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CENTRALISATION OF WAGE BARGAINING AND MACROECONOMIC PERFORMANCE – A SURVEY

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INTRODUCTION

The wage bargaining systems of the OECD countries exhibit great differences. One extreme is represented by the United States and Canada with decentralised wage setting at the level of individual firms. The Nordic countries and Austria have traditionally represented the other extreme with highly centralised bargaining procedures. Other countries such as Germany, France, Italy, Belgium, and the Netherlands are between these polar cases with wage setting mainly at the industry level. The trend towards more decentralised bargaining in most European countries during the last decade has reduced these differences somewhat, but on the whole they seem to persist (Windmuller et *al.,* 1987).

The 1980s saw a growing interest in the macroeconomic consequences of various bargaining systems. It has been claimed that centralised wage bargaining is conducive to aggregate real-wage restraint and low unemployment (early references are McCallum, 1983; Bruno and Sachs, 1985; Bean *et al.*, 1986; Newell and Symons, 1987). This conclusion has provoked a large amount of research in the last few years, some of which has been based on the observation that both very centralised and very decentralised wage-setting systems seem to have been consistent with good macroeconomic performance (*e.g.*, Heitger, 1987; Calmfors and Driffill, 1988; Rowthorn, 1992). One lesson appears to be that the effects of the bargaining system on aggregate wage formation may be far more complex than was originally acknowledged. The aim here is to survey the recent literature in the field and discuss the possibilities to draw policy conclusions. The focus will be on the theoretical contributions, although the empirical research is also briefly commented upon.

The structure of the article is as follows. Section I discusses how aggregate wage determination is likely to be affected if the effects of wage increases for specific groups on the rest of the economy are internalised under centralised bargaining. Section II extends this analysis by incorporating the restraining power of market pressures under decentralisation. Section III highlights different dimensions of centralisation, whereas Section IV addresses the effects of multilevel bargaining. Section V provides a critical assessment of empirical work on centralisation and wage behaviour. Finally, tentative policy conclusions are drawn in Section VI.

I. INTERNALISATION EFFECTS AND CENTRALISATION

The effects of varying degrees of centralisation on the aggregate real wage have been analysed within different theoretical frameworks. The simplest ones are union wage-setting and efficiency-wage models (see Layard *et al.*, 1991, for an exposition of the main ideas). In the *monopoly-union* framework, wages are assumed to be set unilaterally by unions, which trade off the benefits from a real-wage increase for employed union members against the associated loss of employment. According to the *efficiency-wage* hypothesis, wages are instead determined unilaterally by employers, who weigh the disadvantages from higher wages due to the increase of the wage bill against the benefits in the form of more effort from the employees or reduced turn-over of labour. The most realistic models for western European conditions appear to be the *bargaining* models (Layard *et al.*, 1991), in which unions and employers negotiate about how the revenues from production are to be shared. These latter models involve a trade-off between the gains from a higher wage for the employees and the associated profit decrease for the employer. The revenue sharing also depends upon the alternatives that the two bargaining parties face in the event of a break-down of wage negotiations.

These frameworks all stress the economic incentives facing unions and employers. In this context it is natural to define the extent of centralisation as the degrees of *inter-union* and *inter-employer co-operation* in wage setting. A basic idea in the literature is that wage increases for one group have negative *externalities* on others that will be *internalised* under co-operative behaviour, and hence create incentives for wage restraint. Such internalisation effects will work on both sides of the labour market, since both other employees and other employers are likely to be adversely affected by wage increases in one part of the economy.

At least seven types of negative wage externalities have been treated in the literature.

i) A *consumer price externality* stems from the fact that "one man's wage increase is mainly another man's price increase" {Layard *et al.*, 1991, p. 132). Every wage increase in the economy contributes to a rise of the general price level and therefore to a fall in the real disposable income of all workers – and capital owners – that are not directly affected by the wage bargain (Strand, 1987; Calmfors and Driffill, 1988; Layard *et al.*, 1991; Moene *et al.*, 1993).

ii) An *input price externality* arises when wage increases in one part of the economy cause price rises for the products used as material inputs by other firms. The consequence will be lower output elsewhere and also lower employment if material inputs and labour are complements in production (Wallerstein, 1990; Layard *et al.*, 1991).

iii) A *fiscal externality* is imposed on the rest of the economy if wage increases in one sector causes unemployment there to rise and the associated cost for unemployment benefits have to be paid through higher taxes or lower government expenditure in general. A similar externality arises because a fall of output in one sector due to a real-wage increase there means a reduction of the aggregate tax base, which again will be paid for mainly by others (Blanchard and Summers, 1987; Calmfors and Driffill, 1988).

iv) Real-wage increases may impose an *unemployment externality* on the rest of the economy. The reason is that an unemployment rise in one sector makes it more difficult for laid-off workers everywhere in the economy to find new jobs (Hoel, 1991; Jackman, 1990; Layard *et al.,* 1991).

v) An *investment externality* may also arise under decentralised wage setting. Because of the turn-over of labour, some of the present employees in a given firm will quit before they can reap the benefits of higher future wages from present investment in new capital stock. This will lessen union incentives for current wage restraint in order to promote such investment (Rødseth, 1985; Hoel, 1991).

vi) If the welfare of individual workers depends negatively on the wages of others, every wage increase in the economy will have an *envy externality* that reduces the welfare of others (Oswald, 1979; Gylfason and Lindbeck, 1984; Calmfors, 1993*a;* Udden-Jondal, 1993).

vii) Finally, there may be an *efficiency-wage externality* on the employer side. It arises if the effort of employees depends upon their relative wage, in which case one employer's wage increase will reduce effort elsewhere. Alternatively, a wage rise in one firm may make it more difficult for other employers to recruit and keep labour (Hoel, 1989; Layard, 1990; Moene *et al.*, 1993; Rødseth, 1993).

The above externalities have all been used to explain why centralised bargaining is likely to produce a lower aggregate real wage and hence, according to a standard negatively sloped labour-demand schedule, higher employment. The simple idea is that inter-union and inter-employer co-operation imply that the effects on others of a wage increase in one part of the economy will be considered. Thus the marginal benefit of a real-wage increase is reduced and/or the marginal cost increased. As a consequence, the incentives for real-wage restraint ought to be strengthened when bargaining is centralised.

Yet another advantage of centralised bargaining may be that it provides a mechanism of handling *information* on the aggregate economic development and therefore of *co-ordinating* the behaviour of various wage setters. These aspects have recently been stressed by Bhaskar (1990). In his analysis the individual wage setter has strong incentives under decentralised conditions to match the *expected* aggregate wage because of envy or efficiency-wage considerations. This makes *multiple equilibria* possible (in Bhaskar's terminology there does not exist a given *natural rate* of employment but instead a *natural range, i.e.*, a whole set of equilibrium employment rates). Which equilibrium is realised will depend on the perceptions of the wage behaviour of others. For instance, if everyone anticipates wages to be high, they will indeed be set high, so that expectations are fulfilled *ex post* and thus turn out to be rational.' It follows that centralised bargaining may be one way of ensuring that the economy ends up in "good" instead of in "bad" equilibria.

Somewhat paradoxically, adaptive expectations with respect to the aggregate wage as well as staggered wage setting of the British or the U.S. type may facilitate co-ordination in the sense that they remove the ambiguity introduced by a range of self-fulfilling rational-expectations equilibria. But such a lack of *syn*-chronisation, of course, makes it impossible for the economy to react swiftly to a change of macroeconomic conditions, as was much discussed in connection with the oil price shocks of the 1970s and the disinflation of the early 1980s (*e.g.*, Bruno and Sachs, 1985; Jackman, 1986; Layard *et al.*, 1991). However, a possible conclusion from the above discussion is that synchronisation of pay deals with respect to time is not necessarily favourable in the absence of a mechanism of co-ordination.

II. THE HUMP-SHAPE HYPOTHESIS AND THE EFFECT OF COMPETITIVE PRESSURES

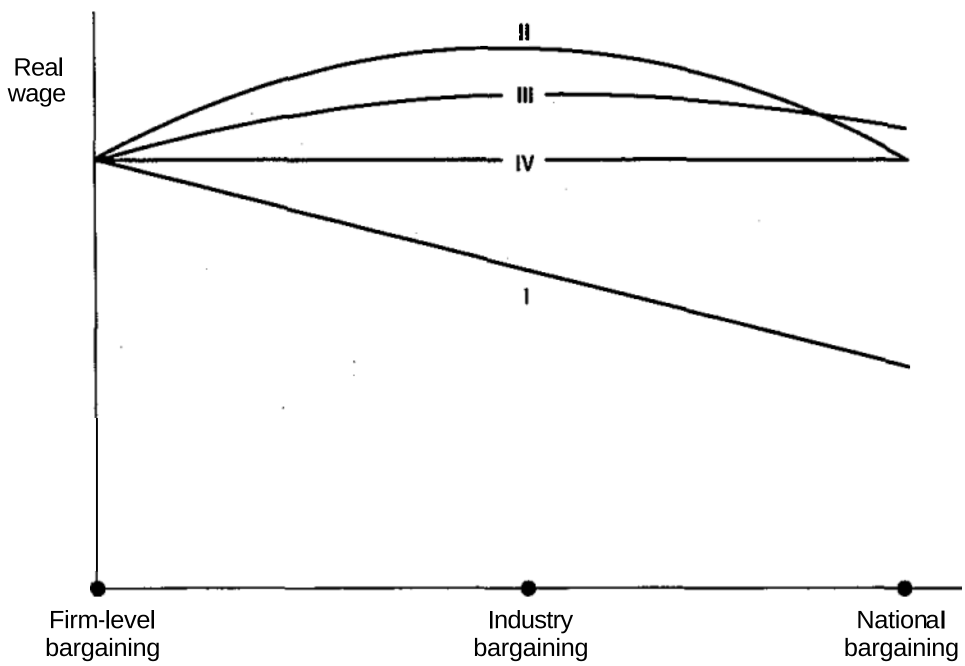
The externality arguments suggest a monotonic negative relationship between the extent of centralisation and the aggregate real wage, as depicted by the line I in Figure 1. This does not, however, take into account that the degree of centralisation may also affect the market power of wage setters, and that competitive pressures can therefore help to restrain wages under decentralised bargaining. These issues have been analysed by Strand (1987) and Calmfors and Driffill (1988), and later on by Rowthorn (1992), Danthine and Hunt (1993) and Driffill and van der Ploeg (1993).

A. The basic theoretical argument

The Calmfors-Driffill hypothesis is that both very centralised and very decentralised bargaining systems are likely to produce real-wage moderation and high employment. In the former case this is explained by the internalisation of the various wage externalities discussed above, in the latter by the restraint imposed by market forces. The highest aggregate real wage and the lowest employment may be associated with intermediate centralisation in the form of bargaining at the industry level, because then both market forces and the internalisation effects could be too weak to restrain wages. The result is then a hump-shaped relationship between the extent of centralisation and the real wage, as illustrated by curve II in Figure 1.

The reasons for a hump-shaped relationship can be explained in more detail as follows (Calmfors and Driffill, 1988; Moene *et al.*, 1993; Calmfors, 1993*a, b,* c). Consider the incentives for raising the real consumption wage (the nominal wage deflated by the consumer price index) in a bargaining model, where unions care both about the real consumption wage and employment, and employers about the real value of profits (nominal profits deflated by the consumer price index). When wage bargaining concerns a whole industry, so that wages are raised simultaneously across all firms producing similar products, the possibility of shifting pay rises on to consumers via an increase of the relative output price are great. This will hold back the rise of the sector's real product wage (the money wage deflated by the producer price). Since employment is determined by the real product wage, the employment loss from a given increase of the real consumption wage is

Figure 1. **The extent of centralisation and the aggregate real wage**



Relationship I: an economy with strong externalities.
Relationship II: the case of a closed economy.
Relationship III: the case of an open economy.
Relationship IV: the case of an open economy when domestic and foreign goods are perfect substitutes.

reduced. This weakens the incentives for wage moderation on the union side. Similarly, the output price increases reduce the profit decrease from a given increase of the real consumption wage, so that the incentives for wage restraint are weakened on the employer side as well.

Compare then the case of industry bargaining with the two extremes of completely decentralised wage setting at the level of the individual firm and completely centralised wage setting at the national level. Assume furthermore that there is perfect competition in the goods market, that the economy is closed, *i.e.,* that there is no foreign trade, and that the only externality is the consumer-price one discussed in Section I. Since the individual firm is a price taker under perfect competition, it follows that it cannot raise its relative price when the real consumption wage is increased in the firm only, but not elsewhere in the sector. Hence there is no relative-price offset to the employment and profit decreases from a real-consumption-wage increase under decentralised bargaining. Exactly the same result will hold if we instead consider completely centralised bargaining at the national level. The simple explanation is that, if real consumption wages are raised uniformly throughout the economy, no relative price can change (provided that sectors are perfectly symmetrical). Therefore a given increase of the real consumption wage will give the same employment and profit effects under complete centralisation as under complete decentralisation. Since incentives are affected in the same way, the result under the stated assumptions is the same real wage in both cases. It must be lower – and hence employment higher – than under industry bargaining.

B. Extensions to the basic model

The conclusion that bargaining at the level of the individual firm and at the national level gives the same aggregate real-wage outcome should, however, be regarded only as a benchmark case. In a complete analysis, additional considerations need to be introduced.

i) The possibility that individual firms can raise their relative prices under decentralised wage setting was ruled out above by the assumption of perfect competition in the product market. In the more realistic case of *monopolistic competition,* such a relative-price increase will indeed be the result of a wage increase in the individual firm. This weakens the incentives for wage restraint under decentralised wage setting (Cahuc, 1987; Moene *et al.*, 1993). In Figure 1, the left-hand part of the hump-shaped relationship is shifted upwards. The conclusion that industry bargaining gives the highest aggregate real wage is, however, still likely to hold, since inter-union and inter-employer co-operation *within* industries will result in larger increases of market power than co-operation *between* industries (and hence a larger increase of the possibilities to raise relative output prices in the case of uniform wage increases across all co-operating firms). The reason is, of course, that the products within an industry are closer substitutes than the aggregate outputs of different industries (Layard *et al.*, 1991).

ii) The result that no relative output price can change if wages rise uniformly across all (symmetrical) sectors hinges on the assumption that the economy is closed. In an *open economy* with foreign trade, there still exists a wedge between the real consumption and real product wages, because part of the consumption basket is made up by imported goods. Since the relative price between domestic and foreign goods will rise if the real consumption wages in all domestic firms rise, the employment and profit losses from wage increases are dampened also under centralised bargaining in an open economy. The more open the economy is, the higher the right-hand end point of the hump-shaped relationship in Figure 1 will be as compared to the left-hand end point (as indicated by curve III).[2] Indeed, if the only externality is a consumer-price one, completely centralised wage setting in an open economy must result in higher real wages than if wage determination can be decentralised to perfectly competitive firms (Layard *et al.*, 1991; Calmfors, 1993*a, b;* Driffill and van der Ploeg, 1993). When there is monopolistic competition between firms (see item *i)* above), it is less clear which of the two extremes produce the most real-wage restraint in an open economy.

iii) The conclusion that an intermediate extent of centralisation (wage setting at the industry level) may produce worse macroeconomic outcomes than both very high and very low degrees of centralisation rests on the assumption that a substantial amount of competitive pressures for wage restraint is eliminated if *domestic* producers bargain together. The increase in market power will, however, be less, the more important is *international competition,* since foreign competitors are not encompassed by domestic wage increases. As has been demonstrated by Danthine and Hunt (1994), the hump in Figure *1* will be lower the more international competition there is (curve III has been drawn so that it is flatter than the closed-economy relationship II). Indeed, if domestic and foreign products are perfect substitutes, it would be impossible for domestic firms within a given sector in a small open economy to raise their relative price even if they co-operate (Calmfors and Driffill, *1988;* Moene *et al., 1993).* In this case, the relationship between the extent of centralisation and the aggregate real wage degenerates into a horizontal line like IV in Figure *1* (Calmfors, 1993*b*).

iv) It has *so* far been assumed that the only externality is a consumer price one. As soon as one takes the *other externalities* discussed in Section II into account, strong arguments are added why nation-wide bargaining ought to result in lower real wages than bargaining at the level of the firm (Calmfors and Driffill, *1988;* Calmfors, 1993*a, b*). The extent of internalisation under industry bargaining is, however, still likely to be too small to have a substantial effect on wage determination in that case.

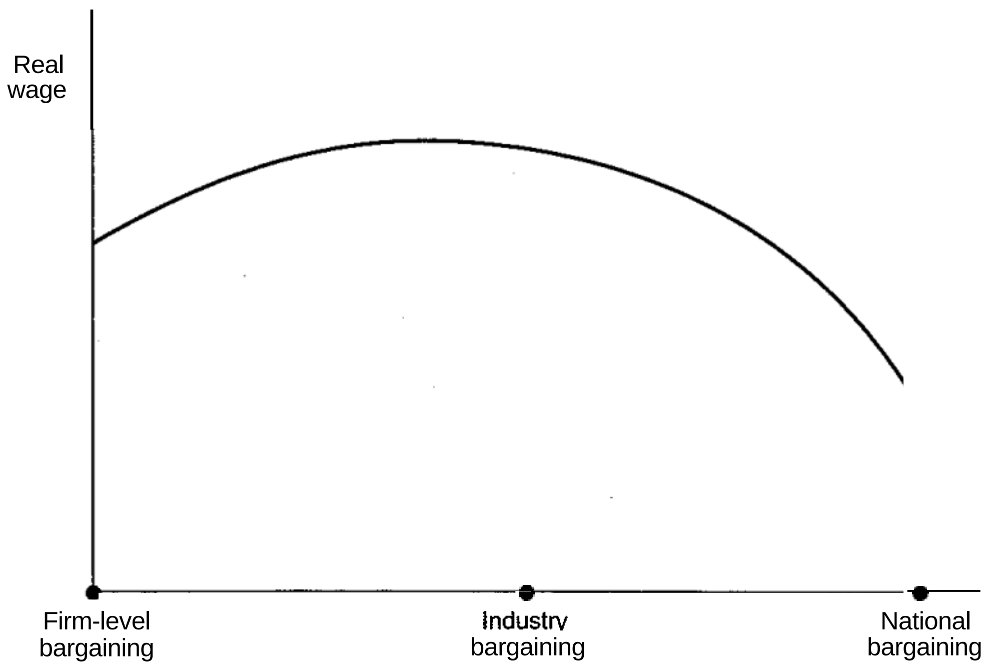
v) The analysis above has not considered the *insider-outsider issue* that has received so much attention in recent years, (see, for example, Gottfries and Horn, *1986;* Blanchard and Summers, *1986;* or Lindbeck and Snower, *1988).*The point of this literature is that temporary shocks reducing the level of employment are likely to raise wages permanently, because the unemployment risks of insiders become smaller when their number is reduced, which weakens their incentives for wage moderation. It is often argued that these effects should be weaker under centralised bargaining, because unemployed workers remain union members and are not disenfranchised to the same extent as under decentralised wage setting (Blanchard and Summers, *1986;* Layard *et al., 1991*; Ramaswamy and Rowthorn, *1992;* Moene *et al.,* 1993). To the extent that this holds true, the incentives for real-wage restraint ought to be stronger under centralised as compared to decentralised bargaining after adverse labour-demand shocks. It is not evident though how large the difference is likely to be, since it ought to be the same insiders that co-operate under centralised wage setting as those who decide union wage policy under decentralised bargaining.[3]

vi) The extent of decentralisation may also affect the *relative bargaining strength* of employers and employees because the alternative welfare levels in the event of a labour-market conflict (the fall-back positions of the parties) are changed. In this context it is important to distinguish between the two sides of the labour market. On the one hand, co-operation between unions within an industry that negotiate with individual employers one at a time lowers union strike costs to the extent that workers in competing firms benefit when these gain market shares during a conflict (Davidson, *1988).* On the other hand, employer co-operation within an industry may be designed precisely to internalise or prevent the profit consequences of demand spillovers to other firms during labour market conflicts (Dowrick, 1993*a*). Layard *et al. (1991)* and Layard and Nickell

(1992) have stressed how employer co-operation is likely to reduce workers' possibilities of finding *alternative jobs* during a conflict. It is less clear though how employer co-operation at the national level affects the relative bargaining positions. The argument has been made in, for instance, Sweden that *political constraints* on the employer side on using economy-wide lock-outs in response to union strikes confined to key groups of workers may favour the union side (Elvander, 1988; Calmfors and Forslund, 1990).

vii) A neglected issue in the literature is how the extent of centralisation is likely to affect wage setting in the *public sector.* The argument that decentralised bargaining may produce wage restraint because of competition between different production units does not apply in this case (unless public-sector production is opened up for competition, which may be possible in some cases but not in others). One way of reasoning focuses instead on fiscal discipline as a key factor. Attempts to create incentives for wage moderation in the public sector through cash limits for government spending may not be *credible* under centralised bargaining, because large pay rises can then result in general cut-backs of public services that are regarded as politically intolerable. One would expect it to be easier to adhere to strict fiscal discipline in the case of *local* bargaining within the public sector, because the parties to such wage agreements cannot expect to influence the central government cash limits. In addition, it may be difficult for the central government to act as a tough employer under centralised bargaining, since it will then in effect be negotiating with a significant share of the electorate (Calmfors *et al.,* 1985, 1988).

Figure 2. **The most likely relationship between centralisation and the aggregate real wage**



Summing up, *my* conclusion is that on balance one should expect complete centralisation (inter-union and inter-employer co-operation at the national level) to produce more real-wage restraint than complete decentralisation (non-cooperative wage setting at the level of the individual firm). One might therefore expect a relationship like in Figure 2. Moreover, it appears important to distinguish between different sectors of the economy. In tradeable sectors with strong foreign competition, the differences in terms of wage outcomes may be small between bargaining at industry and firm level. Industry bargaining is more likely to lead to higher wages than firm-level bargaining in the private non-tradeable sectors. This presupposes, however, that there is a reasonable number of domestic competitors. When this is not the case, policies strengthening competition may be a necessary prerequisite for decentralised bargaining to deliver wage restraint. Especially under industry bargaining, increased international integration of markets for goods and services may be a powerful tool of increasing pressures for wage moderation.[4] However, this will succeed only if inter-union and inter-employer co-operation in wage bargaining *across borders* but *within sectors* (for instance, in a more integrated Europe) is avoided.[5]

C. Centralisation and decentralisation in practice

Although the *theoretical* results above are clear-cut, the *practical* conclusions are more ambiguous. The reason is that actual wage bargaining systems seldom conform to their theoretical counterparts. There is neither complete centralisation with nation-wide determination of all wages nor complete decentralisation with independent bargaining at the level of individual firms. In terms of Figure 2, one does not therefore find oneself at any of the extremes. Instead actual wage bargaining is characterised by various hybrid forms.

Much of the literature exaggerates the actual amount of centralisation in, for instance, the Nordic countries (*e.g.*, Bruno and Sachs, 1985; Newell and Symons, 1987; Layard, 1990; Jackman, 1990; Layard *et al.*, 1991). In these economies there has never been complete centralisation in the sense that all wages have been determined in the same bargain. Instead, the traditional systems are better characterised as *semi-centralised ones,* where wages have been determined by a small number of bargaining units (Elvander, 1988; Calmfors and Forslund, 1990; Calmfors and Nymoen, 1990). Complete centralisation does not appear a feasible alternative even in small and homogeneous countries like the Nordic ones or the Netherlands; it is, of course, out of the question in larger economies – because of the inherent difficulties of holding large coalitions together and the problems of handling all the information necessary (Freeman, 1988; Moene *et al.*, 1993). It is likely to make an important difference for the degree of wage moderation whether the effects of wage increases are internalised completely or only partly.[6] The existence of a few, very large and competing wage-earner organisations may also reinforce union concerns over relative wages as compared to more decentralised systems, with the consequence that the incentives for wage restraint are weakened (Calmfors, 1986; Udden-Jondal, 1993).

An equally important consideration concerns the actual degree of co-operation in decentralised systems. A substantial amount of *informal* co-operation may emerge also when wage bargaining is formally decentralised. Since wage increases in one part of the economy have strong influence on other sectors, there will in this case be strong incentives for informal consultations between bargaining units on each side of the labour market. These tendencies have been claimed to be the strongest on the employer side, where there usually exist strong business and personal ties between different firms, and where it may be profitable for them not to jeopardise their long-run relationships through "irresponsible" wage-setting behaviour (Soskice, 1990). One would, however, expect similar mechanisms to operate for unions as well. They, too, have strong incentives to maintain stable long-run relationships, for instance, in order to achieve common political aims and to be able to form a united front against employers on issues that may be negotiated at more centralised levels also when *wage* bargaining is decentralised, including working time, bargaining procedures and rules for settling disputes about the interpretation of contracts, etc., (Flanagan *et al.*, 1983; Bratt, 1986; Windmuller *et al.*, 1987). It has been argued that such informal inter-union and inter-employer co-operation is a characteristic feature of both the German and the Japanese bargaining systems (in the former case across industry employer associations and across industry unions, in the latter across individual employers and across local unions at the firm level – see, for example, Windmuller *et al.*, 1987, or Soskice, 1990).

One reason why some co-operation on both sides of the labour market is always likely to emerge is the demand for insurance against labour market conflicts. A main function of employer associations and union confederations at industry or national levels in many countries is to provide such insurance through the build-up of central conflict funds (Soskice, 1990). Indeed, the need to pool conflicts risks appears historically to have been one of the driving forces behind the emergence of more centralised labour market organisations in the first place (Skogh, 1984). Such an insurance system does create trade-off problems under independent decentralised bargaining. On the one hand, compensation in the case of conflicts must be high enough to provide the individual firm (union) with sufficient bargaining strength relative to the other side. On the other hand, high compensation levels create problems of moral hazard, because the incentives for the insured agents to avoid labour market conflicts are weakened. Some kind of influence from the insurer (employer associations and industry unions/union confederations) on local wage bargaining is a natural way to deal with these problems.

Many formally decentralised wage-setting systems are characterised by so called *pattern bargaining, i.e.,* by a stable pattern according to which some sectors (or firms) act as wage leaders, setting the pace for wage increases in the whole economy (Flanagan *et al.*, 1983; Windmuller *et al.*, 1987). In systems where the actual bargaining takes place at the industry level, the metal and engineering sectors often fulfil this role (*e.g.,* in Germany, Australia, Austria, Denmark, the Netherlands, New Zealand, and recently Sweden). Such bargaining practices can be regarded as a method of informal co-operation, where the employer association and the union in the wage-leading sector not only consider their own interests but also negotiate "on behalf" of all employers and unions in the economy (Soskice, 1990). Alternatively, key-sector bargaining of this type can be viewed as another form of intermediate centralisation, where the wage-leading employer association and union only take their own objectives into account but recognise that the wage they set will affect other wage decisions and hence have implications for their own members' welfare (Calmfors, 1987; Wallerstein, 1990). This may also help to promote wage restraint. Suppose that a wage increase in the wage-leading sector tends to raise all wages in the economy. If wage increases have negative externalities, it is then in the interest of the employers and employees in the key sector to restrain wages as compared to a non-cooperative situation with independent bargaining, because their wage increases will trigger off wage increases for others that reduce the own welfare.[7] In general, the resulting outcome will not be as favourable for employment as full co-operation, but it will be more favourable than with non-cooperative wage setting (Calmfors, 1987; Calmfors and Forslund, 1990).[8] In addition, key-sector bargaining may provide an efficient means of co-ordinating expectations about wage increases, as discussed in Section I.

III. DIFFERENT DIMENSIONS OF DECENTRALISATION

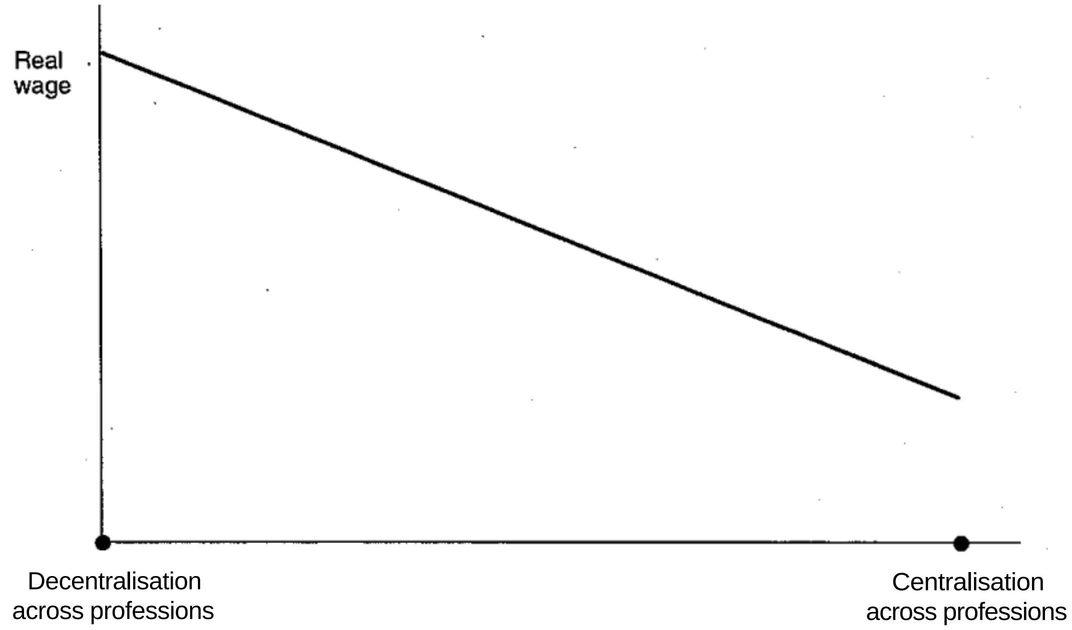
The discussion on bargaining institutions is usually focused as above on whether wage setting should occur at the level of the firm, the industry or the nation, *i.e.*, on what Moene *et al.* (1993) have labelled the extent of *vertical centralisation.* There are, however, other dimensions as well. The consequences of decentralisation according to profession (trade) or along regional lines and the size of the unionised sector will be treated briefly.

A. Decentralisation according to profession

Consider first unions that organise different professions. The most obvious example of independent decentralised bargaining by such unions – *horizontal decentralisation* – is, of course, the United Kingdom, where several unions for different professions that all bargain independently may coexist at the same work place. Similar conditions occur in Australia and New Zealand. But also in the Nordic countries, white-collar and blue-collar workers have traditionally had separate unions and bargained independently. In continental Europe it is more common that unions organise both blue-collar and white-collar workers.

The hump-shaped relationship between vertical centralisation and real wages, as discussed in Section II, rested on the assumption that bargaining at the industry level means a substantial increase of the market power of wage setters as compared to bargaining at the level of the firm, because negotiations then encompass the producers of close substitutes. It is unlikely that a similar argument would hold in the case of horizontal centralisation across professions, which ought not to be as easily substitutable for each other as are the outputs of different firms within an industry. If one draws a diagram with the extent of horizontal centralisation and real wages on the axes as in Figure 3, one should therefore expect a monotonically negative relationship between the two variables. This *must,* of course, be the case if different professions are (gross) comple-

Figure 3. The extent of horizontal centralisation and the aggregate real wage



ments, so that a pay rise for one group reduces employment for others and vice versa.[9]

Considerations with respect to the relative bargaining strength of employers and unions give similar conclusions. If individual groups of workers by themselves can inflict heavy production losses on the employer, the relative bargaining power of the union side becomes larger if unions negotiate separately instead of jointly (Horn and Wolinsky, 1988; Dowrick, 1993*a*).[10] The outcome is higher wages and lower profits. There are hence likely to be benefits in terms of wage moderation from co-operation in wage bargaining between different professions, for instance, white-collar and blue-collar workers (Wallerstein, 1990; Moene *et al.*, 1993). Such benefits of horizontal co-operation are obtained independently of at which *vertical* level (the nation, the industry or the firm) bargaining occurs.

Against this background it is interesting to register the recent tendency in the United Kingdom for different unions to bargain jointly with the employer (Windmuller et *al.*, 1987) as well as the tendency to adopt a single status for white-collar and blue-collar workers (Elvander, 1991). Sweden provides another example of how especially the employer side appears to aim for a change of the bargaining system so that all categories of employees should be encompassed by the same collective agreement (Elvander, 1991).

Note also that the above analysis applies only to co-operation across professions. Another issue is how wage setting is affected by decentralisation where several unions organise the same type of employees. This is often the case in France, Italy, Belgium, and the Netherlands, where unions are split along political and confessional lines (Flanagan et *al.*, 1983; Bratt, 1986; Windmuller *et al.*, 1987). Decentralised bargaining by unions that organise workers who are substitutes in production ought not to have the wage-raising effects discussed above. The risk of losing employment opportunities to other unions ought to promote wage restraint under these circumstances, just as competition between firms does (*cf.* Section II). This effect may, however, be counteracted to the extent that competing unions try to attract members through proving their ability to raise wages. It remains unclear, though, how important these considerations are in practice, since bargaining co-operation between different unions is frequent in the countries mentioned above and the same collective agreement often encompasses the members of all unions (Flanagan *etal.,* 1983; Windmuller *etal:,* 1987).

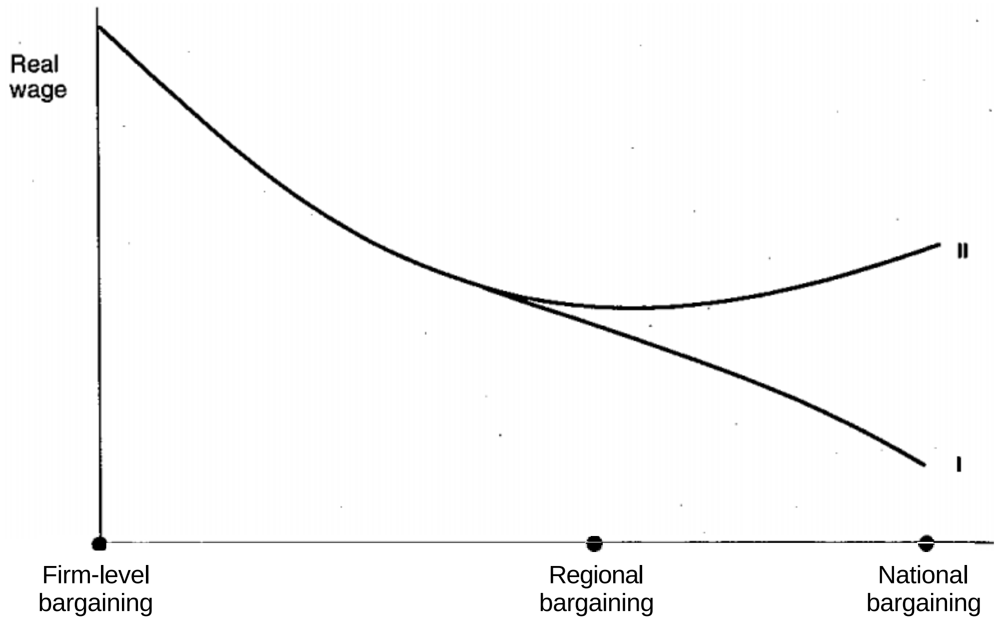
B. Centralisation by region

A second rarely discussed dimension is the *regional* one. This is surprising since bargaining at the regional level occurs *across* sectors in, for example, Belgium and Switzerland, and *within* industries in, *e.g.*, Germany, the United Kingdom, and Austria.

Co-operation in wage setting between different industries *within* a region is likely to contribute substantially to real-wage restraint, because several of the externalities that were discussed in Section I will be internalised already at this level. One reason is that the labour market is primarily regional. Hence the employers in a region ought to have a strong interest in preventing their competition for labour spilling over into higher wages. Unions should also have incentives to restrain wages regionally in order to provide alternative employment opportunities in the case of lay-offs. Moreover, regional and municipal taxes play an important role in many countries, which ought to motivate wage moderation in order not to reduce the regional tax base. Wage increases in a region also have negative effects on the regional price level, especially in the service sector, where the proportion of "non-tradeables" across regions is high. In addition, within regions, envy effects of wage increases may be important because it appears most natural to compare one's own wage with those living in the same area (see, *e.g.,* Nilsson, 1987). Finally co-operation within regions is likely to entail smaller reductions of competitive pressures for wage restraint than industry bargaining, since firms to a large extent compete with firms in other regions.

These considerations suggest that intra-regional co-operation across industries in wage setting ought to result in lower real wages and higher employment than intra-industry co-operation across regions. One might expect a monotonic negative relationship between the extent of geographical centralisation and the aggregate real wage, instead of a hump-shaped one, if the intermediate level of centralisation is the regional one, as depicted by curve I in Figure 4. A possible conclusion illustrated in the figure is that the major part of internalisation of negative wage externalities takes place already when going from independent bargaining at the level of the firm to co-operation within the region, so that the further gains in terms of wage moderation of moving to centralisation at the national level may be limited. *Theoretically,* one cannot even rule out the possibility that intra-regional co-operation across industries might produce more real-wage restraint than bargaining at the national level (curve II in Figure 4). In that

Figure 4. The extent of centralisation in the regional dimension and the aggregate real wage



case there would exist an optimal size of the region from the point of view of aggregate wage setting: on the one hand, it should be small enough that there is sufficient inter-regional competition; on the other hand, it must be large enough to allow the key externalities from a decentralised regime to be internalised.

If regional bargaining occurs only *within* industries, the internalisation effects will, of course, be weaker. But the internalisation of unemployment and competition-for-labour externalities could still be substantial if the bulk of the mobility of labour in the region is within rather than between industries. Similarly, wage comparisons are likely to be more important within than between sectors (Nilsson, 1987).

C. The extent of unionisation

A third dimension is the degree of unionisation. A fall in union density can be seen as a move toward decentralisation but will have different effects than reduced co-operation between unions. In this context it is important to distinguish between *union membership* in unionised firms and *union coverage, i.e.*, the share of the economy that is covered by collective agreements (Layard *et al.*, 1991). The differences between OECD countries in these respects are as pronounced as the differences in bargaining structure *within* the unionised sector (OECD, 1991).

Union membership in a given firm determines how large a fraction of the labour force can go on strike, and hence also the damage that the union can inflict on the employer in the case of a conflict. Therefore, a decrease in union membership weakens the relative bargaining strength of the union and thus tends to restrain wages and increase employment (Bean *et al.,* 1986; Layard *etal.,* 1991).

When union coverage is not complete there exists a non-unionised sector alongside the unionised one. As a first approximation, one can assume the wages in the non-union sector are set so as to equalise the supply and demand of labour there (Minford, 1983; Oswald, 1986). In a long-run analysis, a reduction of *union coverage* can be seen as an increase in the supply of non-unionised jobs that takes place at the expense of the supply of unionised jobs. This is equivalent to a shift of labour demand from the unionised to the non-unionised sector, as discussed by Layard *et al.* (1991).[11] In the union sector, the result is likely to be a fall of both wages – because the number of well-paid union jobs that may provide alternative employment for laid-off workers is reduced – and employment. In the non-union sector, both wages and employment will rise. The *average* wage in the economy is likely to be reduced because the non-union wage is lower than the union wage. The effects on *total* employment are ambiguous. On the one hand, the real-wage increase in the non-union sector raises the supply of labour to it. On the other hand, if non-union jobs are regarded as inferior to union ones (because they are lower paid) labour force participation may drop, so that the supply increase to the non-union sector becomes smaller than the employment decrease in the union sector. The net outcome is theoretically ambiguous, although one might expect the former effect to dominate (Layard *et al.*, 1991; Layard and Nickell, 1992).

Changes in union coverage may have different effects depending upon the degree of centralisation within the unionised sector. The wage-reducing effect discussed above occurs at both high and low degrees of centralisation. But at high degrees of centralisation, a decrease in union coverage also means that the extent of internalisation of various externalities (see Section I) is reduced (Holden and Raaum, 1992). Hence the wage reduction in the union sector due to a fall in union coverage should be larger under decentralised than centralised bargaining.[12] This might go some way towards explaining why both economies with centralised bargaining in the union sector and high union coverage (such as Austria and Sweden) and economies with decentralised bargaining and low union coverage (such as the United States) have performed well with respect to employment in the past (Layard, 1990; Layard and Nickell, 1992).

IV. MULTILEVEL BARGAINING

The above analysis has implicitly assumed that wage setting occurs at one level only. It does not take into account that the centralised systems of, *e.g.*, the Nordic countries have in effect involved *multilevel bargaining,* since national and/ or industry wage agreements have regularly been followed by local bargaining about their implementation. These subsequent local wage negotiations have consistently resulted in wage *drift, i.e.*, money wage increases in excess of the ones agreed at higher levels of bargaining.

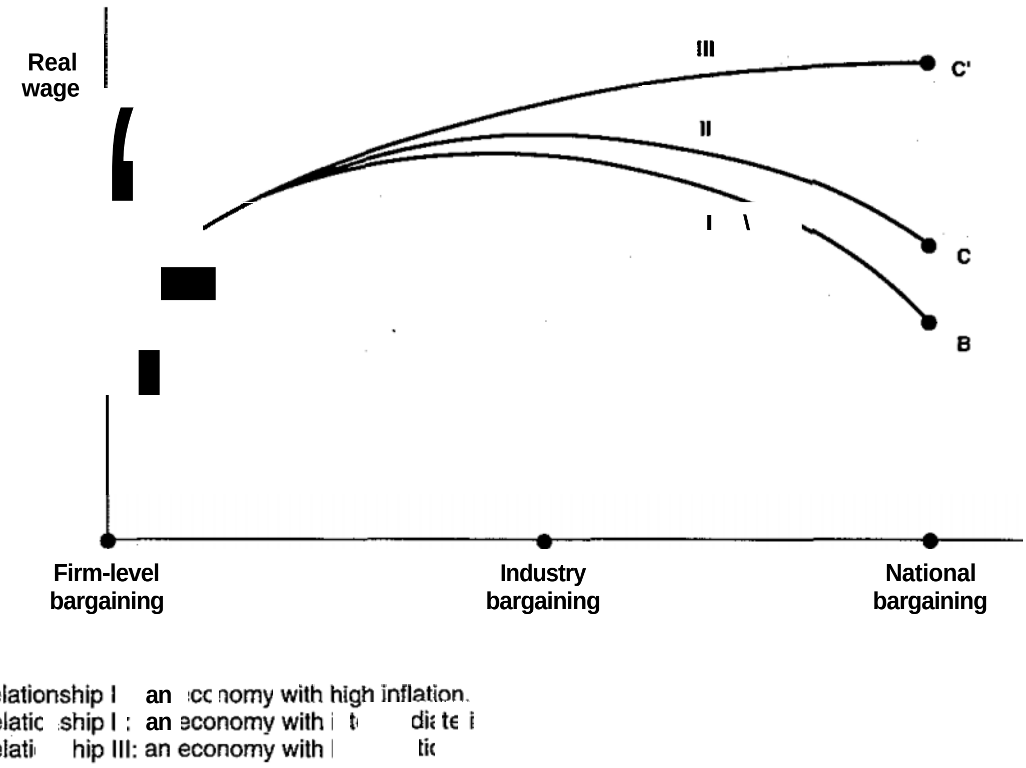
The *interaction* between central wage agreements and wage drift in the Nordic counties has long been a neglected research area. In recent years, however, game-theoretical models, which analyse wage drift as the outcome of local bargaining (*e.g.*, Holden, 1988; 1990*a*, ***b;*** Holmlund and Skedinger, 1990; Calmfors, 1993*a*) have been developed. A basic conclusion is that one should *always* expect wage drift if the subsequent local bargaining takes place under a peace clause, which has typically been the case in Finland, Norway and Sweden (once the contracts at higher bargaining levels have been concluded). The reason is that the bargaining positions of the parties at the local level then become asymmetrical. On the one hand, employers are obliged to pay workers the centrally agreed money wage, but on the other hand workers can inflict damage on the employer through informal methods if the local parties fail to reach an agreement (by working to rule, by go-slow actions or just by individually providing less effort).

Because of the asymmetrical bargaining positions, the employees can obtain extra wage increases in the local negotiations. Wage setters at higher levels must therefore be able to adjust the wage increases there to the subsequent wage drift, if the wage moderation they desire is to be achieved (Calmfors and Forslund, 1990; Rødseth and Holden, 1990). At least at low rates of productivity growth this is likely to mean *real-wage cuts* as a result of the bargaining at the central level. Whether these can be made large enough for the central real-wage target not to be exceeded is likely to depend upon the rate of price inflation. The reason is that it is hard to envisage central *money wage decreases.* Experience even seems to suggest that there may be a lower floor for central money wage *increases* of around 1 to 2 per cent per year. It is true, of course that it is hard to explain such money-wage rigidities from traditional assumptions about rational behaviour. Still, it does represent a "stylised fact" that we need to take into account.

A possible hypothesis is therefore that high inflation may be a necessary prerequisite for a multilevel bargaining system to deliver real-wage restraint (Holden, 1992; Calmfors, 1993*a*). On the one hand, central bargainers may strive for real-wage restraint because of the various internalisation effects discussed above. On the other hand, they may be unable to achieve it, unless inflation is high enough to make central money wage increases consistent with real-wage moderation when there is local wage drift. This may explain the coincidence of high inflation and real-wage moderation which characterised the Nordic economies in the 1980s (Calmfors and Nymoen, 1990; Calmfors 1993*a*).

It thus appears that the rate of inflation may affect the relationship between the degree of centralisation and real wages. The implicit assumption is then that centralised wage setting involves bargaining at several levels, whereas decentralised bargaining does not. At low rates of inflation, the hump-shaped relationship from Figure 2 ought to be shifted more upwards the further to the right one is in the diagram. It may shift to II or III as in Figure 5, where the ranking between national and firm-level bargaining in terms of real-wage restraint has been reversed (C and C' are above A, whereas B is below). As the curves have been drawn, decentralised wage setting thus produces more real-wage restraint than centralised bargaining at low rates of inflation. It does not, however, produce as much real-wage moderation as centralised bargaining with *high* inflation, but in the diagram this real-wage outcome is not a feasible alternative in a low-inflation society.

Figure 5. The extent of centralisation and the aggregate real wage under multi-level bargaining and low inflation



A possible conclusion is that the *number of bargaining levels* may be as important as the extent of formal centralisation when there is low inflation. This may put, for instance, the Japanese, German and Austrian bargaining systems in another perspective. A plausible hypothesis is that the success in achieving *both* low inflation *and* reasonable employment growth in these countries may have something to do with the fact that bargaining takes place only at one level – the enterprise one in Japan, and the industry one in Austria and Germany – even though there is strong inter-union and inter-employer co-operation.

The ambitions of higher-level organisations to influence relative wages may be an important factor influencing the functioning of multilevel bargaining systems. The difficulties of reducing *money wages* mean that the higher the central ambitions of affecting the wage distribution, the more "nominal room" is needed at the central level and the more wage drift may be induced at the local level in order to counteract the "distortion" that has been imposed on the wage structure. This has been highlighted as a serious problem in Sweden (Calmfors, **1992).** Hibbs and Locking **(1991)** have presented empirical evidence in favour of the hypothesis that an increased central push for wage equalisation have raised both central and total money wage increases in Sweden.

The Swedish experience can be compared with that of Austria and Germany, where central attempts to even out wage differentials have been much weaker (Flanagan **et** *al.*, **1983;** Broms, **1992).** In the German system, industry negotiations are not about *actual* wages but about *minimum* wages that are only binding for but a few workers: the minimum wage increases agreed at the industry level, however, act as guidelines also for the actual wage increases, but unions do not seem to interfere in the distribution within firms as long as the total wage increases there conform to the norm. This may be a necessary prerequisite for combining bargaining at the industry (or the central) level with low inflation.

V. EMPIRICAL RESEARCH

The discussion about the centralisation of wage bargaining and macroeconomic performance has provoked a substantial amount of empirical research during the last decade. The focus has been on testing the rival hypotheses of whether there is a monotonic relationship between centralisation and aggregate real wages (macroeconomic performance) or whether both centralised and decentralised systems do better than intermediate ones (the hump-shape hypothesis). Two types of studies can be distinguished: *i)* those that have related centralisation to various measures of macroeconomic performance; and *ii)* those that have concentrated on various parameters in estimated aggregate wage equations. The focus has been on explaining Cross-country differences.

A. Studies of centralisation and macroeconomic performance

The first studies in the field (Tarantelli, 1983; Cameron, 1984; Bruno and Sachs, 1985) pointed to a positive association between macroeconomic performance – usually measured as low values for some kind of misery index adding up unemployment and inflation – and the degree of *corporatism.* The concept of corporatism was designed to capture aspects believed to be conducive to real-wage restraint. Centralisation of bargaining was one such crucial factor but a general attitude of consensus between labour and employers as well as government involvement in wage negotiations were others.

These early studies were criticised by Calmfors and Driffill (1988), mainly because of the vagueness of the concept of corporatism. They substituted an explicit index of the centralisation of wage bargaining for earlier corporatism indicators. Their finding was a hump-shaped association between on the one hand the degree of centralisation and on the other hand increases in unemployment and other macroeconomic misery indicators (unemployment plus inflation, and unemployment plus current account deficit in percent of GDP) in the post oil-shock period 1974-85. These results were confirmed in OECD (1988). Similar conclusions were also drawn by Freeman (1988) using instead wage dispersion as a measure of the effective degree of centralisation.

Subsequent work has provided diverse results. Rowthorn (1992) verified a hump-shaped association across countries between centralisation and unemployment in the eighties but not in the seventies. Soskice (1990), however, argued for a monotonic negative relationship, mainly on the basis of a reclassification of

Japan and Switzerland as examples of highly centralised rather than highly decentralised ones as in the Calmfors-Driffill analysis (see Section II.B).

The empirical work surveyed so far must be regarded as fairly unsophisticated, since it mainly focused on simple correlations. A few recent studies have, however, estimated unemployment equations in which cross-country differences are explained by a number of factors in addition to the degree of centralisation (*e.g.*, duration of unemployment benefits, expenditures on active labour-market measures, union coverage, the reduction of inflation in the early eighties). Layard *et al.* (1991) and Layard and Nickel (1991) found a strong monotonic unemployment-reducing effect of employer co-operation and a weaker such effect from union co-operation. This finding on employer co-ordination received further support from regressions in Layard and Nickell (1992), which pooled cross-country and time-series data. In a similar study, Zetterberg (1993), however, found that the data are consistent also with the hump-shape hypothesis.

Other work has instead studied the relationship between centralisation and growth. These studies are harder to judge in this context, since the impact of wages on growth is more complex to analyse. However, Heitger (1987) found that both centralised and decentralised economies tended to do better than economies with intermediate centralisation in the seventies, which he explained with internalisation benefits under centralisation and relative-wage flexibility under decentralisation. Similar results have been obtained by Dowrick (1993*b*). His conclusion is that the same factors that are conducive to real-wage restraint in the Calmfors-Driffill analysis should also make labour more willing to accept measures implying labour-augmenting productivity growth.[13] Grier (1993), however, failed to find support for the results of Heitger and Dowrick, and instead concluded that there is a monotonic negative relationship between centralisation and growth, so that more decentralisation always implies more growth.

B. Centralisation and parameters in wage and price equations

The work quoted above can be seen as investigating the effects of centralisation of wage bargaining in a reduced-form context. A more direct method is to examine how the structural parameters in aggregate wage and price equations are affected.

The first attempts in this direction were provided by McCallum (1983, 1986) and Bruno and Sachs (1985). They estimated cross-country Phillips-curve equations relating inflation (or its change), which should be closely associated with wage developments, to, ***inter alia,*** various measures of capacity utilisation and corporatism. The latter variable was found to contribute monotonically to lower inflation. However, these studies are subject to the same criticism as above about the imprecision of the corporatism concept. Indeed, Calmfors and Driffill (1988) showed that the results were not robust to substituting a centralisation indicator for the corporatist one.

Later studies have often focused on the responsiveness of real wages to unemployment, which seems according to both theoretical arguments and empirical observations to be a crucial determinant of equilibrium unemployment, (Layard *et al.,* 1991). Another variable that has been emphasised is the sensitivity of the real product wage to changes in taxes and relative import prices (the wedge between the real product wage and the real consumption wage). In a comparison across countries, Bean *et al.* (1986) found that corporatism increased the real-wage responsiveness to unemployment and reduced the sensitivity of the real product wage to increases in the wedge. Calmfors and Driffill (1988) confirmed these results when instead using their centralisation indicator. They also looked at the wage equations for different countries in five other studies but could find a similar relationship in only one of them. The support for the hump-shaped relationship was, however, even weaker.

Later studies of the relationship between centralisation and the wage responsiveness to unemployment have come up with mixed results. The results in both OECD (1989) and Alogoskoufis and Manning (1988) were consistent with the hump-shape hypothesis. However, in the latter study, other evidence suggests that this may not reflect how the attempts to moderate wages is associated with the degree of centralisation (instead the parameter capturing the desire for wage moderation in their study is positively related to centralisation in a monotonic way). Layard *et al.* (1991) and Heylen (1993) have related the wage responsiveness of unemployment to a number of structural characteristics of different economies, including centralisation. The former study found evidence in favour of a positive association, whereas the results in the latter were in favour of the hump-shape hypothesis.

Finally, there is some scattered evidence on other parameters in wage equations. Alogoskoufis and Manning (1988) reported that price increases appear systematically to cause lower wage increases the higher the degree of centralisation. Layard *et al.* (1991) found employer co-operation to reduce hysteresis effects on wages, *i.e.*, the wage increases following from decreases in the number of insiders in the labour market, but union-co-operation to increase them. The findings in Holmlund and Zetterberg (1991) seem to indicate that firm-specific conditions that only affect insiders are more important for wage determination the less centralised is bargaining.

C. The contribution of empirical research

In all, the empirical research on the impact of centralisation on wage bargaining and macroeconomic performance gives a mixed picture. It is natural to pose the question of which significance should be attached to these results. At least two conclusions seem warranted.

First, the centralisation of wage setting has been captured through only one summary measure in most studies (mainly with the exception of Layard et al., 1991, and Layard and Nickell, 1992). The discussion in Sections I-IV has, however, highlighted the importance of a number of different aspects: the firm-industry-nation dimension, centralisation across professions and across regions, the number of bargaining levels, union versus employer co-operation, co-ordination in the sense of providing information as opposed to co-operation involving internalisation of externalities, union coverage and union participation in unionised firm. In addition, co-operation at the national level will mean different degrees of effective centralisation depending upon the openness of the economy. All this suggests the need to distinguish different aspects of centralisation in further empirical work.

Second, since bargaining systems in individual countries are so stable over time, studies of variations in the degree of centralisation must by and large build on cross-country differences. This means that the number of observations on centralisation is more or less restricted to the number of OECD countries. At best, some additional information can be added to the extent that the gradual development in the direction of more decentralisation in some countries such as the United Kingdom, Denmark, Finland, the Netherlands, and Sweden can be exploited. The upshot is that the degrees of freedom when studying the impact of several institutional variables (including other characteristics of the labour market as well as various political conditions) become very few. This problem is seriously exacerbated if one tries to do a proper analysis of the various dimensions of centralisation.

One must therefore regard the empirical research in this area with a fair amount of scepticism. It is always better to organise the knowledge there is in a systematic way, but in the end we do not have much more than individual country examples that may be open to many interpretations. Therefore, we may have to rely more on the theoretical generalisations that can be made.

VI. CONCLUSIONS

This survey of the relationships between the extent of centralisation, aggregate wage formation and macroeconomic performance has discussed a number of theoretical mechanisms. The extent of centralisation is likely to have different effects depending upon whether it refers to sectors, professions, regions or unionisation. Too much should not be expected from empirical studies in the field. This makes it hard to arrive at unambiguous conclusions. Keeping these caveats in mind, the preceding analysis can be summarised as follows:

i) It is unrealistic to expect *one* universally optimal set-up of bargaining institutions to exist for all countries. Because of varying historical traditions and structural characteristics of different economies, different wage-setting institutions may contribute to good macroeconomic performance in different places. This survey has illustrated that there are good reasons why both centralised (co-operative) and decentralised (competitive) solutions may work. In countries like the United States with strong traditions of local wage bargaining and low union density, co-operative solutions such as practised in Germany or the Scandinavian countries are just not relevant. In the latter countries truly decentralised solutions might be equally irrelevant. Since wage-setting systems change only slowly over time, any proposals for change must by necessity build on existing institutions and traditions.

ii) The outcome of wage bargaining at the industry level, such as occurs in many western European economies, is likely to depend on the degree of foreign competition that domestic producers are exposed to. If it is high, the forces restraining wages are not likely to be much weakened as compared to decentralised wage setting at the level of the firm. This is an argument *for* increased international integration (and *against* co-operation in wage setting within industries between producers in different countries). In non-tradeables sectors, industry bargaining may, however, have strong adverse effects on incentives for wage moderation. If there is little scope for inter-industry co-operation in wage setting, decentralisation to individual firms in these sectors might therefore be preferable.

iii) Co-operative and co-ordinated wage setting can take many forms. Bargaining at the national level, such as have occurred in the Nordic countries, is one possibility. A drawback of this model may be that it in effect implies multilevel bargaining, which could make it difficult to combine low inflation and real-wage moderation. This problem may be avoided with more informal co-operation (including the possibility of pattern bargaining), between lower-level bargaining units, such as occurs in Germany and Japan. Without such informal co-ordination much is not likely to be achieved only through synchronisation of pay deals in time.

iv) Horizontal co-operation in wage setting across different occupational groups when there are high rates of unionisation appears likely to be advantageous from the point of view of aggregate real-wage restraint. This applies independently of whether bargaining takes place at the level of the firm, industry, region or nation.

v) Too little interest may have been devoted to the region as a suitable level of co-ordination. A possible conclusion is that many of the negative externalities of wage increases could be internalised already with intra-regional co-operation.

vi) Finally, there seem to be reasons to question the – sometimes legislated – practices in many western European countries to extend the collective agreements in a sector to all firms there. In effect this means that potential competition from non-unionised firms is eliminated, with less wage restraint and adverse effects on employment as probable consequences.

The above discussion has focused on the relationship between bargaining institutions and *aggregate* wage formation. However, a complete evaluation must also take into account how the extent of centralisation affects relative wages. There has been much less research on this latter aspect, but there is a presumption that decentralised wage setting is associated with more wage dispersion and relative-wage flexibility (Abraham and Houseman, 1992; Agell and Lommerud, 1992; Flam, 1987; Freeman, 1988; Ramaswamy and Rowthorn, 1992; Rowthorn, 1992). This raises the possibility that optimal bargaining institutions may have to reflect a trade-off between aggregate-wage and relative-wage considerations. In general, the arguments for decentralised bargaining are strengthened. One could also hypothesise that informal methods of inter-union and inter-employer co-operation may represent a way of combining centralisation benefits with respect to aggregate wages with a reasonable degree of relative-wage flexibility. Since the reduction of inter-regional labour-market imbalances is considered an important policy aim in most countries, a similar argument might apply to co-ordination of wage bargaining within regions.

It is likely that further research, especially on relative-wage determination, may provide more insight in the impact of various bargaining institutions. But the most striking conclusion of my survey is perhaps that the links between centralisation and macroeconomic performance appear so complex that a scientific consensus on how best to organise wage bargaining seems unlikely to develop.

NOTES

1. A crucial assumption for multiple equilibria to exist in Bhaskar's model is that preferences are asymmetrical in the sense that the dissatisfaction from being paid less than identical workers in other sectors is greater than the perceived benefit from being paid more. Technically, this introduces the possibility of "corner solutions" with the optimal wage equal to the expected aggregate wage. See Calmfors (1993*c*) for a diagrammatical exposition.
2. Note that this statement applies only to the relation between wage outcomes under centralised and decentralised conditions with a given degree of openness. The impact of increased openness on real-wage levels at given degrees of centralisation is discussed below (see also note 4).
3. In practice, only employed members of local unions elect the union officials that take the decisions on co-operation between different unions or enter into bargaining with employers at higher levels of aggregation. It is therefore not obvious why larger attention should be paid to the interests of unemployed outsiders under centralised than under decentralised wage setting.
4. The same conclusion applies to firm-level bargaining when there are few domestic competitors. It is more complicated to analyse the consequences of increased international integration under wage setting at the national level. Driffill and van der Ploeg (1993) find that a lowering of (effective) tariffs in this case reduces real product wages – and thus increases employment – at the same time as real consumption wages increase. This is the combined effect of a reduced tariff (tax) wedge and smaller real-product-wage increases from given increases of the real consumption wage (because the off-setting effect from the increase of the relative price between domestic output and consumption increases with the share of imports). This analysis does not, however, take into account the full general-equilibrium effects of the reduction of effective tariffs (*i.e.*, how the proceeds from it are used).
5. To realise the internalisation benefits of international co-operation in wage bargaining would imply centralisation both across borders and sectors, as discussed by Driffill and van der Ploeg (1993).
6. In a simulation exercise, Calmfors and Driffill (1988) showed that a change from one to two bargaining areas in a model economy will raise wages much more than a change from two to four, etc.
7. Technically, pattern bargaining can be analysed as a so called Stackelberg equilibrium, which arises if the wage leader optimises against the reaction (best-reply) functions of the other agents. The non-cooperative (decentralised) bargaining case discussed in the text corresponds to a Nash equilibrium, in which each agent optimises taking the action of others as given, so that the solution is given by the "intersection" of the various reaction functions.
8. This conclusion differs from that of Wallerstein (1990), who analyses a case where a wage increase for one group of employees leads to a wage reduction for other groups

at the same time as there is a negative externality. This case would seem less probable than the one discussed in the text.

9. See, *e.g.*, Ekberg (1984) for such a result for blue-collar and white collar workers in Sweden. Most empirical studies seem to indicate that production and non-production workers are Hicks-Allen substitutes, *i.e.*, that the output-constant cross elasticities of demand are positive (Hamermesh, 1986; Risager, 1993). This does not rule out, of course, the possibility that these two groups of workers may be gross complements, ***be.,*** that the output effect dominates the substitution effect.
10. For this to occur, different types of labour must be sufficiently complementary in production in the sense that the marginal revenue product of one labour input is increasing in the other. Complementarity in this sense does not have to mean that the two factors of production are Hicks-Allen complements (Layard and Walters, 1978). See also note 8.
11. The dynamics is more complex, since in the short run a reduction of union coverage entails shifts in both labour demand and labour supply from the union to the non-union sector (most workers will remain in a given firm even if collective agreements are abandoned there). However, in the long run when individual workers are mobile between firms, the relative labour supply to the two sectors should depend only on the relative expected income.
12. Theoretically, one could not rule out that a decrease in union coverage might even increase the wage in the union sector under centralised bargaining (though the average wage in the economy may still fall because the non-union wage is lower than the union wage). It has also been pointed out that co-operation between unions in a repeated-game situation may be sustained by the threat that non-cooperative behaviour of one union will lead to "punishment" from the others, causing utility losses in some future periods. By reducing the potential utility losses that other unions can inflict on a non-cooperating union, lower union coverage may cause co-operation to break down (Holden and Raaum, 1992).
13. The argument is that workers perceive a high elasticity between the demand for effective labour and wage costs under decentralised wage setting in the individual firm, because of its possibilities to gain market shares at the expense of others. Hence, since workers will expect this factor to counteract the adverse employment effects of labour-augmenting technological progress, they ought to be more inclined to accept it than under industry bargaining. There will also be strong such incentives under centralised bargaining, because the full benefits of lower prices and higher output are then internalised.

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