = - \frac{w - b - \tau}{G - N_W W} < 0.$$

The slope of the $\bar{E}_E^1$ -line is $\frac{1}{N_W}$. It is easily verified that the B_B^{SS} -line is flatter, i.e. that $\left| \frac{1}{N_W} \right| > \left| - \frac{w - b - \tau}{G - N_W W} \right|$.

13) The original proposal was made by Wallich and Weintraub (1971).

14) The utility loss from a decreased after-tax real wage when the pre-tax real wage increases must then outweigh the utility gain from the induced expansion of the government sector.

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

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