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The Bargaining Society: An essay in memory of LJ

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The Bargaining Society*

Abstract

Multi party negotiations within a complicated pattern of coalitions are typical for bargaining societies like the Nordic countries. Inefficiency in some bargaining constellations enhances the benefits from overall cooperation and therefore for the chances that the grand coalition forms. To substantiate and defend this claim I discuss four assertions. i) Encompassing organizations can lead to efficacy: threats and counter threats in central negotiations can induce a binding agreement that resembles the competitive market equilibrium. ii) To fulfill all demands in central negotiations can be impossible: when all possible coalitions can threaten to break out and start negotiations over the terms to return, cooperation easily fails. iii) Cooperation should have a non-cooperative foundation: when only intermediate coalitions that remain stable in the non-cooperative equilibrium can pose a threat, endogenous overall cooperation is more easily sustained. iv) Negotiations based on distorted information lead to inefficiency: intermediate bargaining may have an inherent tendency to eliminate the potential gain that is the object of the bargaining —but thus raise the gains from cooperation.

JEL classification: *C7, P16*

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> "By the term 'the bargaining society' I try to characterize various tendencies which cannot be analysed by the 'classical' approaches". (Johansen, 1979)

1 Introduction

When Leif Johansen coined the phrase 'the bargaining society' in the 1970s, the tendency of moving decisions into bargaining like processes in several Northern European countries was particularly strong. Today the trend is less stark, but the level persists. Large scale bargaining still plays a prominent role, including multilevel collective wage bargaining, three party negotiations between capital, labor, and government about taxes and employment, negotiations about agricultural prices between farmers' associations and the government.

In the bargaining society important economic decisions are concluded within a diffuse and unstructured bargaining processes, often without specific rules or time limits, and without an arrangement that secure that a decision is taken in the absence of an agreement between the parties involved. In the Scandinavian countries of Denmark, Norway and Sweden, for instance, the entire wage structure are basically taken out of market competition and placed in a system of collective decision making based on multiparty bargaining both at local and central levels. The parties involved can conclude a mutually beneficial agreement, but they have conflicting interests over which agreement to conclude, and no agreement can be imposed on any party without its consent. In addition to well structured negotiations between well-defined parties the bargaining society also has informal haggling similar to rent seeking and influence competition, and routine consultation between the government and interest organizations —where the parties involved can exercise bargaining power.

In this essay I discuss some fundamental questions for the bargaining society, emphasizing the use of power and the role of coalitions, to shed light on the possibility to reach cooperative solutions in multiparty bargaining. The essay is inspired by the work of the late Leif Johansen (or just LJ as we called him) who was particularly interested in understanding the breakdown of cooperation and collective rationality, and who claimed that bargaining is often an inefficient decision procedure that distorts information and wastes resources with an inherent tendency to eliminate the potential gain which is the object of the bargaining.

I think about LJ's postulate on the inefficiency of bargaining as a sharp and highly relevant observation, but I claim contrary to LJ that the difficulties and inefficiencies that the bargaining society can be beset with, can make it *easier* to obtain a cooperative solution at a central level. The instability of intermediate coalitions and the potential waste of resources in conflicts, can make it less tempting to break away from full cooperation. To defend this claim I provide a brief discussion of some of LJ's articles on the bargaining society and combine them with my own somewhat speculative extensions. I emphasize the Scandinavian variant of the bargaining society in order to illustrate, criticize, or complement the points raised by him.

I discuss how threats and counter threats can produce market like outcomes

(Section 3), how aggressive play can imply a breakdown of cooperative solutions (Section 4), how intermediate cooperation emerges in mixed cooperative and non-cooperative play (Section 5), how bargaining may lead to inefficient outcomes (Section 6). As the essay is written in memory of LJ, I start by a few remarks about him.

2 Opposing apologetic formalism

LJ was a mathematical economists by the strict qualifications required to belong to that group whose members were still respected in the 1960s and 70s. Yet he was discontent with being considered a mathematical economist only. He opposed 'apologetic formalism' 46 years before Paul Krugman famously denounced economists who mistook mathematical beauty for the real world. LJ attacked the "narrow circle of economists and mathematicians who are mainly occupied by the formal aspects for their own sake," and he added that "in no other science is so high a fraction of the total research effort put into formal "methodological studies" as in mathematical economics and econometrics."

Like Krugman he stressed the general importance of math in the social sciences, and rejected beliefs that a complicated world was not possible to understand by mathematical models: "that the world is complicated"—he insisted—"is an argument *for*, not against, the use of mathematics," and "mathematics as such cannot be blamed for the apologetic conclusions drawn by economists who have used it" (Johansen, 1963).

His discussion of the bargaining society is an example of his ambitions to go beyond clever formalism. He wanted to be more broadly orientated and more applied to real world problems. He wanted to be part of an economics profession that better communicated with other disciplines and with the political community. As he saw it, the best means to achieve both goals were to incorporate more of game theory, or theories of conscious economic and social interaction as he sometimes preferred to call it.

Among the many things he should be remembered for is this pioneering conviction that game theory not only was extremely important for applied economics, but for all the social sciences. He stated this conviction repeatedly both in his lectures and in his writings. Game theory was simply the most appropriate paradigm as soon as we go beyond mere accounting and description of production technology and want to include various aspects of economic behavior — as he said i various connections.

For instance, in a talk given at the sociology department at the University of Oslo in 1975, he summed up: "My belief is that game theory not only will become of great importance within economics, but within all the social sciences broadly defined. I consider game theory to provide the best concepts and the best methodology to formulate, understand and analyze general problems in society" (see the reprint in Norwegian in Johansen, 1982a).

He also thought that a game theoretic approach would make it easier to communicate with politicians. While economic experts may tend to think of politicians as irrational, he sensed, politicians easily considered the theoretically ori-

ented economist to be naive. One reason for this could be that economists insisted on a simple "decision theoretic scheme while the politicians have perceived the game theoretic nature of the situation" (Johansen, 1977a, p. 99). No wonder that he devoted much of his two volumes of *Lectures on Macroeconomic Planning* to the theory of games.

Throughout the two volumes the government, or the central authority as it is called in the book, as well as other major decision makers in the private and the public sector are considered conscious players with their own goals, beliefs and actions. Planning is approached as a game where part of the goal of the central authority is to alter the rules and regulations in order to move parts of the game from non-cooperative to a cooperative play. Nowhere is planning considered a dictate by the central authority. It is rather the outcome of a mixture of non-cooperative and cooperative games — in accordance with the logic of the bargaining society.

Today, the book may be under-appreciated simply due to its title. More than recipes of planning, however, the book can be considered a treatise of endogenous economic policies in line with much of modern political economy. Planning is not a one direction influence but a procedure of mutual interdependencies. He also discusses how the pay-off to the central authority may depend on the preferences of the electorate even though he did not incorporate explicitly how political competition shaped governmental preferences.

As for the role of the market in the policy games, LJ was concerned about the stability of the competitive equilibrium, not so much from a dynamic point of view, but more from the point of view of incentives to deviate from price taking behavior. This is also clear from his short article on the topic where he insisted that one should consider all types of incentives for deviating both in individual decisions and coordinated decisions by two or more agents (Johansen, 1977b). In this context he also emphasized how reasoning based on the concept of the core in cooperative games can help us understand the stability of competitive equilibrium outcomes with and without explicit market institutions, and in a bargaining context — my next topic.

3 Markets and the core

The shrinking of the core of an exchange economy to the competitive equilibrium as the number of participants increases, is often considered to be of marginal interests for the evaluation of economic systems and actual economies. LJ had a different view (Johansen, 1978). He thought that the perspectives opened up by this seemingly formal and esoteric theory would help explain why markets were so robust against alternative allocation mechanisms. This is why, I think, he found it important to have a simple exposition of the properties of the core of an exchange economy. He wanted to demonstrate the basic result so it could be lectured in elementary courses. The wish for simplicity is indicated by the first words, 'a calculus approach', in the title of the 1978 paper. Contrary to most other expositions, no other math is needed to derive it than first year elementary calculus.

To appreciate his enthusiasm for the basic result, one should remember that the core is an institution free solution concept. We are only considering a set of agents with initial holdings of commodities or resources who may improve upon their situation by reallocations. They may do this in whatever way they like as long as the allocations are feasible. There is no presumption of a price system. Agents can communicate with each other and enter into coalitions. They may give away their resources if they so prefer. The point of the exercise is to characterize which binding agreement they tend to agree to about how to allocate resources.

The traditional competitive general equilibrium, in contrast, presupposes markets and a price system. The prices balance all markets when each agent is maximizing his pay-off taking these equilibrium prices and his initial endowments as given, but the theory does not explain how the equilibrium prices are found. That the core of the economy shrinks to this competitive equilibrium is therefore far from obvious. LJ thought that the ability of different coalitions to block the acceptance of any other allocation than this competitive equilibrium could provide part of the explanation for the the dominance of markets in most economies. At least he thought the shrinking of the core to the competitive equilibrium was a good starting point for speculations of

> "why competitive market mechanisms have appeared in almost all corners of the world and, under almost all conceivable circumstances, why they have proved to be so robust, why other arrangements tend to be less permanent, and why attempts to abolish the market mechanism have often failed in the sense that markets reappear unofficially parallel with the official non-market system."

Accordingly, the political left's attacks on the market as such might appear as no more than a shooting of the breeze. If attempts to abolish the market mechanism easily fails as it reappears unofficially parallel with the official non-market system, attacking 'market fundamentalism' may miss the point. Instead the left could take advantage of how market outcomes depend on the initial distribution of endowments and rights.

To redistribute initial resources such as ownership rights, wealth, education, and welfare entitlements, in favor of disadvantaged groups and letting then the market mechanism operate more or less untouched, would perhaps be a more sustainable left alternative than one that relies on continuous market interventions leaving initial endowments untouched. Social Democracy in Northern Europe may be a good example of using the market for egalitarian ends. In these small open economies strong collective organizations and the welfare state help sustain redistributions within an otherwise market oriented economy of free trade and global competition.

The main point is that markets dominate, for given initial distributions, simply because it is difficult to improve upon market allocations in a way that cannot be blocked by coalitions that are strong enough. After a redistribution of initial endowments and rights there is a new market allocation reflecting the new distribution of resources. It is again difficult to improve upon the new market allo-

cation in a way that cannot be blocked by coalitions that now have become strong enough.

These interpretations go beyond the basic contribution of LJ's article. His contribution was to give a simple demonstration of why the core shrinks to the competitive market allocation. There is no need to reproduce his exposition here. It suffices to sketch the logic of his argument. Recall that an allocation belongs to the core only if no coalition can block that allocation. Blocking means that the members of the coalition can do better by breaking away from the grand coalition. To understand how he constructed his argument observe that 1) the core only consist of Pareto optimal allocations; 2) the competitive equilibrium allocation belongs to the core.

For any Pareto-optimal allocation that is not a competitive equilibrium LJ provides a recipe for how one can construct a coalition that can block that allocation. Given this recipe it is rather straight forward to demonstrate that these coalitions are feasible to construct when the number of each type of agent in the economy is sufficiently large. Hence, the shrinking of the core. In addition, when the number of agents of each type is sufficiently large a sub coalition can break away and guarantee itself the competitive allocation simply because it is a replica of the total set of agents. Hence, the shrinking of the core to the competitive allocation. There are some problems with the theoretical foundation of cooperative games that might also cast some doubts on the general robustness of this argument. I shall return to these problems in Section 5.

What is robust, however, is how the shrinking of the core to the competitive allocation does not rely on an assumption that the competitive allocation in fact would result in decentralized markets. The core would shrink to what is characterized as the competitive allocation whatever the equilibrium outcome in a decentralized market economy. Let me highlight this point by a different example with a similar flavor.

Example: Centralized wage setting as a competitive equilibrium?

Consider a union association that negotiates wages at a central level with employers who can unilaterally set employment levels after the wages are fixed. This is the classical case of monopoly unions that care about both the pay and the number of jobs. Now, in stead of increasing the number of agents of each type, we can derive the consequences of making the union movement more and more encompassing. We may then end up with a union demanded wage structure that pays equal wages for equal work. Since the union movement is sufficiently encompassing it may also care sufficiently about employment levels so that wage levels are set such that full employment is achieved. Hence, encompassing unions may demand the wage structure that text books normally associate with a competitive equilibrium.

All this may result even though a decentralized labor market would not yield anything like what the textbooks claim. In decentralized labor markets insider-outsider mechanisms may dominate with unemployment and mis-allocation of labor. There may also be unequal wages for equal work as revenue sharing in local wage setting ties wages to the different productivity levels of each separate

firm. Centralized wage setting may therefore produce a 'textbook competitive' outcome, while decentralization may fail to do so.

Let me now return to the concept of the core and discuss to what extent it is based on a reasonable incorporation of power and aggression.

4 Aggression and the break down of cooperation

The concept of the core seems to portray players who use their blocking power aggressively to obtain an allocation (in the core) to their own benefit. But is an allocation in the core consistent with real aggressive play? It is not. I shall now show that more aggressive attitudes can reduce defacto power over allocations as the core easily breaks down if players are not sufficiently acquiescent.

Think of a situation with n players who come together to write a binding agreement. One example could be an arrangement with central wage negotiations between employers and employees. If a subset of players forms a coalition, they agree to implement a joint course of actions. If the grand coalition of all n players forms, it allocates the outcome between each player.

Let N indicate the set of all players. Further, let S indicate any coalition from any set of the n players and let $N \setminus S$ indicate the set of players in N who are not in S (the complementary coalition to S). The maximum value a coalition S can *guarantee* itself is $v(S)$, called the characteristic function of coalition S. I return to a critical discussion of this concept. Here it should be noted that $v(S)$ represents what a coalition is guaranteed to obtain *no matter what the others do*.

The outcome to the n players is represented by a 'pay-off vector' $x = (x_1, ...x_n)$. I shall focus on the case with transferrable utility.

The ordinary core

Consider the following two types of requirements on the set of pay-off vectors

$$\text{i) } \sum_N x_i = v(N) \text{ and } \text{ ii) } \sum_S x_i \geq v(S) \text{ for every } S \subset N \tag{1}$$

The first requirement in (1) is Pareto optimality. The second requirement says that each coalition must at least obtain as much as indicated by its characteristic function, including the characteristic function of degenerate coalitions that consist of single players. Allocations, or outcomes, $(x_1, ...x_n)$ that satisfy these requirements belong to the core.

The basic idea of the core is that the n players tend to agree to one of the feasible allocations in the core since then nobody can do any better by breaking out and operate on their own.

I shall assume that the game is super additive in the sense that a larger coalition can always obtain something in addition to what each sub coalition can obtain in isolation. That is, for any S_1 and S_2 with no member in common we have

$$v(S_1) + v(S_2) < v(S_1 \cup S_2) \tag{2}$$

If the two sub coalitions join into one coalition there is a surplus to be shared. There is no requirement, however, that guarantee each of the two a share of this surplus in the definition of the ordinary core. An allocation in the core can be 'unfair' in the sense that one group of players, say S_1, may obtain much more than their next best alternative, for instance given by $v(S_1)$, while other groups may obtain no more than their best option outside the grand coalition.

Returning again to the example of centralized wage setting, the core as a solution concept of such negotiations opens up for a lot of *arguing* between unions and between unions and employers. But it does not open for explicit *bargaining* between any coalition S and its complement $N \setminus S$. LJ introduced requirements that went some way to introduce this possibility of more demanding attitudes where each group of players has more aggressive claims.

The Johansen-core

In his framework each group S demands what it could get outside the grand coalition, $v(S)$, plus a fraction λ_S of the surplus it brings to the coalition by joining, $[v(N) - v(S) - v(N \setminus S)]$. Hence, what I call the Johansen-core is defined as outcome vectors $(x_1, ...x_n)$ that fulfill the requirements

$$\text{i)} \sum_N x_i = v(N) \text{ and } \text{ii)} \sum_S x_i \geq v(S) + \lambda_S[v(N) - v(S) - v(N \setminus S)] \text{ for every } S \subset N \tag{3}$$

Note that the ordinary core is defined by the same requirements, but with $\lambda_S = 0$ for all S. It is clear that as the aggressiveness of the players increases, that is as λ_S increases, the Johansen-core may be reduced. Indeed, the Johansen-core cannot possibly exist unless $\lambda_s + \lambda_{N\setminus S} \leq 1$. Otherwise the demands for shares of the surplus are incompatible.

How should the weights λ_S be determined?

- LJ basically talked about *the degree of aggressiveness* of coalitions as a given group characteristic.

- Another equally natural assumption is that the λ_S'es represent *fairness norms*. Proposer-responder experiments have shown repeatedly that a responder who faces a proposal that offers an unfair split may turn it down, even though he would be better off by accepting. Such fairness norms easily translate into claims of the surplus that the two parties are supposed to share. The responder is willing to punish an unfair proposer by sacrificing some gains to himself unless he obtains a certain share of the surplus.

- Yet another natural assumption is that the λ_S'es are *the product of explicit bargaining* between the coalition S and its complement $N\setminus S$ (Moene, Wallerstein, and Hoel, 1993). In that case we have $\lambda_S + \lambda_{N\setminus S} = 1$. Under these conditions the Johansen-core is almost always empty. Equations (3) i) and ii) imply

$$\sum_{N\setminus S} x_i \leq v(N \setminus S) + (1 - \lambda_S)[v(N) - v(S) - v(N \setminus S)] \tag{4}$$

But if $(1 - \lambda_{N\setminus S}) = \lambda_S$, the equations (3) and (4) imply that the inequality sign must be replaced by strict equality

$$\sum_{S} x_i = v(S) + \lambda_S[v(N) - v(S) - v(N \setminus S)] \text{ for every } S \subset N \tag{5}$$

Equation (3) i) and (5) constitute a set of $2^n - 1$ equations to determine the n variables $(x_1, ...x_n)$.

In the case with only two groups, $n = 2$, the Johansen-core will trivially exist. With $\lambda_1 + \lambda_2 = 1$ there is a unique solution x_1, x_2 replicating traditional sharing rules from two-party bargaining games were each side gets its fall back pay-off v_i plus its share λ_i of the surplus $[v(2) - v_1 - v_2]$.

In the case with three or more groups, $n \geq 3$, a solution will not exist with $(\lambda_S + \lambda_{N\setminus S}) = 1$ except in very special circumstances. In general it is impossible to obtain an agreement that is "negotiation proof". All possible allocations leave some group worse off than it could be if it withdrew from the grand coalition and bargained over the terms of rejoining.

It should be observed that the circumstances that guarantee non-empty cores traditionally defined, do not so in the case of the Johansen-core with $(\lambda_S + \lambda_{N\setminus S}) = 1$. Balanced games (Shapley 1967), for instance, have nonempty ordinary cores (as there is a "lot" of superadditivity), but in the Johansen-core this will only serve to increase the aggressiveness of coalitions, each of whom feel they are bringing a lot to the table. So balancedness or high super-additivity does little to alleviate the tensions.

It follows that in multiparty wage setting, even if all unions and employers could obtain a higher level of welfare with centralized bargaining than they could by bargaining separately, it may still be impossible to distribute the gains from centralized bargaining in a way that maintains co-operation. Yet, national level of bargaining has existed for decades in Norway and Sweden. Within the theoretical set-up above the persistence of central wage negotiations can perhaps be explained by fairness norms that either restrain 'bargaining opportunism' by imposing a stigma of entering into certain intermediate coalitions; or restrain the aggressiveness exercised in separate bargaining encounters.

Restraints on bargaining opportunism are equivalent to the presence of norms against certain bargaining constellations. For instance, one could think that some unions should not enter into a bargaining attitude towards each other, using threats and counter threats. Likewise, there might be certain coalitions that are completely unlikely to form and that therefore do not impose restrictions on the outcomes. All such norms and social attitudes might reduce the number of requirements that the solution must fulfill and hence making a cooperative solution more likely.

One may therefore assert that central wage negotiation is not compatible with aggressive bargaining attitudes of the participating organizations at least not against every other participating group. It may require some sort of social co-

hesion or norms against union-union bargaining or against employer-employer bargaining, or against the formation of certain union-employer coalitions.

Let us now return to the general set-up given by (3) i) and ii) with $\lambda_S + \lambda_{N\setminus S} \leq 1$. LJ provided several numerical examples as illustrations of how the mechanisms worked. Based on these examples he concluded that there is no simple rule that says in advance what degree of aggressiveness a game may accommodate before the core disappears. This is so also in cases with a common level of aggressiveness $\lambda \leq 1/2$ shared by all players and all coalitions. As I have demonstrated above, a shared value of $\lambda = 1/2$ represents in general too much aggression (as it is a special case where $\lambda_S + \lambda_{N\setminus S} = 1$). But how much a common value of λ has to be reduced below 1/2 differs from case to case.

What happens if the core breaks down? Ordinary cooperative game theory had no answer to that question. Johansen (1982b) provided a tentative general framework that could be used in these cases. It is relevant whatever the reason for the break down of the core, whether it was caused by excessive aggressiveness or some other reason, or whether the core is empty or not. It also has implications for allocations in the core. But the core concept must then be properly revised with a better non-cooperative foundation.

5 A non-cooperative approach to cooperation

What LJ called 'tentative explorations' is in my view the best starting point for what I would denote a general non-cooperative approach to cooperation. A rather broad analytical approach is needed to understand how modern societies work with its collective organizations such as big governments, big companies, large interest organizations and other groups of actors who have joined to achieve some common interests. They compete for power and influence, they bargain with each other and they interact in other serious ways in a non-cooperative fashion. At the same time they need to maintain their internal cooperative structure voluntarily. All this is particularly important for the understanding of bargaining societies and it is important to derive the general equilibrium of the complicated social situation.

The equilibrium in this connection relates to both *the social organization*, that is to what coalitions that form, and to *the economic behavior* of these organizations. Both of these activities are basically non-cooperative in nature, and we should therefore search for a general equilibrium theory of bargaining societies that explains both how coalitions are formed and how they play. I deliberately choose the overused 'general equilibrium' phrase in order to emphasize that the organization and behavior of participants in one segment of the system is crucially dependent of which coalitions that form and the behavior of these organizations in other segments — and since I personally consider the traditional general equilibrium models somewhat partial, capturing a rather special case.

The basic idea is simple, but its implementation complicated. The idea is that the game consists of coalitions that agree to a course of actions in a cooperative fashion, but that play non-cooperatively towards other coalitions. More specifically cooperative game theory applies for the formation of coalitions, but non-

cooperative Nash-equilibria apply for the determination of the actions taken by each coalitions towards other coalitions and other players. There is an important simultaneous interdependence, that needs to be addressed upfront: Which coalitions form, depend on the non-cooperative equilibrium; and the non-cooperative equilibria depend on which coalitions that form.

This is not a complication constructed to demonstrate 'clever formalism'. The complications are caused by the nature of of the problem which again is important to analyze to understand modern societies. Yet, the literature is sparse on these issues and it was nonexistent when LJ published his article in 1982. (In fact, his article was first outright rejected for publication in *the Review of Economic Studies* for reasons that are difficult to understand.) More recently, there is at least one approach in the literature associated with Debraj Ray and various coauthors that follows similar lines. Their solution concept clearly does more than discussing how cooperative coalitions play non-cooperatively across coalitions by simultaneously exploring how the cooperative sub-coalitions are formed. LJ was interested in the same issues, but concentrated less specifically on coalition formation.

Debraj Ray and coauthors started to publish articles on coalition formation and multi party negotiations in the end of the 1980s, but they seem to be unaware of LJ's contribution. Their approach is excellently discussed and further elaborated in Ray's book from 2007, *A Game-Theoretic Perspective on Coalition Formation*.

The worth of a coalition

To proceed we need to attack the value of a coalition by another concept than the traditional characteristic function. There are at least two problems with the ordinary formulation:

Firstly, as it is defined the characteristic function $v(S)$ tells us what a coalition S maximally can guarantee itself whatever the other players $N \setminus S$ do. But this implies an overly pessimistic expectation that does not make sense as a general description of social interaction. The most a coalition S can guarantee itself is of course the best it can achieve when the others are behaving in a manner that is *worst* for the coalition we consider. But why are the others behaving in such a non-selfish rude manner? Traditional cooperative game theory is silent on this issue, except for the approaches by Debraj Ray that make these weaknesses crystal clear.

Secondly, there is an inherent inconsistency in the traditional procedure in cooperative games (Ray 2007). It tests for whether the grand coalition $v(N)$ is stable or not towards the temptation for any set of players of breaking out and form any sub-coalition S, but the theory does not check whether this sub-coalition, with a worth $v(S)$, itself is stable towards similar temptations for any sub-set of players S' to break out and form another sub-sub coalition. If the coalition S is not stable, the temptation of S to break away from the grand coalition is not a credible threat and should not affect the allocations in the grand coalition. But it does — according to the traditional cooperative game theory.

The first problem and the second problem are related and can be remedied by the same fix. To do that one has to think about the worth of a coalition as an equilibrium outcome — a Nash equilibrium of the game played with that partition of players into coalitions. The solution we are seeking consists of a vector of pay-offs $\mathbf{x} = (x_1, ...x_n)$ and a partition P of players into coalitions $S_1, ...S_k, ...S_m$ where $m \leq n$. For short we write the pay-offs and the coalition structure as $\mathbf{x}|P$. A pair $\mathbf{x}|P$ that is 'stable' is an equilibrium.

Each coalition in P receives a total value (pay-off) given by

$$\sum_{S_k} x_i = v(S_k|P) \text{ for } k = 1, 2...m \tag{6}$$

This is the pay-off to coalition k in the non-cooperative Nash-equilibrium between organizations and other players with the given coalition structure P. To find which coalition structures that are stable we have to check the temptations to break away and form new coalitions taking into account the equilibrium play for each coalition structure one considers. If a sub-coalition of S_k is considering to break away, it is important what new constellation of coalitions this would lead to.

Here LJ considered two different assumptions. The first I denote the myopic case, as it only checks for temptations to deviate under the presumption that the other coalitions stick together as before. The second I denote the farsighted case as it checks for temptations to deviate under the assumption that the other coalitions adjust their organizations to the new *equilibrium* constellation.

To me the farsighted case (only considered in an appendix by LJ) is most satisfactory of the two. It corresponds to the non-cooperative nature of coalition formation with conscious players. LJ himself was in other contexts a strong defender of the Nash equilibrium as the natural solution concept to non-cooperative games (see Johansen 1982c).

In the farsighted case an equilibrium is a constellation of allocations and partitions $\mathbf{x}|P$ from which no coalition or sub-coalition have reasons to defect. I shall not go further in formalizing the general equilibrium. In stead I provide two examples that may clarify the concepts.

The first illustrates how the outcome in the core depends on equilibrium constellations of coalitions outside the grand coalition. It also speaks to our understanding of the reorganization of wage setting that started in the 1930s in Sweden and Norway and laid the foundation for the Scandinavian model. The second example is basically due to Debraj Ray's (2007) discussion of the stability of monopoly coalitions in the output market. Here I reproduce his example and reinterpret it to the structure of unions. The basic idea is to illustrate the differences between the myopic and the farsighted case and again how real blocking opportunities may depend on equilibrium outcomes after deviating from the grand coalition.

Example: wage coordination

In line with the traditional reasoning in cooperative games one should think that groups that are favored without coordination cannot lose from coordination. But they can. In the early attempts of wage coordination in Sweden and Norway in the 1930s, for instance, workers with a job in sectors sheltered from foreign competition lost even though they were among the workers who would have been best off within the old type of wage setting. De facto power was altered with the strength of new intermediate coalitions. A numerical example can clarify what I'm hinting at.

In the example there are three groups. Group 1 consists of the workers in the exporting industries, group 2 consists of the workers in the sheltered industries, group 3 consists of the employers. All pay-offs are shown in Table 1. The partition where all groups operate on their own (decentralization), is indicated by P_0. It yields pay-offs $v(1|P_0) = 1$, $v(2|P_0) = 2$, and $v(3|P_0) = 10$. Notice that the workers of the sheltered industries (group 2) obtain an advantage relative to other workers.

One might think that the grand coalition, indicated by P_N, could not give them less, hence that $x_2 \geq v(2|P_0) = 2$. But this is not so. If a coalition can benefit from blocking decentralization, $v(2|P_0)$ has no relevance for the allocations in the core.

Let us by P_{ij} denote intermediate partitions where i and j operate together and the third group operates alone. Hence, P_{13} denotes the partition where an export lead coalition S_e of workers in the exporting industries together with the employers, operates against workers in sheltered industries. As I shall discuss shortly a coalition of that type was so strong in the thirties, that it was able to hold back workers in sheltered industries. In our example we incorporated this by assuming $v(2|P_{13}) = 1$ and $v(S_e|P_{13}) = 12$. As long as this is the case, decentralization would never be reached since the export lead coalition would always do better by sticking together. Hence, sheltered workers cannot threaten to break away from coordination if they do not obtain $x_2 \geq 2$. the coalition structure (partition P_0) is not a Nash equilibrium in the case of a breakdown of the grand coalition.

To complete our numerical example I assume that class struggle is not beneficial, i.e all workers against employers (P_{12}) yields worker pay-offs $v(S_w|P_{12}) = 2$ and $v(3|P_{12}) = 8$ to the employers. Similarly, protectionism in the labor market is not beneficial, i.e. a protection lead coalition(P_{23}) against workers in exporting industries yields $v(S_p|P_{23}) = 10$ to the coalition and $v(1|P_{23}) = 1$ to the workers in exporting industries. Finally, I assume that the grand coalition is worth $v(N|P_N) = 13$ implying that the total pay-offs with full coordination and decentralization are the same.

If the grand coalition does not form there is only one equilibrium partition P_e. Clearly, S_p would fail to form since employers can get more by cooperating with workers in exporting industries; S_w would fail to form since workers in exporting industries rather would gain from cooperating with employers. In contrast, S_e is a stable coalition since there are feasible allocations in that coalition such that neither employers nor exporting workers have reasons to break away. Hence, the core allocations are x_2=1 and $x_1 = 1 + y$ and $x_3 = 12 - y$ for $0 \leq y \leq 1$.

Table 1: **Wage coordination**

	group 1 Export workers	group 2 Sheltered workers	group 3 Employers	Coalition
P_N Cooperation				$v(N\|P_N) = 13$
P_{13} Export lead e		$v(2\|P_{13}) = 1$		$v(S_e\|P_{13}) = 12$
P_{23} Protection lead p	$v(1\|P_{23}) = 1$			$v(S_p\|P_{23}) = 10$
P_{12} Class struggle w			$v(3\|P_{12}) = 8$	$v(S_w\|P_{12}) = 2$
P_0 Decentralization	$v(1\|P_0) = 1$	$v(2\|P_0) = 2$	$v(3\|P_0) = 10$	

If we also added explicit bargaining power in this example, say $\lambda = 1/2$ for each of the three players, we still have that sheltered workers would obtain $x_2 = 1$. The reason is that adding sheltered workers to the grand coalition yields no surplus as the export-lead coalition obtains 12 by operating alone and the value of the grand coalition is 13. Bargaining between employers and workers in the export sector would then imply that $y = 1/2$ so that the bargaining outcome would be $x_1 = 1.5$, $x_2 = 1$ and $x_3 = 11.5$. Thus using credible threats of equilibrium partitions in the case of break downs provides us with a bargaining core in this example while it does not in the more mechanical approach of section 4. Using that approach with a common bargaining power equal to $1/2$ we easily find that the Johansen bargaining core is empty.[1]

The simple numerical example captures important features of the wage negotiating in 1930s in both Sweden and Norway. Construction workers in Sweden and Norway were highly paid, militant and sheltered from foreign competition. When foreign demand collapsed in the 1930s, workers in the export sectors such as metal workers accepted large wage reductions in order to stem the decline of employment. Construction workers came under no such pressure, in large part because of increased government spending on housing. Since construction workers were employed in the export sector as well as in home construction, higher

[1] We then have

$$x_1 \geq 1 + .5[13 - 10 - 1] = 2$$
$$x_2 \geq 2 + .5[13 - 12 - 1] = 2$$
$$x_3 \geq 10 + .5[13 - 2 - 10] = 10.5$$

by the demands from respectively sheltered workers, export workers, and employers threatening to break away. Clearly this is inconsistent with the the value of the grand coalition implying that $x_1 + x_2 + x_3 \leq 13$.

construction wages raised labor costs in the export sector, which threatened the jobs of metalworkers.

When construction unions called a strike in support of higher wages, the national confederation of unions intervened to force the strike to an early and from the construction workers' point of view, unsuccessful conclusion. The intervention of the national union confederation to end the strikes in construction was the initial step in a process of centralization of authority within the union movement in both Norway and Sweden, a process that was encouraged and supported by employers.

Thus, the political coalition that prevailed in the 1950s and established the pattern of centralized and solidaristic bargaining was comprised of export oriented unions and employers. High-wage unions in sheltered were prevented from leaving the centralized negotiations by the threat of lockouts. It is unlikely that the low-wage unions and the leadership of the union confederation would have been able to force the high-wage unions to accept an egalitarian wage policy without the backing of employers and the threat of lockouts against recalcitrant unions.

Example: endogenous union structure:

There may be multiple unions in an industry. In large metal working firms in Britain, for instance, it was not unusual in the 1970s that the work force was represented by 15-20 unions (Bratt 1986). In the Scandinavian Airlines there has been up to 20 unions only in one of the three national subdivisions of the company. Most of these unions supply complementary labor inputs and it is well understood that workers who are each others complements can gain from organizing in separate unions. But what about workers who are substitutes? The same theory would predict that they should organize in the same union to obtain the maximal bargaining power(see Moene, Wallerstein and Hoel, 1993) for a discussion of these aspects and for references to the literature).

In the following example we shall consider workers who are perfect substitutes and see whether the grand coalition of one single monopoly union is an equilibrium outcome of a mixed cooperative non-cooperative game. The game is cooperative in the formation of union coalitions, but non-cooperative between union(s) and employers and between unions, if there is more than one union coalition.

I'm going to make stark assumptions in order to illustrate some general points:

- there are n unions of equal size and an endogenous number $m \leq n$ of union coalitions
- each of the unions care about both pay and jobs, but so that each union i only cares about its wage bill $w_i L_i$
- marginal productivity in the industry is $A - bmL$ where A and b are constants and mL is total employment decided by the employers by equating the wage to the marginal product

- the description of perfect substitutes is taken to the extreme in the sense that there is only one uniform wage (in equilibrium) and each union can only affect the wage by restricting its labor supply

Each union (or coalition of unions) maximizes its pay-off $U_i = w_i L_i$. Employers have the right to manage employment levels, implying that the trade-off between wages and employment. This trade-off for the unions is represented by $w_i = A - b[(m-1)L + L_i$, and where $(m-1)L$ represent the labor supply of the other unions. It is straight forward to show how the equilibrium wage and employment depends on the number of union coalitions: We have $w = A/(m+1)$ and employment $L = A/b(m+1)$. The pay-off (in the non-cooperative equilibrium) for each coalition of unions equals

$$U = \frac{A^2}{b(m+1)^2} \tag{7}$$

This expression tells us what each coalition of unions achieve, the worth of the coalition, as a function of the the number of union coalitions. It differs from the characteristic function by its dependence on the partition of the unions into coalitions.

As stated, while the worth of a coalition as represented by the standard characteristic function of say group S only depends on the characteristics of S, the worth of a coalition, as represented by the equilibrium outcome (7), depends on the how all the other players are divided up in different coalitions (the number of union coalitions $m \leq n$ in the expression). This is a reflection that the worth according to (7) is an Nash-equilibrium outcome where each coalition do the best out of the situation vis a vis other union coalitions (and employers).

Now, consider first the case where $n = 3$.

- The worth of the grand coalition with $m = 1$ is $U = A^2/(b4)$ giving each of the three participating unions $U_i = A^2/(b12)$.

- Can one of the unions do better by breaking away from the grand coalition? If one breaks away, say number 1, assuming that the remaining two stick together, union 1 obtains $U_1 = A^2/(b9)$ which is better than its pay-off in the grand coalition. Hence, using the naive myopic principle, the grand coalition would be blocked and one is lead to the conclusion that it will resolve.

- For the more realistic farsighted principle, however, it is important whether the coalition of two unions in itself is stable. Sticking together, either of them is at most guaranteed $U = A^2/(b9 \cdot 2) = A^2/(b18)$. If the coalition of two unions resolves, we have $m = 3$ and the pay-off to each union is $U_i = A^2/(b16) > A^2/(b18)$. Hence, the coalition of two unions is not stable.

- Consider now again the situation where one union considers whether it should break away from the grand coalition in the first place. The equilibrium outcome that this defector has reasons to expect by breaking away, taking all the adjustments in the organizational structure into account, yields

each of the three unions $U_i = A^2/(b18)$ which is less than what they achieve in the grand coalition. Hence, no union has incentives to break away and the grand coalition remains stable.

The same result holds with $n = 4$. The grand coalition is stable even though there is a myopic temptation to break away assuming wrongly that the other unions will stick together. Taking all adjustments into account, however, there is nothing to be gained by breaking away from the the monopoly union association with $n = 4$ member unions.

The situation change, however, for cases with n larger than 4. Using an algorithm developed by Ray (2007) it can be proved that the stable union structure is one with 4 unions in the association and the remaining $n - 4$ operating alone.

The promises of mixed cooperative and non-cooperative play

Returning now to LJ's contribution, I have tried to make a case for the proposition that it represent a very promising starting point for a general equilibrium theory of social organization and competing interests. It should be considered as a theory of the mutual dependence between social organization, what coalitions that form, and the economic behavior of these organizations.

As the simple examples show this dependence yields far from obvious conclusions. Most importantly, it should be noted that in both examples above, the grand coalition (or full cooperation) is viable according to the non-cooperative approach, while it is not according to the corresponding mechanical approach of traditional cooperative games. The non-cooperative approach predicts more cooperation because not every possible coalition represents a credible threat. Only coalitions that themselves prove to be stable in the social structure that emerges once the grand coalition breaks up, represents credible threats.

The non-cooperative approach can also be combined with different levels of aggressive play as illustrated in section 4. Doing that one can obtain a richer theory of which coalitions that are likely to form and survive. LJ himself provided some numerical examples of some interest. It can be shown, for instance, that with four predetermined groups in society, where two groups are aggressive and two groups are acquiescent, the equilibrium coalition structure is likely to represent a divided society with two coalitions opposing each other consisting of one aggressive and one acquiescent group in each coalition — resembling the pattern of ethnic conflicts in many developing countries. It can also be combined with more realistic perceptions of the costs of bargaining — the topic of the next section.

6 The inefficiency of bargaining societies

As stated in the introduction, LJ was skeptical of the general efficiency of bargaining (see in particular Johansen, 1979). He believed that negotiations often constituted an inefficient decision making procedure that distorts information

and wastes resources. He also claimed that these inefficiencies tended to eliminate the potential gain which is the object of the bargaining. If this is right, there must be a resemblance between rent-seeking behavior and bargaining.

One should, however, distinguish between different sources of potential bargaining inefficiencies. There are at least two types. One is related to the decisions over which the parties negotiate. Inefficiencies then take the forms of delays in reaching a decision and in other costs associated with negotiations such as the incidences of strikes, lock-outs and conflicts in the labor market. I call all this the direct inefficiencies of bargaining. The other source of inefficiency is related to possible distortions of decisions that are not themselves bargaining outcomes, but where future bargaining nevertheless effect the decisions. Typical examples are under-investment in human and physical capital due to sharing of the gains caused by future hold up problems. I call this the indirect inefficiency of bargaining.

LJ was most concerned with the direct inefficiency of bargaining (Johansen, 1979). His criticism might have been triggered by the performance of three party negotiations between unions, employers, and the government that were so prevalent in Norway in the 1970s. Decisions were moved simultaneously from the market and from the parliament in a corporatist direction.

In a longer perspective, however, it seems to be the acceptance of extended bargaining as an important distributional mechanism that improved the direct bargaining efficiency—most likely it improved both the direct and the indirect bargaining efficiency. The indirect efficiency was improved by not tying the local wage to the local productivity of the firm, but rather to the average productivity of sector, or of the entire economy. Hence, in this way the impact of local investments on local wages became negligible, eliminating most of the hold up problem.

The direct bargaining efficiency, our main concern, was clearly improved if one compares the wasteful contested bargaining, or open class conflicts, that dominated the Scandinavian countries in the 1920s and the beginning of the 1930s, to the more orderly structured wage bargaining systems that emerged after World War II.

From one world record to another

Norway and Sweden went from an unofficial world record of high incidence of strikes an lock-outs prior to World War II, to an unofficial world record in the absence of such conflicts and industrial actions.

In the period 1920-40 the yearly number of labor disputes per 100 000 workers were

- between 10 and 25 in Norway and Sweden
- between 3 and 7 in England and the US
- between 3 and 10 in France

After World War II the path is opposite. In the period 1945-65 the numbers are

- between 0 and 3 in Norway and Sweden
- more than 10 in England and the US
- close to 20 in France

Measured by the loss of working days in Norway also shows a clear change. More than 100 000 man years were lost in labor disputes between 1920-40, while the number came down to 10 000 for the first 20 years after World War II. The incidence of strikes and lock-outs has remained low up till today.

Below I first discuss how the high incidences of conflicts can be explained by exploring extremely simple models that are more specialized than the more general framework sketched out in Johansen (1979). Like LJ I distinguish between aggressive and acquiescent behavior, but now within more specific - highly stylized micro models. Next I use these mechanism to explain the absence of strikes and lock-outs after World War II.

Simple models of industrial conflicts

How should the high incidences of strikes and lock-outs be explained? Any explanation must face the Hicks paradox: No theory founded on rational behavior with a unique solution could ever explain industrial conflicts such as strikes and lock-outs, since both sides could then predict the outcome and agree to it without costly conflict (Hicks 1963).

Strikes

The usual way out of the Hicks paradox is to include private information held by one side or both (Kennan 1986). Suppose the firm is hit by a sudden decline in demand. If the decline in demand was common knowledge, the union would adjust its expectations accordingly and contract negotiations would be no harder than usual. But whether demand is falling or rising, the firm has always incentive to be pessimistic in its message to the union. Knowing this, the union discounts any message from the firm that is not costly for the firm to transmit. One way that the firm can credibly communicate a worsening of conditions is to lay of workers

To illustrate, consider a firm with a value added that is R when local conditions are good and θR, with $\theta < 1$, if local conditions are bad. When the firm and union negotiate the firm knows the true state, while the union believes the state is bad with probability s_w and good with probability $(1 - s_w)$. The union can commit to industrial action by mobilizing its members on beliefs of these probabilities. We distinguish between an aggressive strategy based on a tactics as if $s_w = 1$ and an acquiescent strategy based on a tactics as if $s_w = 0$.

Aggressive union: The union demands a wage w and threaten to strike a certain share of the contract period $\alpha < 1$ if the firm does not yield acting as if the firms demand conditions are good. Profits are

$$\pi = \begin{cases} R - w & \text{if the firm yields} \\ (1-\alpha)(R-q) & \text{if the firm declines} \end{cases} \tag{8}$$

Here q is the compromise wage after a strike. In the Scandinavian cases we consider, a labor court ("voldgiftsdomstol") is likely to intervene after the work stoppage has lasted for while. The labor court then dictates the compromise wage. The value of α can thus be thought about as the expected length of time before the labor court intervenes, and the value of q is the compromise wage that it dictates. To focus on the most interesting cases we assume that the compromise wage adjusted for the work stoppage is higher than the participation constraint q_0 of workers, i.e. $(1-\alpha)q > q_0$. The godfather principle of wage negotiations means that the union should demand the highest wage that it is in the self interest of the firm to accept. This wage must fulfill the constraint $(R-w) \geq (1-\alpha)(R-q)$ and the highest wage consistent with this constraint is

$$w = \alpha(R-q) + q \tag{9}$$

Hence, as the expression shows, the aggressive strategy implies that the union's wage demand beyond the compromise wage is a claim to the entire rent saved by not having the strike carried out when local conditions are good.

It should be observed that there is no strike if the local conditions of the firm actually are good, but it is in the interest of the firm to let a strike occur if the demand conditions in fact are bad. The expected wage of following the aggressive strategy is

$$Ew = (1-s_w)[\alpha R + (1-\alpha)q] + s_w[(1-\alpha)q] = (1-s_w)\alpha R + (1-\alpha)q \tag{10}$$

Acquiescent union: In this case the wage demand of the union is based on the worst case expectations $\theta < 1$ about the firm's demand conditions. Hence, by analogy the wage becomes

$$\tilde{w} = \alpha\theta R + (1-\alpha)q \tag{11}$$

In this case the firm always yields.

Comparing the outcomes of the aggressive and acquiescent strategies, we see that $Ew > \tilde{w}$ whenever $(1-s_w) > \theta$, implying that the optimal strategy of the union is aggression whenever the probability that demand conditions of the firm actually are good $(1-s_w)$ is high relative to the share of value added lost when times actually are bad and thus $\theta < 1$.

The expected profits to the firm of the aggressive union strategy are

$$E\pi = s_w[(1-\alpha)(\theta R - q)] + (1-s_w)[(1-\alpha)(R-q)] = (1-\alpha)\left[(1-s_w(1-\theta))R - q\right] \tag{12}$$

Observe that the more likely the strike, the lower the expected profits, as $dE\pi/ds_w = -(1-\theta)R$.

It should also be noticed that

- every strike ends with a defeat in the sense that the union ends up with less than what they demand
- aggressive wage demands are necessary to obtain w when the firm is not hit

by a negative shock

- strikes can be equilibrium outcomes as they can be based on optimal strategies under asymmetric information

Lock-outs

Similarly, to resolve the Hicks paradox in the case of lock-outs the obvious idea is to include private information about the union's ability to tolerate a work stoppage. Suppose the union has little strength as it does not have sufficient funds to support its members during a conflict. If this is common knowledge, the employer would take advantage by threatening to lock the workers out from their jobs if they do not yield to his the wage he offers, or the wage decline he insists on. Since the union is weak, the workers have no better option than to accept the wage offer. The union has therefore all reasons not to reveal the truth about its strike fund. Whether the strike fund is large or small, the union has always incentive to pretend to be financially strong in its message to the firm. Knowing this, the firm discounts any message from the union that is not costly for the union to transmit. One way that the union can credibly communicate a sufficient strike fund is trough a its tolerance of a conflict.

Consider again a firm with value added equal to R. When the firm and the union bargain the union knows its strike fund, but the firm believes it is sufficiently large with probability s_l and that it is not large enough with probability $(1-s_l)$.

Acquiescent employer: If the firm believes that the union has a sufficient strike fund the best the firm can do is to offer a wage w backed by a threat of lock-out that is expected to last a fraction β of the contract period. Thus the workers obtain

$$u = \begin{cases} w & \text{if the union yields} \\ (1-\beta)q & \text{if the union declines} \end{cases} \tag{13}$$

where w is the highest wage that the union will accept, implying that $w = (1-\beta)q$. The profits of the employer is thus

$$\pi^* = R - (1-\beta)q \tag{14}$$

Aggressive employer: The employer may do better by trying to exploit the potential weakness of the union in case it does not have sufficient strike funds. Backed by a lock-out threat the employer can then insist on offering no higher wage than what makes the workers indifferent between working and not working. This participation constraint q_0 is the lowest wage that the union will accept if it does not have sufficient strike funds. The union would not accept this low offer unless it does not have strike funds to tolerate to be locked out from the jobs. Thus, from the firms point of view the probability that the wage becomes equal to q_0 is $(1-s_l)$.

The lock-out does take place, however, if the union have sufficient strike

funds. It lasts for a share β of the contract period until the labor court intervenes and set the compromise wage q. The probability that the lock-out actually takes place is thus s_l. The wage that the firm expect to end up paying is therefore $s_l(1-\beta)q + (1-s_l)q_0$ and the profits that the firm expects to earn are

$$E\pi = s_l[(1-\beta)(R-q) + (1-s_l)[R-q_0] = [1-s\beta]R - [s(1-\beta)q + (1-s)q_0] \quad (15)$$

Observe that the more likely the work stoppage, the lower the expected profits, as $dE\pi/ds_l = -[\beta R + ((1-\beta)q - q_0)]$.

Comparing the two employer strategies we find that the aggressive strategy is optimal for the firm whenever $E\pi > \pi^*$ which is equivalent to

$$(1-s_l)[(1-\beta)q - q_0] > s_l\beta R \quad (16)$$

The left hand side of this inequality expresses the savings in wage costs of an aggressive employer strategy weighted by the probability that there is no work stoppage. The right hand side of the inequality expresses the loss of values added due to a lock-out weighted by the probability of such a work stoppage. Hence, the aggressive strategy by the employer is optimal whenever the expected savings in wage costs is higher than the expected revenue loss during a lockout. It should be noted that

- lock-out threats enable the employer to price discriminate between vulnerable and non-vulnerable groups
- lock-out threats can create higher wage inequalities on top of productivity differentials

How can we explain the decline in strikes and lock-outs?

As stated one important consequence of the new system of wage setting after World War II was the virtual elimination of industrial conflict. The end to industrial conflicts came by a centralization of wage setting. Both the union movement and the employer association became stronger and more encompassing. Centralization of wage setting also had implications for information. To day one important objection against centralization of wage setting concerns the loss of information. Assar Lindbeck (1993) makes the informational advantage of decentralization crystal clear:

> "The main argument for decentralized economic decisions in national economies is that the information about time and place within firms about production processes and markets cannot be centralized without losing the bulk of that information. We would also expect that such a centralization process would distort the information. This is, of course, the main argument for decentralized decision making – i.e. to allow decisions to be taken where the information is available — a point that was first emphasized by Friedrich von Hayek."

Yet even though central wage negotiators may have less detailed information it is equally remarkable that they tend to have the same information. When decisions are "taken where the information is available," it is taken where it is most likely asymmetrically distributed which may lead to a high incidence of conflict. When decisions are taken more centrally, central negotiators can't distinguish between good and bad periods in local enterprizes; between strong and weak groups of local workers. And if they could it would be less relevant since they are going to decide on tariff wages. In addition comes that unions in the same association would pool their strike funds, eliminating any speculation about who has which funds. For all these reasons both the strike strategy and the lock-out strategy become less attractive.

It was also important that "basic agreements" between the national associations of unions and employers, establishing rules for collective bargaining, were reached (in 1935 in Norway and 1938 in Sweden). The new agreements had a peace clause, stating that once wages were determined by concluded negotiations, strikes and lock-outs were prohibited in the contract period. It should be noticed, however, that if the system of coordinated wage negotiations dissolved, one would perhaps move back to the decentralized negotiations with asymmetric information. In this case the peace clause would not prevent industrial conflicts as long as the disputes are over new wage contracts.

So, again it is important to understand how cooperation in the form of centralized wage negotiations was sustained. The simple explanation, it seems, is the shrinking of feasible blocking alternatives. As emphasized in Section 5 the reasonable focus on equilibrium alternatives (equilibrium partitions) in the case of a break down, relaxes some of the constraints on feasible bargaining outcomes and makes cooperation more likely. In addition, participants had a fresh memory of how bad the conflict regime had been. To deviate from the grand coalition of centralized bargaining was therefore perceived as less attractive. Finally, and perhaps paradoxically, implicit threats of lock-outs from employers are also part of the explanation for the elimination of conflicts.

As stated in Section 5, the political coalition that supported centralized bargaining was comprised of both unions and employers. The strength of the well organized employers were important. Their threats of lockouts against recalcitrant unions, explain why some high-wage unions were prevented from leaving the centralized negotiations—and thus why central wage setting was maintained and why labor disputes vanished.

7 Conclusion

Cooperative game theory had initially an optimistic but perhaps somewhat mechanical approach to cooperation and collective agreements. The optimism is evident from the first of the four assertions discussed in this essay. According to this assertion collective decision making takes the form of implicit bargaining. It is portrayed as an efficient decision system. Threats and counter threats among all possible sub coalitions induce a binding agreement where nobody can do better by breaking away. The threats have a competitive flavor. In fact, even

without any market like institutions the cooperative solution tend to mimic the general competitive equilibrium as the number of participants become large, or as I suggest, the participating associations become more and more encompassing.

Cooperation easily fails, however, when participants become more aggressive in their claims of a share of the surplus from cooperation. This is the main message of the second assertion in this essay. It portrays collective decision making again with no restrictions on which coalitions that can form. One way to interpret aggressive claims is to let the participants take an explicit bargaining approach. When each potential group demand at least as much as it could obtain by breaking away and start bargaining on the terms of rejoining, all groups together tend to demand incompatible shares of the surplus from cooperation. The Johansen bargaining core then ceases to exist under conditions where the ordinary core does exist. To realize an allocation in the Johansen bargaining core requires restrictions on possible coalitions—perhaps in the form of norms against bargaining opportunism.

The third assertion puts more weight on which coalitions that are likely to form. I denote it the non-cooperative approach to cooperation emphasizing the general equilibrium of bargaining societies. The relevant equilibrium can involve a mixture of cooperative and non-cooperative games, incorporating both the formation and behavior of bargaining coalitions. This equilibrium approach can be combined with explicit bargaining attitudes, using credible threats of equilibrium partitions in the case of break downs. The bargaining core may then exist even though it would not in accordance with the ordinary approach. The reason why the non-cooperative approach to cooperation is more likely to yield a collective solution, is the more realistic approach to coalitions. The insistence on credible threats implies that groups cannot credibly demand what they could obtain from the formation of coalitions that would not be stable. Hence, the equilibrium requirement can work as if one imposed restrictions on possible coalitions— or simply a reduction in bargaining opportunism.

Finally, the fourth assertion portrays bargaining as an inefficient decision procedure that distorts information and wastes resources with an inherent tendency to eliminate the potential gain which is the object of the bargaining. This kind of inefficiency is more likely in some types of bargaining situations than in others. Decentralized wage bargaining, for instance, seems more easily to lead to labor disputes and conflicts as the information that become available at the local level are likely to asymmetrically distributed. Adding inefficient bargaining in some constellations may increase the chances of cooperation at central level to emerge as an equilibrium outcome simply because breaking away might lead to equilibria with a waste of resources due to conflict and industrial action.

Combing the insights from all four assertions, it is evident that the bargaining society can be beset with difficulties and inefficiencies — just as LJ said. Yet, unlike what he emphasized, some of the bargaining problems, including the instability of some intermediate coalitions and the potential waste of resources at lower levels of bargaining, can make it less and not more difficult to obtain a solution at the central level.

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