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UNION MILITANCY, EXTERNAL SHOCKS,
AND THE ACCOMMODATION DILEMMA

by

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Abstract

Stabilization policy under centralized wage-setting is represented as a non-cooperative game between an encompassing union and the government. The dilemma of the government is whether or not to accommodate supply disturbances when it cannot tell if they are due to an intentionally militant wage policy or to unforeseen external price shocks. In a single round of wage setting, there is no government strategy which can both guarantee full employment and prevent union militancy. In a repeated game, however, there exists a conditional accommodation policy, which permits accommodation of supply shocks while inducing the union to refrain entirely from a militant wage policy.

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UNION MILITANCY, EXTERNAL SHOCKS, AND THE ACCOMMODATION DILEMMA

1. Introduction

Rational stabilization policy must always take the wage formation response to policy action into account. In economies where an encompassing trade union has monopolistic power to determine the wage level, rational union behavior must also take the policy response to wage formation into account. Given a conflict of interests between the union and the government, wage determination and stabilization policy can then be regarded as a non-cooperative game between the government and the union.

The game-theoretic approach to stabilization policy under centralized wage-formation has been used in recent work by inter alia: Calmfors (1982), Calmfors and Horn (1983, 1985), Driffill (1984, 1985) and Hersoug (1985). The union is normally assumed to be trading off the real wage against the employment level of its members. The government may then find that attempts to maintain full employment (via, say, fiscal expansion) in response to real wage increases, may be fully taken into account in the union's wage-setting behavior and lead to even higher wage demands. With a downward sloping demand curve for labor, it may under such circumstances be impossible for the government to attain full employment.

By union militancy we mean in this paper that the union is striving for a higher real wage than is consistent with the employment target of the government. The government may in this

situation choose to concentrate on deterring union militancy by refusing to respond to unemployment with an expansionary fiscal and/or monetary policy. Such a non-accommodation policy stance has gained widespread use in the last few years, not only in economies with centralized wage formation (like West Germany) but also in economies with a low degree of unionization (like the USA) or with a decentralized union system (like the UK).

A non-accommodation policy may fail to hold back union militancy for at least two different reasons, which have been observed in the literature.

First, there is the problem of policy consistency, both simultaneous and intertemporal. By simultaneous consistency we mean that the government must at each point in time use all its instruments, not only fiscal and monetary policy, with the aim of accomplishing the objectives of the non-accommodation policy. It must not counteract those objectives e.g. in its capacities as a public sector wage bargainer, employer of last resort, or as a subsidizer of unemployment insurance schemes (Calmfors (1984)). By intertemporal (or dynamic) consistency is meant that it must be optimal for the government to stick to the non-accommodation policy also after the occurrence of a wage disturbance. If the government is better off departing from a declared non-accommodation policy once a disturbance has occurred it will run into credibility problems as soon as other agents in the economy discover that this is the case. Policy declarations will then have little value (Kydland and Prescott (1977)).

Second, there is the problem of effectiveness. Even if the non-accommodation policy is consistent and therefore credible it

may not be effective in changing the behavior of the union. This is because the decision structure of the union may make it act on behalf of its median member and not take into account the interests of those marginal members who are primarily affected by the policy (Grossman 1983, Horn 1984).

In the analysis of consistency and effectiveness it is normally assumed that the only source of disturbances is union behavior (real wage shocks). If there are other potential sources of disturbances a non-accommodation policy will encounter a different type of problem. This is the problem of appropriateness. If disturbances are Keynesian rather than classical it will serve no useful purpose to try to affect the behavior of the union, since a lower real wage is no cure for Keynesian unemployment.

Even if disturbances are essentially classical in character a non-accommodation policy may not always be appropriate. It can be argued, of course, that wage contracts can be formulated so as to absorb all price and productivity shocks without any resulting unemployment (short duration of contracts, wage indexation, contingent contracts, etc.). But in the absence of complete and perfect wage indexation a sudden and unexpected decline in world market prices will give rise to classical unemployment unless the resulting increase of the product real wage is accommodated by government intervention.

It is this latter aspect of the appropriateness of non-accommodation policy which is the subject matter of the present paper. The dilemma of a government that would like always to maintain full employment and to prevent union militancy is the following. If it declares an accommodation policy it will induce the union to a militant wage policy since the resulting unemployment will be alleviated, and there is no cost attached to the real wage gain of the union members. If it declares a non-accommodation policy it risks to put an unnecessary burden on society by not relieving unemployment which is due to unexpected external shocks. Indeed the burden on union members of a non-accommodation policy may be so high that the perceived additional cost to the union of adopting a militant wage policy is smaller than the prospective benefit (the real wage gain). In that case the non-accommodation policy will back-fire. In such a situation, what is the best policy announcement the government can make?

We shall apply a game-theoretic model from Rubinstein (1979) to analyze this problem. The paper is organized as follows. In Section 2 we set out a minimal macroeconomic framework in which the interaction between wage formation and stabilization policy can be analyzed. Section 3 represents macroeconomic stabilization and union wage determination as a two-person non-cooperative game played between the Government and the Union, and the rationality of non-accommodation policy in this one shot game is investigated. In section 4 we analyze a repeated game of the same structure, where the Government strategy lasts for a large number of wage contract periods. This analysis

leads up to the recommendation of an alternative strategy - here labelled "conditional accommodation". Section 5 contains a discussion of the results and of alternative stabilization strategies within the framework derived.

2. The macroeconomic framework

The minimal ingredients of a macro framework for our analysis is presented in Fig. 1. We postulate a downward sloping aggregate employment function with the real wage as its only argument. The money wage is unilaterally determined by a monopolistic trade union, and the price level is determined by world market prices via a fixed exchange rate. Full employment, E^* , is reached at real wage w^*/p^* , and a higher real wage will consequently result in unemployment.

The government may choose, however, to accommodate real wage disturbances, and maintain full employment independently of the real wage. The method of accommodation is assumed to be direct government purchases of labor à la Söderström-Viotti (1979) and Calmfors-Horn (1983). An important aspect of accommodation for the structure of our analysis is that full employment is maintained without any reduction of the real wage. This rules out monetary accommodation and it also means that we disregard the (implicit) tax burden on wage earners of fiscal accommodation, which is considered by e.g. Calmfors-Horn (1983).

At the heart of the accommodation dilemma is the fact that there may be two different reasons for an above equilibrium real wage. The first reason is union militancy, i.e. the union sets the money wage at $w' > w^*$ with the intention of attaining real

wage $w'/p^* > w^*/p^*$, where p^* is the price level which is expected by the union. The second case is the one where the union aims at the equilibrium real wage by setting $w = w^*$, but the real wage is upset by an external supply shock, $p = p' < p^*$. The price level takes its lower value, p' , with objective probability α and remains at p^* with probability $1 - \alpha$. For reasons that will become clear toward the end of the paper the probability of an external shock, α , will be taken to be rather small, not larger, say, than 0.1. p^* is hence the normal price level.

For convenience, we shall deal only with these discrete values of the exogenous variables. Furthermore we choose w' and p' such that $w'/p^* = w^*/p'$, i.e. the real wage is the same for the two types of disturbances, as depicted in Fig. 1. Without government accommodation this higher real wage will result in some unemployment, as indicated by employment level E' .

Finally, union militancy may coincide with the event of an external shock. In this case the real wage becomes w'/p' and employment would fall below E' in the absence of government accommodation. We shall rule this case out from the ensuing analysis by assuming that in this case of "fundamental disequilibrium" the government will indeed take recourse to monetary accommodation. In particular, we shall assume that the government abandons the fixed exchange rate and depreciates the currency so as to bring the domestic price level back to p^* .

This implies that the scope of the paper is limited to the analysis of fiscal accommodation in a range of real wages which is limited to $w^*/p^* \leq w/p \leq w^*/p' = w'/p^*$. In graphical terms we limit the analysis to the three positions B, C, and D in Fig. 1.

3. Wage setting and accommodation: The isolated game

Wage-setting and stabilization policy in this minimal macro framework is represented as a two-person non-cooperative game whose players are the Union and the Government. We shall analyze in this section the case where the game is played only once. An analysis of the repeated game is deferred to Section 4.

The Union embodies all wage earners in the economy and can unilaterally determine the money wage level. At the beginning of the contract period it knows with certainty the equilibrium wage in the absence of external shocks, w^* , and the probability of a shock, α . It must then choose between two types of wage-setting behavior:

$$\text{Union wage policies} \left\{ \begin{array}{l} \text{P (passive wage policy): } w = w^* \\ \text{M (militant wage policy): } w = w' \end{array} \right.$$

The employment outcome of strategy P in the absence of government intervention will depend on the realized value of p . With realization p^* (no external shock), strategy P means that the economy ends up at a position B in Fig. 1 with the equilibrium real wage and full employment. With realization p' the economy ends up at position C with a higher real wage and unemployment in the absence of government accommodation.

The outcome of strategy M in the absence of fiscal accommodation is also point C in Figure 1. This is independent of whether an external shock occurs or not, since the monetary authorities will not allow the real wage to rise above w'/p^* .

The Government has full information on the state of the labor market and from this information it can draw inferences

about the real wage. But in the case of employment level E' it has no way of determining whether the above equilibrium real wage attained by the union members is intentional (i.e. due to Union militancy) or accidental (i.e. due to an external shock). The reason for this ignorance on the part of the Government is that it has no way of ascertaining the Union's projection of the price level at the time of the wage setting. Independent of its actual intentions the Union will ex post always plead not guilty of wage disturbances by arguing that it was aiming at the equilibrium wage but was mistaken with respect to the price level, i.e. that the above equilibrium real wage is accidental.

With full employment there is no reason for the Government to act. In the case of unemployment there are two possible strategies:

Government strategies in case of unemployment	{	NA (non-accommodation)
	{	A (accommodation)

Strategy A implies government hiring of labor so as to bring the economy from the unemployment position C to the full employment positions D in Fig. 1. Full employment is thereby attained without any reduction of the real wage.

We assume that the strategy of the Government - as a major ingredient in its economic policy - must be a matter of public knowledge. The strategy cannot be changed during the duration of a wage contract. Formally, therefore, the Government acts as a Stackelberg leader, and the Union knows with certainty the strategy of the Government before the money wage is determined.

The sequences of events that may result from the choices that the players can make and from the states of nature that may occur are represented as a game in extensive form in Figure 2. The outcomes are represented by letters corresponding to the three possible combinations of real wages and employment in Figure 1. The encircled areas are the information sets of the Government. The essential aspect of the structure of information is that the Government - in contrast to the Union - cannot distinguish how the economy has arrived at positions C and D, i.e. whether the Union has deliberately chosen a militant wage policy or whether the economy has been subjected to an external shock.

The choice of strategies will depend on the assessment of the outcomes. This assessment is assumed to differ between the Government and the Union. The Government's ordering of the possible outcomes is determined by the following structure of preferences: $E^* >_G E'$, $w^* >_G w'$, and $p^* >_G p'$, i.e. the Government prefers more employment to less, it prefers a passive wage policy to a militant, and it prefers not to have external shocks. These preferences lead to a Government ranking of the different outcomes that can be represented by attaching the following pay-off numbers to the positions in Fig. 1:

$$P_G(B) = 4$$

$$P_G(D^P) = 3$$

$$P_G(C^M) = \theta \quad (1 < \theta < 3)$$

$$P_G(D^M) = 2$$

$$P_G(C^P) = 1$$

The analysis depends only upon the ordinal relation between the pay-off numbers, and it should be noted that the ordering

depends not only on the positions, but also on how they have been arrived at, as indicated by superscript P (for passive wage policy) or M (for militant wage policy). The best outcome for the Government is full employment in the absence of disturbances. The second best outcome is the maintenance of full employment with passive Union behavior when the economy is subjected to an external shock, the traditional interventionist policy stance. The worst outcome is when a non-accommodation policy leads to unemployment in spite of passive Union behavior, due to an external shock. Between the second best and the worst outcome there are two intermediate outcomes where Union militancy is met with and without accommodation. The internal ordering by the Government of these two outcomes depends on whether or not it considers it to be an end in itself to "punish" Union militancy with unemployment.¹ This obviously depends on the intensity of Government employment preferences relative to its aversion to Union militancy. That is left open for the time being.

The pay-offs to the Union of the various outcomes are determined by a different structure of preferences: $E^* >_U E'$, $w' >_U w^*$ and $p' >_U p^*$. The ordering of the outcomes given by these preferences can be represented by the following pay-off numbers:

$$P_U(D) = 4$$

$$P_U(B) = 3$$

$$P_U(C^M) = 2$$

$$P_U(C^P) = 1$$

1) It should be noted that in an isolated game unemployment can have no feed-back effects on Union behavior.

Again, only ordinal significance should be attached to the figures. The Union ranking postulated here is consistent with derived Union objective functions where the real wage and the level of employment enter as arguments, see e.g. McDonald and Solow (1981), Oswald (1982), Sampson (1983), and Calmfors and Horn (1983). It is also consistent with a lexicographic Union preference for full employment. It should be noted that the best outcome from the Government's point of view (B; full employment with the equilibrium real wage) comes in only second in the Union's ranking. The preferred outcome from the Union's viewpoint is D, where accommodation leads to full employment at an above-equilibrium real wage. The unemployment outcomes are at the bottom of the Union ranking, where unemployment due to militancy is ranked ahead of accidental unemployment.

The reason why the Union has a preference for fiscal accommodation is that full employment is preserved while the real wage gain is maintained by the workers. With an accommodative stabilization policy a militant wage strategy (or an external shock) is therefore advantageous to the Union but harmful from the Government's point of view.

Since the Union acts as a Stackelberg follower, its strategies are of the form: "We will do X if the Government announces NA, and Y otherwise", where $X, Y \in \{P, M\}$. Let such a strategy be denoted XY. The Union's set of strategies then contains four elements PP, PM, MP, and MM. We can now represent the game in strategic form (Figure 3).

For each element of the pay-off matrix in Figure 3 the

pay-off to the Union and to the Government is given in the upper right hand and lower left hand corner, respectively. We let the symbol θ be used for probability mixtures. If R and Q are pay-offs and if α satisfies $0 \leq \alpha \leq 1$, then $\alpha R \theta (1-\alpha)Q$ stands for a lottery that yields R with a probability α and Q with probability $1 - \alpha$. The certainty equivalent pay-off of such a lottery is left open for the moment.

The dominant strategy for the Union will depend on its evaluation of the safe pay-off 2 relative to the pay-off lottery $\alpha 1 \theta (1 - \alpha)3$. If $2 > \alpha 1 \theta (1 - \alpha)3$, strategy MM is the dominant strategy for the Union and non-accommodation does not serve as a deterrent to militant wage-setting behavior. The Government strategy in this situation will depend on $\theta \gtrless 2$, i.e. whether or not it has an independent interest in "punishing" the Union for its militancy. In the isolated game, where no past or future games are involved, there seems to be little point in "retaliating", so as to end up with not only a wage disturbance (which cannot be avoided anyway) but also unemployment. This implies $\theta < 2$. The most likely equilibrium point in an isolated game where non-accommodation does not serve as a deterrent to Union militancy is therefore (A, MM) with the economic outcome D in Fig. 1.

If the Union prefers the lottery $\alpha 1 \theta (1 - \alpha)3$ to the safe pay-off 2 , then non-accommodation does serve as a deterrent to Union militancy and the dominant strategy for the Union will be (PM) . The Government strategy is then determined by its evaluation of the safe pay-off 2 relative to the lottery

$\alpha(1 - \alpha)^4$. There are two cases. If the Government is not willing to run the risk of having unemployment when the Union has settled on a passive wage policy, then $\alpha(1 - \alpha)^4 < \frac{1}{G}$ and the equilibrium point will be (A, PM) with the economic outcome D in Fig. 1 just as in the case where MM was the dominant Union strategy. If the Government is willing to take that risk, which means that $\alpha(1 - \alpha)^4 > \frac{1}{G}$, then the equilibrium point is (NA, PM) and the economic outcome will be (B) with probability $(1 - \alpha)$ and (C) with probability α .

Obviously, a non-accommodation policy makes economic sense in a single round of wage setting only if its announcement can induce the Union to shift from a MM to a PM strategy. The condition for this is that $\alpha(1 - \alpha)^3 > \frac{1}{U}$. The fulfillment of this condition, in turn, depends on two factors in addition to the intensity of preferences behind the ordinal ranking of alternatives. The first is the risk aversion of the Union. For any given value of α there is some degree of risk aversion such that $\alpha(1 - \alpha)^3 < \frac{1}{U}$. In the extreme case where the Union is risk averse enough to apply the maximin criterion, $\alpha(1 - \alpha)^3 < \frac{1}{U}$ for all $\alpha > 0$, and a non-accommodation policy will never be a deterrent to Union militancy as long as some risk of external shock remains.

The second factor determining whether PM will be a dominant Union strategy is the magnitude of α . For any given degree of risk aversion there exists (under normal continuity assumptions) one $\bar{\alpha} > 0$ such that $\alpha(1 - \alpha)^3 < \frac{1}{U}$ for all $\alpha > \bar{\alpha}$. We recall that α is the probability that an external price shock will occur ($p = p' < p^*$) when the Union has decided on a passive wage policy

($w = w^*$). This probability is obviously related to the variability of the economic environment. It may be rational for the Union to shift from a PM to a MM strategy when the probability of external shocks increases, and the Government will then have to carry out an announced NA policy. The result will be excessive wage increases coupled with higher unemployment - stagflation.

We have found that a non-accommodation Government policy in this setting is rational only if it can induce the Union to shift from the MM to the PM strategy, and if the Government is indeed willing to pay the price of accommodation, leading up to equilibrium point (NA, PM). This equilibrium, however, is Pareto dominated by the pair (A, PP) where wage disturbances are never caused by Union militancy, and where full employment is maintained in the case of external shocks. The problem with the latter point is that it is not an equilibrium point in the isolated game. As soon as the Government has announced an accommodation policy it will be rewarding for the Union to shift to a militant wage policy. Does this mean that it is necessary for the Government to impose on society the suffering of unemployment even in the case of unexpected external shocks in order to prevent the Union from militant wage behavior?

The answer is no. A result from Rubinstein (1979) implies that if the game is played many times, the Government can choose a time dependent strategy which converges on the (A, PP) equilibrium. This is the subject matter of the next section.

4. Wage setting and accommodation: The repeated game

The isolated game is played under the assumption that there is no "history" of previous games and there are no future games

to be played after the present one. This may be a useful way of modelling a society where a new government policy announcement is made ahead of each round of collective wage determination.

Consistent behavior in long lived governments or policy consensus among political parties is perhaps better analyzed in a setting where the Government strategy is assumed to outlast several wage contract periods, and where no contract period is expected to be the last one under the present Government strategy. Mathematically, this is equivalent to the analysis of an infinite sequence of plays.

We shall assume that the set of available strategies, the evaluation of outcomes (pay-offs), etc. remain the same in all games irrespective of what has happened before. However, both the Government and the Union are assumed to learn from previous experience, and to base their strategies on their knowledge of the complete history of previous games. It is also assumed that both the Government and the Union behave so as to maximize the limit of the long-run average pay-off, i.e.

$$\max P_i(g, u) = \lim_{T \rightarrow \infty} \frac{1}{T} \sum_{t=1}^T p_i^t(g, u) \quad i = G, U$$

where p_U^t is the pay-off of the Union at time t as a function of the strategies g, u of the two players, which in turn depend on all experience accumulated up to time t .

It can then be demonstrated (see Rubinstein (1979)) that an optimal policy for the Government is to respond to a wage disturbance at time t with non-accommodation if and only if the relative frequency of wage disturbances having occurred up to time t is greater than $\alpha + \alpha_t$, where $\{\alpha_t\}$ is a sequence of

positive real numbers converging to 0 "sufficiently slowly".²

If the Government announces and sticks to this policy (which we might call "Conditional Accommodation", CA), the strategy of the Union that maximizes its long run average pay-off will be always to adopt the passive wage policy, P. Furthermore (CA, P) will be an equilibrium point in the repeated game.

The time profile of Conditional Accommodation policy is illustrated in Fig. 4. Instead of the formal proof we shall present here some intuitive arguments for the optimality of this policy.

There are two essential ingredients in the Conditional Accommodation strategy. The first is that - in a long-run ($t \rightarrow \infty$), steady state (parameters constant) situation - accommodation of wage disturbances should take place only if they do not occur more frequently than predicted by the objective probability α . If more frequent wage disturbances were accommodated, it would be possible for the Union to benefit from a militant wage policy adopted with a certain frequency. The dominant strategy for the Union would then be some mixed strategy instead of a pure P strategy.

We may observe the special case $\alpha = 0$, where the objective probability of exogenous disturbances is zero. If and only if $\alpha = 0$ will an unconditional non-accommodation policy be the dominant long-run steady state Government strategy. If the Government pursues a stubborn non-accommodation policy under

2) By "sufficiently slowly" is meant here at least as slowly as $\alpha_t = \sqrt{2k \alpha(1 - \alpha) \ln \ln t} / \sqrt{t}$, where $k > 1$ (see Rubinstein (1979)).

conditions where $\alpha > 0$ we are back in the situation described for the isolated game. The risk of unemployment in spite of a passive wage policy may then drive the Union to adopt a militant wage policy, because its perceived costs may be smaller than the benefits.

The second essential ingredient of the conditional accommodation strategy could be labelled the "principle of gradualism". The principle of gradualism says that directly after the announcement the Government should be more lenient in its policy toward wage disturbances than it will ultimately be. During this phasing-in period of the new policy regime it should accommodate a higher frequency of wage disturbances than α . If the Government upon announcement of the new policy jumped directly to the long-run steady state strategy, the possibility of unemployment even under a passive wage policy due to "bad luck" with respect to early shocks would seem so imminent that the harshness of the Government might drive the Union to adopt a consistent M policy. In the longer run the law of large numbers reduces the role of bad luck and permits the Government to let the proportion of disturbances accommodated asymptotically approach α .

Table 1 below gives the number of wage disturbances that should be accommodated under a complete "gradualist" CA strategy, for different values of α . In all cases the value of k is set very close to unity, which means a rapid convergence to the steadystate. As the expression for α_t is not defined for $t \leq 2$, we must look at the first three contract periods as an aggregate, and it is impossible to separate out in which (if any) of these periods the first accommodation should be allowed.

TABLE 1. Number of disturbances to be accommodated in t contract periods when the probability of an exogenous disturbance is α . ($1 < k < 1.1$)

α	t										
	≤ 3	4	5	6	7	8	9	10	50	100	1000
0.05	0	0	0	0	1	1	1	1	5	8	63
0.10	0	0	1	1	1	1	2	2	8	15	119
0.25	1	1	2	2	3	3	3	4	17	32	277

For an interpretation of Table 1 let us single out the row for which $\alpha = 0.10$. It is assumed there that the Government at time $t = 0$ declares a conditional accommodation policy in a situation where both Union and Government assess the probability of an external shock to 0.1. The implication of the CA policy is then that disturbances occurring in any of the first four contract periods will not be accommodated. Within the first eight contract periods a maximum of one disturbance will be accommodated, and within the first ten periods at most two. The maximum number of disturbances accommodated in 50, 100 and 1,000 contract periods is presented in the table only to demonstrate the slow convergence of the series to the long-run steady-state relative frequency of α .

Since the strategy pair (CA, P) is an equilibrium point in the repeated game the CA policy is time consistent as long as the parameters of the game remain constant. From this point of view the announcement of a CA policy should not have any credibility problems. However, considering the early leniency of the policy,

it might be difficult to come across with the message that the CA policy rule has actually been adopted. With zero wage disturbances accommodated in the first four contract periods and a maximum of one in the first eight, this information problem does not seem to be serious. In other words, the policy rule seems to be harsh enough to convince the Union members that the Government has actually adopted the CA policy. Once adopted, the time consistency of the policy should convince the Union that the Government intends to stick to it.

Only when the objective probability of an unintended wage disturbance approaches 0.25 does the CA rule call for accommodation of one wage disturbance within any of the first three contract periods. In this case it may be difficult to convince the Union that the CA policy has actually been adopted by the Government.

5. Discussion and conclusions

The results derived in this paper are based on an extremely simplified macroeconomic framework and on a simple game theoretic model, where the Union and the Government are treated as individual players with recourse to only two policy choices each. It does not seem meaningful to attempt to catalogue the restrictiveness of the assumptions involved and to embark on a detailed investigation of the potential consequences for the conclusions of relaxing one or another of these assumptions. Rather, I would like to end on a more general discussion of some lessons that can be learned from the exercise, and which are perhaps of a somewhat wider applicability.

A first category of lessons concerns the appropriateness of non-accommodation policies as discussed in the introduction to this paper. Non-accommodation may be a useful way of preventing cost disturbances originating in the wage formation process of the economy. But to Keynesian effective demand disturbances non-accommodation is clearly an inappropriate policy response. Also when unemployment is entirely classical in nature - as is the case in this paper - a strict non-accommodation policy may turn out to be counterproductive, even in the long run when the feed-back effects on union behavior are taken into account.

Some types of classical unemployment, notably those caused by sudden, unexpected changes in exogenous prices or productivity, are appropriate targets for government intervention. If the government gives up all stabilization endeavors also in those cases, unemployment risks may appear so high that the perceived costs to the union of a militant wage policy become lower than its prospective benefits. In that case the non-accommodation policy will backfire.

In the isolated game there is no way out of the accommodation dilemma for the government. It must accept either the bad of union militancy or the bad of unemployment in the case of external shocks. As demonstrated in Section 4, the dilemma can be solved in the repeated game. There, the government can indeed enforce the adoption of a passive (non-militant) wage policy by the union without accepting unemployment in the case of external shocks, via the announcement of a time-dependent conditional accommodation policy.

The principle of gradulism which is the backbone of the time dependent strategy in the repeated game may seem to run counter to current opinion regarding methods to establish credibility of a non-accommodation policy stance. But it should be observed that the points of departure are quite different. In our setting credibility is established by assumption in the single game, and by the time consistency of the conditional accommodation policy in the repeated game. There is consequently no need to "set an example" by exaggerated harshness in the early stages of the policy. Quite to the contrary, leniency in the early stages is the only effective inducement to the union to adopt a consistently passive wage policy.

A factor highlighted by the distinction between the isolated and the repeated game is the interdependence between the length of collective wage contracts and the expected duration of the government strategy. If incumbency periods are of no longer duration than wage contracts, and if there is genuine uncertainty regarding the valuations (and therefore strategies) of the next government, then - formally - we are in the situation of an isolated game. In this game, as we have seen, there is no possibility for the Government to enforce a non-militant wage policy on the Union without taking the cost of unemployment in the case of unexpected external supply shocks. The conditional accommodation policy derived here is the only way out of the dilemma. It is time consistent in the sense that - once embarked upon - neither of the two players have any incentive to deviate from their strategies (CA, P) no matter what contingencies occur. The CA policy is therefore also credible. But this presupposes

that the players' evaluations of the various potential outcomes remain invariant over time. Long incumbency periods and/or political consensus as to the conduct of stabilization policy may help in this respect. But, given the number of contract periods required before a reasonable degree of convergence of the time dependent policy is reached, the requirement of time invariance of parameters and evaluations is quite formidable.

It seems reasonable therefore to investigate whether a closer look at the structure of the game can give us some indications as to how stabilization policy under centralized wage determination should be conducted in order to avoid the accommodation dilemma without running into the problems of virtually infinite time invariance.

One idea may be for the government to try to affect the "benefit" rather than the "cost" side of the union's cost-benefit analysis of wage militancy. Accommodation policies could perhaps be conducted in such a way as to eliminate all Union gains from an above equilibrium real wage. If the entire real wage gain is immediately and consistently eliminated under accommodation - via e.g. a devaluation policy - the union loses interest in intentionally creating wage disturbances in order to reallocate income to its members. Monetary rather than fiscal accommodation could therefore eliminate the incentive to union militancy in this particular setting. It would not in other economic frameworks, however, e.g. under decentralized wage-setting where unions or individuals care about relative wages, or in a situation where the union feels that it can achieve a temporary real income gain before a devaluation comes about.

Another factor which is brought to the forefront by the present analysis is the information set of the government. If the government can distinguish the origin of unemployment the accommodation dilemma is resolved. It would then suffice for the government to specify that disturbances due to external shocks are to be accommodated, and disturbances due to union militancy are not. But under normal conditions the government does not have the information necessary to make a credible announcement to that effect. Unemployment will look the same and appear in the same sectors of society no matter which disturbance is its origin. Ultimately, is is a question of distinguishing the intentions and the perceptions of the union. Has the union intended to create a real wage disturbance or has it misperceived the equilibrium real wage? Even with very high money wage increases the union may deny any militant ambitions and be able to convincingly argue that reasonable expectations with respect to international prices and productivity were such as to motivate these wage hikes (c.f. "the world-wide wage explosion" in the mid-70's).

A possible way to overcome the information asymmetry, which is at the root of the accommodation dilemma, would be for the government to announce, before wage-setting takes place, its policy and its own perception of the equilibrium money wage, w_G^* . The policy would be to restore full employment after a disturbance if and only if $w < w_G^*$. This solution would in practice come very close to an incomes policy, since there is no

incentive for the union to hold the money wage below w_G^* , and high risks involved in surpassing that limit.³

A third alternative way out of the dilemma is indicated by the nature of the game itself. The government may have something to gain by not revealing its strategy before wage-setting takes place. If the union is left in uncertainty about the government strategy, union militancy will be more risky than under the certainty of accommodation. The solution concept would then be Nash rather than Stackelberg, and appropriate changes in the structure of the game would have to be undertaken in order to analyze the optimal strategies of the players and possible equilibria of the game.

As a final note it could be added that the analysis pursued in the paper has a more general applicability to public policy than just the problem of government accommodation of wage disturbances. Many types of public intervention in the private sector have the aim of eliminating an individual "bad", which is sometimes (or partly) outside the control of the individual, but sometimes (or partly) could have been avoided by appropriate precautionary action on the part of the individual himself. All such government intervention involves a moral hazard problem.

3) Independent of the exact nature of the formalized game, it seems that a game-like situation is the appropriate starting point for the analysis of cooperative solutions (e.g. incomes policy) to the wage-stabilization problem. Only then can we make a reasonable assessment of the bargaining situation and of the threats, side-payments, etc which are necessary to achieve a cooperative equilibrium when there is a conflict of interests between unionized workers and the government.

In this paper the "bad" is classical unemployment and the intervention an accommodation policy. It is possible, however to conceive of many other examples. Some cases in point are public unemployment benefits, "free" hospital care, subsidies to declining industries, and state supported old age pension schemes. All these government interventions eliminate obvious "bads". But they also reduce the individual incentives to find a job, to prevent accidents and illness, to restructure unprofitable corporations, and to save for old age. Therefore, the cost-benefit analysis of government intervention should include on the "cost" side not only the direct resource cost of providing public goods on transfers, but also the indirect cost of weakened private incentives to precautionary action. This is the conventional wisdom about the problem of the "welfare state".

The relation between government intervention and private incentives is not necessarily monotonic, however. In the complete absence of government intervention the risk of various "bads" due to circumstances outside the control of the individual may be perceived as so large that it would be irrational to devote any significant resources to their avoidance. Some individuals may in such cases prefer to engage in zero-sum games (like stealing) rather than in the more productive activity of trying to avoid the "bad" (like looking for a job).

In these cases Government intervention has a rationale in raising the expected private return on socially beneficial activities relative to zero-sum (to negative-sum) games. The cost-benefit analysis of government intervention should be made taking this incentive strengthening effect into account.

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