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TRADE UNIONS, WAGE FORMATION AND
MACROECONOMIC STABILITY

by

Lars Calmfors

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TRADE UNIONS, WAGE FORMATION AND MACROECONOMIC STABILITY -

AN INTRODUCTION

by

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The process of wage formation plays a crucial role in present discussion about the causes of stagflation. In fact, differences between various policy prescriptions usually depend upon differing assumptions about wage responses. Proposals to reduce unemployment through expansion of monetary demand are usually based upon assumptions of rigid money wages. In contrast, recommendations of non-intervention policies often rest on the opposite assumption of rigid real wages, in which case monetary expansion will only cause inflation but not affect employment.

Unfortunately, our knowledge about wage formation is very incomplete. The macroeconomic literature abounds of models with assumptions about fixed money or fixed real wages that are given no or only weak theoretical underpinnings. Also the Phillips-curve approach, which explains wage increases by excess demand in the labor market and expected inflation, is to a large extent theoretically ad hoc, although it has proved empirically valuable. No explanation is usually given of what determines the speed with which deviations of actual unemployment from the equilibrium (natural) rate affects wage inflation. Nor is there usually any explanation of the determinants of the equilibrium rate of unemployment, which is instead treated as exogenous.

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The macroeconomic literature of the sixties and seventies paid little attention to actual institutions in the labor market and especially to trade unions; they lived a life of their own in labor economics but were not integrated into mainstream economic theory. This may have reflected the US dominance in economics: in an economy where trade unions organize only about 20 percent of the labor force, it may be reasonable to treat labor markets as atomistic as a first approximation in macroeconomic analysis. But for European countries, where union participation rates are much higher (as much as 70-90 percent in the Scandinavian countries, Belgium and Austria, as discussed by e.g. Faxén (1982)), and where union contracts often cover unorganized labor as well, neglect of trade unions may be fatal for the understanding of macroeconomic problems. One cannot, of course, à priori rule out that labor market organizations may be only a "veil" and that they may mimic the behavior of atomistic markets, but if so this must be shown and not just assumed.

Recent years have seen a remarkable growth, especially in Europe, of research in the area of trade unions and wage formation. This probably depends upon several factors. One may be the long-run tendency in the sixties and early seventies of nominal wage increases in excess of productivity gains in Europe and the inertia of real wages after the oil price shocks. Another factor is probably the greater belief of economists in general in the applicability of economic theory. The last decade has seen a profusion of

models in which an increasing number of aspects of human life are explained in terms of optimizing behavior on part of individual agents. It is natural that this tendency also affects work on trade unions and wage setting.

The new literature on wage formation has two main characteristics. First, it concentrates more on trade unions than on employers. One reason may be that we know less about union behavior than about the behavior of profit-maximizing employers. Second, it can be seen as an attempt to find out how far we can get in this area by conventional assumptions about maximization of well-defined preference functions under given constraints.

This volume covers four areas. A first is the basic micro theory of trade union behavior and wage setting, which is treated by Oswald and Pencavel. A second area concerns the interaction between governments and trade unions in economies with centralized wage setting. Calmfors and Horn, Hersoug, Driffill, and Söderström consider various aspects of this interaction. A third area concerns the effects of trade unions on wage setting under decentralized conditions. Jackman, Pissarides and Solow deal with this. Finally, a fourth area is empirical applications, which are made by McCallum and also by Pencavel.

I. Basic micro theory

Oswald summarizes recent theoretical research on the micro theory of union behavior, according to which unions care about both (real) wages and employment. This formulation has either

been postulated as a "revealed-preferences-description" of union behavior or derived from individual preferences of union members. In the simplest formulations of the latter approach, all members of the union are treated as alike, and the union's utility is the expected utility of a representative member. It thus equals a weighted average of the utility of receiving a certain wage when employed and the utility experienced when unemployed, with the weights corresponding to the probabilities of being employed and unemployed, respectively. Since those to be unemployed are assumed to be singled out by random draw, these probabilities equal the rates of employment and unemployment, respectively.

A central question concerns the so called monopoly-union model versus the so called efficient-bargain model. According to the monopoly-union model, a trade union unilaterally determines the wage. Employers take it as given when profit maximizing with the result that the trade union meets a downward-sloping labor demand schedule in the real-wage-employment plane. The trade union sets the wage so as to maximize its utility. This means that it has to trade off the utility gain from an increased wage against the utility loss from decreased employment.

A more sophisticated formulation of trade union behavior recognizes the heterogeneity of workers and assumes that the individual's risk of unemployment depends upon his seniority. A voting equilibrium, according to which the trade union leadership behaves so as to maximize the expected utility of the median voter, is assumed. Provided that there is uncertainty about exogenous shocks, in which case there is a certain unemployment

risk also for the median worker, this model gives the same result as the simpler models that the risk of unemployment works as a deterrent to wage increases.

One problem with the monopoly-union formulation is that it is not Pareto-efficient: both the union and the employer could improve their welfare by agreeing upon a lower wage and higher employment than in this case. But there exists a multitude of such efficient bargains. To obtain a unique solution, additional conditions have to be added. Examples are generalized Nash solutions (unions and firms share the rents from their joint activities in relation to their relative bargaining strength), fair-shares rules (the shares of value added that should accrue to capitalists and labor, respectively, are held constant), and minimum profit conditions (trade unions push wages just to the point before which firms are closed down) (cf McDonald and Solow 1981).

Oswald makes an attempt to reconcile the monopoly-union and efficient-bargain approaches. He finds it improbable that firms and unions would fail to exploit the gains from efficient bargains. But he is bothered by the fact that real-world bargaining does not usually take place over employment and that there is a reasonable amount of empirical research in favor of the hypothesis that firms are on their labor demand schedule (cf McCallum in this volume). Oswald's solution is to reject the notion that unions are willing to trade off lower wages for increased employment. He argues that seniority does in effect matter for employment and that the median-voter approach therefore

is to be preferred. But in contrast to the standard formulations of this model, as developed by Grossman (1983) and Blair and Crawford (1984), Oswald claims that uncertainty is in effect so small that there is no risk of unemployment for the median worker, who therefore ought to be interested only in the wage. If so, an efficient bargain will be reached if the union and the employer negotiates a wage, and it is then left to firms to determine employment according to the labor demand schedule.

Oswald's paper is thus a criticism of much of the present literature on union behavior and in particular of the monopoly-union approach, to which he himself has been a main contributor. Pencavel also develops a critical attitude to the recent literature. His main point of criticism concerns the expected-utility-formulation, and he reminds us that it is only a hypothesis that has not yet been subjected to enough empirical testing (cf section IV below). The expected-utility approach presupposes that no redistribution of income from employed to unemployed members occur within the union. If workers were homogeneous, one should expect strong incentives to equalize the utilities of employed and unemployed members through internal unemployment insurance schemes. If incomes are equalized, the trade union should behave so as to maximize the rents from unionization. In the absence of government-paid unemployment benefits, this amounts to maximizing the wage bill of union members, which was Dunlop's (1944) original formulation of trade union objectives.

Pencavel is also critical of the use of simple trade union models for macroeconomic purposes. His main point is that simple

microeconomic formulations will not, because of aggregation problems, survive on the macroeconomic level.

The key conclusion from the papers by Oswald and Pencavel is that many questions remain unclear despite the last few years' development. The main uncertainties concern union preferences (do unions bother about both wages and employment or only about wages?) and the monopoly-union versus the efficient-bargain approaches.

What is a reasonable stand on these issues? As concerns union preferences, the assumption of uncertainty about employment for the median worker in an individual firm is not in my view unreasonable. It is true, of course, that we do not observe aggregate unemployment rates of 50 percent, but one should take account of the possibility of relative-demand shocks that may hit the specific firm or the specific trade of the employee.

As concerns bargaining, it is obviously the case that it does take place in the real world. It is no doubt more realistic to model wage determination as the outcome of bargaining between unions and employers than as the outcome of unilateral wage fixing by unions. But it is also more complex. To the extent that the monopoly model gives similar results, it may be to prefer because of its simplicity.

I find it harder to accept that bargaining must be Pareto-efficient in terms of the models used since bargaining about both wages and employment is unusual. To the extent that it does occur, it is usually on the firm level but bargaining over employment is rare when separate firms delegate bargaining to employer federations on industry or national levels. One would expect this to

be explained by negotiation costs that are not captured by the models at hand. It may be profitable for individual firms to delegate wage negotiations to higher-level employer organizations in order to economize on administrative capacity. But there may be large costs involved in letting them bargain about employment as well, since central agreements on aggregate employment would have to be broken down on individual firms with conflicting interests. This is consistent with the general observation by Olson (1982) that cartels and collective organizations prefer to administer prices but let the market determine the allocation of quantities between members.

II. Centralized wage setting

One macroeconomic application concerns wage setting under centralized condition such as in Sweden, Denmark, Finland, Norway, Austria, Germany and the Netherlands, where economy-wide employer and labor organizations bargain about wages. Under such conditions it is not only the case that the government must take wage responses into account when formulating its policies but labor market organizations must also consider government reactions when setting wages. Economic policy and wage formation thus have the characteristic of a game between the government and the labor market organizations.

This game is the subject of the papers by Calmfors and Horn, Hersoug, Driffill, and Söderström. These papers all employ the monopoly-union approach and assume that the whole labor force is organized in one all encompassing union. The common aim is

to explain why the increasingly ambitious attempts to stabilize employment during the sixties and seventies in Europe in fact coincided with a movement towards higher unemployment. The explanation given is that government employment policies steepen the labor demand schedule that the trade union perceives. Hence the price of real wage increases in terms of lost employment is reduced, and the union is induced to set a higher real wage. As a result, employment may actually fall. The employment policies of the government take the form of fiscal policies that affect the form of the labor demand schedule in the real-wage-employment plane. These policies may be of various types: changes in the direct employment in the public sector, changes in government spending on domestic goods that are imperfect substitutes for foreign goods or changes in pay-roll taxes and wage subsidies.

The papers provide an explanation of the determinants of the equilibrium rate of unemployment in economies with centralized wage setting. To the extent that the marginal benefit of a wage increase (in terms of increased consumption for employed workers) exceeds the marginal cost (in terms of lost employment) at full employment, the trade union will set the real wage above the full-employment level. As pointed out by Gylfason in his comment to Hersoug, the resulting unemployment is voluntary from the point of view of the union but involuntary from the point of view of individual workers, who will be supplying more labor than is demanded at the union-determined wage. A main point in the four papers is how this equilibrium unemployment is endogenously affected by the way fiscal policies are seen by

the union to influence the labor demand schedule.

Calmfors and Horn postulate an employment policy rule for the government. According to it, the government chooses an employment target and tries to counteract variations of employment around it through changes in public-sector employment. The paper stresses the importance of trade union perceptions. If the policy rule is not perceived, it will have no effect on the real wage and employment in the case when the government employment target equals the employment that the trade union would choose in the absence of government employment policies. But if it is perceived, the trade union is induced to raise the real wage with the consequence that employment falls.

Most of the analysis of Calmfors and Horn presupposes that the trade union does not take future effects of a present government budget deficit into account. But it is also shown that the analysis carries over to an intertemporal model, in which the trade union perceives that a present deficit will necessitate future tax increases, provided that the level around which the government varies public employment is lower than the optimal level for the trade union. Then the trade union can make a utility gain from the government employment policy rule by increasing the real wage and thus triggering off an expansion of the public sector.

Calmfors and Horn discuss possible ways of restoring equilibrium in an economy that has ended up in an underemployment equilibrium because of government accommodation of real wage increases. A non-accommodation policy, according to which the government abstains

from employment stabilization, or a tax-based incomes policy, according to which the government raises personal income taxes when the wage exceeds a preannounced level, can induce the union to choose a lower real wage and thus higher employment. But the difficulties of reaching such solutions are also stressed. Government policies of this type may lack credibility because of the lack of time consistency: the government has an incentive to announce harsh policies *ex ante* but not to stick to them *ex post* if a too high wage has already been set, since they may then only aggravate the imbalances.

Hersoug derives the behavior of the government from a well specified preference function with employment and the current account as arguments, following Gylfason and Lindbeck (1983). He shows that an employment policy rule of the Calmfors-Horn type can be derived as the optimal government response to wage changes, if the government takes the wage as exogenous to its own actions and assigns as large weight to employment as opposed to the current account. Hersoug's specification of utility functions for both the trade union and the government makes it possible to analyze different types of equilibria: (1) a Cournot-Nash equilibrium when each agent takes the values of the decision parameter of the other as given; (2) a Stackelberg equilibrium with the union as leader and thus setting the wage taking the government's response into account; (3) a Stackelberg equilibrium with the government instead as leader and thus determining government expenditures taking the trade union's wage response into account; and (4) cooperative equilibria when the government

and the union reach Pareto-efficient combinations of wage rates and government expenditures.

Hersoug illustrates clearly the advantage of being the Stackelberg leader and thus points to the risk that an economy because of Stackelberg warfare may end up in an underemployment situation when both agents try to achieve the leader position. He argues rather forcefully, however, that the Stackelberg equilibrium with the trade union as leader is the most likely outcome once the agents have learnt about each other's patterns of response. The prime reason is that wage contracts are long-term and usually do not allow much wage flexibility during contract periods. In contrast, government expenditures can be, and usually are, changed frequently during contract periods. Put differently, trade unions are more precommitted than governments. Although these observations are empirically true, the underlying causes are not explained. A possible reason could be that wage bargaining is complex with large bargaining costs: different groups' wage demands have to be traded off against each other within the labor organizations, central agreements have to be translated to lower levels in the bargaining hierarchy and the risks of labor market conflicts work in the direction of limiting the number of bargaining occasions. Therefore a wage agreement is not likely to be changed once made. These factors lie outside Hersoug's framework, however.

Calmfors-Horn and Hersoug assume away all exogenous shocks. The government pursues employment policies because there is a conflict of interest between the government and the trade union

about the appropriate levels of real wages and employment. But there is no role for stabilization policy proper in order to reduce employment variations due to exogenous shocks. This would seem to bias the analysis in favor of non-intervention. Exogenous random shocks instead play a crucial role in the papers by Driffill and Söderström. They see the government's task as reducing employment variations due to unanticipated shocks without at the same time inducing the trade union to raise real wages and thus decrease average employment. This problem arises because of an assumed inability on part of the government to distinguish between whether unemployment depends upon a wage disturbance or upon an unanticipated exogenous shock.

In Driffill's paper the economy is subjected to random supply shocks that affect the demand for labor at given real wages. The government follows an employment policy rule of the same type as in Calmfors and Horn. But here it is a pure stabilization policy: the employment level that the government attempts to stabilize the economy around is chosen so that on average the government budget balances. Provided that the trade union regards the employment level around which the government stabilizes employment as exogenous but understands that employment variations around this level trigger off expansive fiscal policy measures, it is induced to raise the real wage in such a way that average employment falls. This is the price of a reduced variability of employment.

Driffill derives the optimal government policy rule from a government utility function with employment and the government

budget deficit as arguments. The degree of stabilization will depend i.a. on the variance of shocks. If the government chooses its policy rule taking the wage responses of the union into account, the policy rule will always involve less of stabilization than if the government had regarded the wage as independent of its actions. The non-cooperative Stackelberg equilibrium resulting from an optimal government policy rule is, however, never Pareto-optimal: there always exist "social contracts" involving a lower wage on part of the union and more of employment stabilization on part of the government that are superior.

Driffill stresses the difficulties of enforcing such a social contract. Once the government has committed itself to certain policies, the union has strong incentives to renege. Driffill analyzes whether the government by threat of a punishment policy - involving a reduction of stabilization efforts in future periods if the union defects in the present - can induce the union to stick to such a social contract. He shows that if the government can devise a strategy according to which the one-period gain from cheating for the trade union is more than offset by the loss due to being punished in future periods, it will be possible to reach a better social outcome than otherwise. The government may, however, still be unable to reach the employment level that it desires. The difficulties are especially severe if it is required that the punishment strategy is time-consistent, i.e. that the government will not suffer a utility loss from actually carrying out the punishment if the need occurs. Such a punishment strategy is more likely to work if there is a large variance of exogenous

shocks, so that the trade union has much to lose if the government reduces its stabilization efforts.

Söderström studies the related problem of how a government should behave when it does not know whether a real wage increase is intentional on part of the union or the unintentional consequence of lower price increases than expected. In this situation the government is confronted with a dilemma. If it always accommodates real wage disturbances through fiscal expansion, it can avoid unemployment "by accident", but the union is induced to raise the real wage for the same reasons as in the previous papers. If the government never accommodates, there will be unemployment in the case of an unexpected deflationary disturbance, although intentional wage disturbances may be avoided. The dilemma arises because it may be in the interest of the union not to disclose its price forecast ex ante and to claim ex post that also intentional wage disturbances depend upon overestimation of price increases.

Both the accommodation and non-accommodation strategies on part of the government are Pareto-inferior to an outcome where the government always stabilizes employment in exchange for wage moderation on part of the union. Söderström uses a model of legal deterrence by Rubinstein (1979) to show that such a Pareto-optimal solution can in fact be reached. The government should then choose a policy of conditional accommodation, according to which real wage disturbances in the long run are accommodated with the same frequency as the assumed given probability of unexpected price shocks. In the short run, the government

should accommodate more, since, by the law of large numbers, there is a risk that the frequency of price shocks in the short run exceeds the probability. With less of accommodation in the beginning, the union may in Söderström's framework perceive the risk of unemployment also when following a non-militant policy as so large that it may see no use in adopting such an attitude.

In my view, the papers on centralized wage setting cast light on important mechanisms but they also raise a number of questions.

(1) There is a contradiction between the careful modelling of trade union preferences, which are derived from microeconomic underpinnings, and the more ad-hoc formulations of government preferences and policies. The problem is serious, since the constituencies of the government and the trade union leadership overlap: in the models with one union encompassing all workers only capitalists make up the difference.

(2) Driffill and Söderström may, as pointed out by Pohjola and de Bruyne in their comments, overemphasize the government's difficulties of distinguishing the origin of a shock. Although the magnitude of the employment effects of various shocks are likely to be uncertain, the occurrence of at least large shocks would seem to be common knowledge. As soon as the government has some possibility of discriminating between various shocks, it may choose differing degrees of employment stabilization. It may then be possible to reduce employment variability without increasing real wages. Put differently, the government should thus condition policies on wages as well as on employment. But in

the absence of precommitments, such policies may lack credibility. These problems are likely to differ between policies. If the government puts a large weight on employment as opposed to real after-tax wages, it is probably more willing in the case of wage disturbances to carry out threats of tax increases than threats of non-accommodation policies that permit unemployment to arise.

(3) In all papers, except Hersoug's, the question of appropriate policy rules for the government is discussed under the explicit assumption that the government places itself as Stackelberg leader and imposes its strategy on the union. But it is not explained why the union should accept this. Indeed, Hersoug argues that it is not likely to. To answer this question, a more elaborate analysis of which agent has the largest possibilities of making credible threats would seem to be required.

(4) The assumptions that the length and form of wage contracts are exogenous are likely to bias the results in favor of government intervention policies. Less of employment stabilization on part of the government would increase the costs of contracts that fix wages for long periods, and would therefore create incentives for shorter contract periods and contingency clauses. One could also argue that the probability of unanticipated shocks is not independent of government policies: less of employment stabilization creates an incentive for the trade union to invest in better forecasting.

(5) The papers on centralized wage setting discuss only accommodation of real wages through fiscal policy but not accommodation of money wages through exchange rate or monetary policies.

Here the papers obviously lag actual developments: in many smaller European economies, monetary and exchange rate accommodation have been substituted for the earlier fiscal accommodation in recent years (cf Calmfors (1984)). Monetary policies have been discussed by Barro and Gordon (1983a,b), and Backus and Driffill (1984), who in natural-rate models derive conclusions about the rate of inflation. Horn and Persson (1985) have made a similar analysis in a model with an all encompassing monopoly union. These models stress that it may be rational for the government to pursue harsh non-inflationary policies that may cause short-run unemployment in order to build up a long-run reputation for following such policies: the possibilities of creating a reputation may thus mitigate the time inconsistency problems referred to above. But again a major problem is how to model the differences between government and trade union preferences. In e.g. Horn and Persson only the government is concerned about inflation: the trade union is indifferent.

III. Decentralized wage setting

Jackman, Pissarides and Solow all analyze wage and employment determination under decentralized wage setting such as in Britain or the US. In contrast to the papers on centralized wage setting, the focus here is not on the game between the government and wage setters but instead on the interaction between various trade unions or groups of wage earners.

The papers by Jackman and Pissarides are most similar. They share three main aims. The first is to explain the deter-

minants of the equilibrium (natural) rate of unemployment. This is the same aim as in the papers on centralized wage setting, although the stress here is on factors such as union structure, the relative bargaining strength of employers and wage earners, unemployment compensation etc. and not on the economic policy of the government. The second aim is to model how the adjustment process after exogenous shocks is likely to entail temporary deviations of actual from equilibrium employment: these problems occur because of desynchronization of money wage contracts that by assumption cannot occur with centralized wage setting. A third aim is to focus on wage-wage spirals and to model Keynes' original idea that concern over relative wages is a major explanation for rigid money wages. The two papers provide microeconomic underpinnings of earlier explanations of money wage inertia by e.g. Phelps (1978) and Taylor (1979).

Jackman makes two basic assumptions. The first is the existence of several industry-specific unions that set the wage in their industry. To simplify, only two industries and two unions are assumed to exist. Both goods are produced with constant returns to scale so that their prices are proportional to wages and supply curves horizontal. This gives a Keynesian set-up with demand-determined output. The government determines the money supply, and total aggregate demand depends upon the level of real money balances. By choosing the money wage and thus the price level, unions in effect determine real money balances, and therefore also total aggregate demand and employment. If the unions colluded, they would set the money wage in such a way

that there would always be full employment: since real wages by assumption are determined by the production technology, unions maximize (their joint) utility in this way. But when the two unions act in isolation, taking the wage of the other as given, the result is instead a non-cooperative Nash equilibrium with a higher money wage and thus lower real money balances and lower employment than in the collusion case. The explanation is that each union does not internalize the effects of its own wage decision on the other union and thus on the aggregate price level.

The second major assumption is about desynchronization. Wage contracts of fixed length expire at different dates and thus overlap. As a consequence, both money wages and the relative wage follow a leapfrogging pattern. This is no cause of concern in a steady state with a constant rate of monetary growth and thus a constant rate of inflation. In the steady state, the aggregate real wage and employment are independent of the rate of inflation. Only the relative wage at each point in time depend upon inflation; the reason is that the amount by which the money wage for one union must be set above the money wage of the other union when a new contract is entered (in order to reach a given average relative wage) is higher, the higher is the rate of inflation. The desynchronization becomes important only when there is a change in the steady-state rate of inflation. A monetary deceleration will cause unemployment during an adjustment period, because only part of the labor market can react to

new information at a given point of time. The speed of adjustment will depend upon union preferences. A preference for real wage stability as opposed to employment stability gives a prolonged period of unemployment.

Pissarides deals basically with the same issues as Jackman. The differences concern the institutional set-up as well as the role of employers in wage bargaining. Pissarides models an economy in which wage setting occurs not on the industry level but as a result of wage bargaining between individual firms and firm-specific unions. A generalized Nash bargaining solution is assumed, according to which workers receive the expected alternative return they would get if not being employed in the firm plus a fraction - that depends upon their bargaining strength - of the net surplus they create.

Pissarides derives a wage-wage Phillips curve of the Phelps type. In a steady state with constant real wages, an equilibrium unemployment rate can be deduced. Its determinants are the parameters of the production function, union bargaining strength and the replacement ratio (the ratio of the unemployment benefit to the wage).

Pissarides' main conclusions concern the adjustment process when price or supply disturbances occur. He derives an adjustment path that is consistent with the empirical regularities observed in most European countries during business cycle fluctuations, according to which real wage changes have to be preceded by employment variations.

The main contribution of Jackman and Pissarides is that

they go further than earlier work on decentralized wage setting in explaining well-known empirical regularities from optimizing behavior. Still, the optimizing behavior is subject to institutional constraints that are not fully explained. Jackman does not explain why unions do not exploit the gains from colluding, nor why contracts are desynchronized. Possible reasons are bargaining costs and costs of monitoring agreements that now lie outside the model. One rational reason for desynchronization, mentioned by Jackman, could also be that it enhances relative wage flexibility, which is desirable in the case of relative demand shifts. An "empirical" observation in this context is that it is usually the employer side that is in favor of desynchronization. Hence the monopoly union assumption may be inappropriate for an explanation of this phenomenon.

In Pissarides' model the prolonged adjustment period is a consequence of the fact that wage bargainers do not react to expected values of variables but only to earlier observed values. This is something that is assumed but not derived from micro-economic underpinnings. Indeed, this type of behavior appears as non-rational, although it does seem to catch important aspects of real life.

Solow focuses on another type of interaction, namely that between those already employed (insiders) and those unemployed (outsiders). He uses this distinction to analyze the determination of equilibrium unemployment in a model with firm-specific unions. The question asked is why the unemployed do not bid

down wages in order to become employed. This question has also been analyzed by Lindbeck and Snower (1984), who assume that insiders set their wage at such a level that firms find it unprofitable to employ outsiders: because of hiring and firing costs and skill differentials, the insider's wage will still be above the outsiders' reservation wage.

Solow postulates a mechanism that is related to the Lindbeck-Snower one. He assumes that only insiders are members of the trade union, which enters into long-term wage contracts with the firm for both the present and future periods. Solow then examines the possibility that firms would employ outsiders with lower productivity than insiders in the present period in order to train them for employment in the future. He shows that it is in the interest of insiders to try to limit the size of the membership of the union by setting so high future wages that the firm is discouraged from employing and training outsiders in order to turn them into insiders (that also become union members). The reason is that the expected utility of a representative worker is declining with the number of union members, because his risk of unemployment is increased. A monopoly union will always set the wage in such a way with the consequence that business cycle variations will produce variations of the wage rather than of employment within firms. However, if the wage is set through a Nash bargaining solution, the firm has an influence on the wage, and the possibility does exist - not unexpectedly - that the future wage will be set so as to let in outsiders.

Solow thus adds a mechanism by which insiders may keep

out outsiders. But the approach suggests some questions. One is why outsiders accept that insiders set their future wages. Why do they not enter into long-term explicit or implicit contracts offering to work for lower wages than present insiders? Should this be explained in terms of the costs that the insiders can inflict on outsiders that get work in this way? Another question relates to the behavior of firms: could they not employ outsiders even at what appears today to be an unprofitable future wage in order to enlarge their labor pool and thus also the membership of the union and thereby create an incentive for it to reoptimize and chose lower wages in the future? In a seniority model, in which increased membership decreases the wage set by a monopoly union, this possibility ought to exist. A third question relates to the impact of size on trade union utility. As pointed out by Solow himself, casual empiricism would seem to suggest that many unions indeed strive for increased membership.

IV. Empirical testing

One obvious deficiency with the literature in this field is the lack of empirical testing. This volume provides a good illustration. Only Pencavel and McCallum focus on such issues.

It is clear from Pencavel's survey that empirical knowledge is scant. He surveys the empirical literature, for which he himself is responsible for a large part. His main conclusion is that there is some support for the view that both wages and employment enter into trade union utility functions, although estimated elasticities of substitution vary considerably between

studies and the knowledge of the precise functional forms seems very insufficient.

Pencavel also tries to complement earlier knowledge by estimating joint wage and employment equations for Sweden. He does find some weak support for the hypothesis that the trade union movements is concerned about both wages and employment, although a larger weight seems to be attached to stability of real wages than of employment. The study should, however, be seen only as a first attempt to employ the monopoly-union approach to Sweden. A main objection, raised by Holmlund in his comment, is that the testing is done on quartely data. This is less satisfactory, since actual contracts have been long-term (1-3 years). It would seem more natural to run the regressions on yearly data or even on wage contract periods as has been done in earlier studies (cf Nilsson (1984)). Another crucial question, also pointed to by Holmlund, is how wage drift, i.e. wage increases in excess of central agreements, should be taken account of. Is it just an institutional form for union-determined wage increases or does it change the character of centralized wage contracts?

McCallum's paper is concerned with the question of whether firms are on the labor demand schedule, which is the assumption made in most trade union models. He estimates equations explaining the links between factor shares, capital intensity and real wages, using pooled data for several countries, and finds support for the view that firms in fact are on the labor demand schedule. This leads to the policy conclusion that reduced real wages indeed are a

prerequisite for higher employment as assumed in nearly all trade union models.

McCallum also discusses how wage determination is affected by the system of wage bargaining. This is a question in need of empirical investigation since theoretical considerations point to effects working in various directions. On the one hand, the wage-raising effects of general accommodation policies discussed above will be diluted in a decentralized system: only a share of the employment created through government policies will affect the members of an individual union. On the other hand, there is the risk that individual unions, by neglecting the effects of their wage decisions on other unions, may force the economy to end up in inefficient prisoners' dilemma situations in a more decentralized system, as in Jackman's paper. McCallum finds some support for the view that inflation-unemployment trade-offs have developed more favorably in the post-oil-shock-period in "corporatist" economies with a high degree of centralization than in "non-corporatist" economies with decentralized wage setting.

McCallum's tentative results are in conformity with other studies such as those by Bruno and Sachs (1984) and McCallum (1983). It does, however, suffer from similar problems of interpretation. A first one is the lack of a firm theoretical underpinning as given by the recent trade union literature. A second one is the focus on adjustment capability: one system may in principle perform better on average but the pace of adjustment to shocks may be slower. A third one is that both the way in which

bargaining is conducted and wage flexibility may be endogenous variables, so that there is in fact no causal link running from the bargaining set-up to wage formation.

Since the theoretical literature suggests a number of questions that can only be answered by empirical testing, one would expect a heavier emphasis on this type of research in the future. A tentative list of important questions would involve at least the following: (1) How strong is the explanatory power of trade union models as opposed to those of other representations of wage formation? (2) Is the expected-utility formulation of trade union preferences to be preferred to other formulations? (3) Do both wages and employment enter into union utility functions or do unions only care about wages? (4) Is the monopoly-union assumption a reasonable approximation or do we need models with explicit bargaining behavior? (5) Can the determination of equilibrium unemployment be explained in terms of trade union and bargaining models as assumed in the papers in this volume? (6) Are the differences between centralized and decentralized systems really as large as indicated in the papers here, or is the formal degree of centralization just a veil hiding more fundamental forces that always exert their influence? (7) To what extent is the degree of centralization endogenous?

V. Concluding remarks

This volume gives, in my view, a good picture of the state of present knowledge about wage setting and trade union behavior. A large number of theoretical models that provide explanations

of important stylized facts have been developed in recent years. This should be regarded as an important achievement in itself. However, there is now a need also for more careful empirical testing.

The common feature of the new models is the attempt to explain wage and employment determination from optimizing behavior. The main differences between the models are due to differing assumptions on the institutional constraints under which agents optimize. These differences reflect the differing conditions in various countries, which I think the models catch in relevant ways. But a main criticism that could be directed against the papers is that a number of the institutional constraints that are crucial for the results are just taken as given and are not explained.

A number of institutional "puzzles" in the models used can be enumerated. Why are bargains between unions and employers not always efficient? Why do not decentralized unions collude? Why are there not always cooperative solutions between governments and trade unions? Why do long-term contracts without contingency clauses exist? Why are wage contracts desynchronized? In all cases one would be led to believe from the optimization paradigm that there are strong incentives for all parties to eliminate inefficiencies, since all could gain. Yet that does not happen in the real world. Hence there must be other considerations that prevent these gains to be exploited that our models do not catch. These could include factors such as bargaining costs, costs of coordinating behavior within large units,

risks of labor market conflicts etc. It has been a recurring theme of this introduction that it is now probably the time to introduce such factors into the analysis.

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