

Is corporatism feasible?*

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Abstract

In this paper we consider a standard policy game between the Government and a union. In such a framework, we first investigate the effects of corporatism on macroeconomic performance vis-à-vis different kinds of non-co-operative equilibria. Afterwards, we introduce in the literature the issue of the feasibility of corporatism, i.e., whether and under what conditions it is in the interest of both agents to implement a corporatist approach to economic policies. We find that it is difficult to implement corporatism, although it generally increases social welfare, since it often reduces the union’s utility. In particular, we show that a micro-founded union will never find it profitable to co-operate with the Government, unless side-payments are considered. The study of this last issue is however beyond the scope of this paper.

JEL: E24, E61, E31, E58 and J51.

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1. Introduction

Corporatism is an ambiguous concept, which has been defined in a variety of ways. In this paper we focus on one specific aspect of the corporatism and define it as ‘institutional arrangements that involve negotiation, bargaining, collaboration and accord between major economic groupings in the society, and especially, for our present interests, between unions and governments’.¹

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¹ This largely corresponds to definitions of ‘corporatism’ in Cameron (1984) and Bruno, Sachs (1985) and is the same as Cubitt’s ‘Corporatism 4’ (see Cubitt, 1995) and the definition of the term given by Burda (1997). This definition of corporatism stresses the nature of ‘the rule of the game’ whereas other definitions can refer to the

Recent policies of some European countries demonstrate the prevailing trend for the unions to become more actively involved in the formulation of policy both at the national and at the European level. At the national, regional and company levels unions have become more and more involved in drawing up employment pacts aimed at safeguarding or creating employment. The Social Democrat/Green German government, for example, was recently able to revive the idea of an employment pact leading to a new national alliance for jobs which includes the formation of a tripartite body. Similar pacts and labour market policy reform agreements have also been reached at national and regional levels in countries such as Belgium, Ireland, Italy, the Netherlands, Portugal and Sweden.²

Co-operation between governments and trade unions is thus a reality in a number of European countries, in particular in those with a tradition of social-democratic government. The richness of practical cases of co-operation is however in sharp contrast with the reduced number of theoretical analyses aimed at checking its benefits and the conditions for its feasibility.³

An initial attempt to show these benefits was made by Tarantelli (see Tarantelli, 1982; 1986; and 1987), who argues that co-operatively determined wages ensure the same disposable income for wage earners while resulting in a higher level of employment and a reduced inflation rate. He presents no formal model in relation to this statement, but strengthens it by some empirical tests.

After Tarantelli only a few papers and books have appeared on the subject. Among them there are Bruno, Sachs (1985), Gylfason and Lindbeck (1994), Acocella and Cicccone (1995), Cubitt (1995), Burda (1997), and Di Bartolomeo (2001). The common result obtained by these papers is one of (sometimes) conditional positive effects of co-operation on both inflation and unemployment, much in Tarantelli's vein. The effects of co-operation depend on a number of assumptions (*e.g.*, see Burda, 1997). A crucial role among these is played by specification of the objectives of both governments and unions.

The starting point of our paper is closely related to Gylfason and Lindbeck (1994) and Cubitt (1995), who consider implicitly or explicitly the same definition of corporatism used in our paper. Gylfason and Lindbeck (1994) show that joint maximisation of the union preference function, quadratic in real wages, income and price stability, and the government's utility function, quadratic in both income and prices, implies zero inflation, while maintaining an unemployment bias. Cubitt (1995) finds the possibility of reducing unemployment conditional on a sufficiently high bargaining power of the government while having reduced inflation, by initially assuming preference functions of both players quadratic in income and inflation.

We first show that positive macroeconomic consequences on unemployment and inflation can be derived from co-operation between the union(s) and the government under a broad spectrum of assumptions, including the type of non co-operative solution considered as a benchmark for assessing the consequences of corporatism and the type of the union preference function. But the main purpose of this paper is to extend the analysis of corporatism to issues of feasibility, *i.e.* of acceptability of this institutional device. Analysis of the macroeconomic performance of a corporatist system in terms of employment and price stability is important. However, superiority of the macroeconomic performance of

number of existing unions (the degree of centralisation of wage setting) or to the values of their objectives or the weights put on them (see Cubitt, 1995).

² See OECD (1997), Visser (1998), Traxler and Kittel (2000) and Rhodes (2001).

³ The 'formal reticence' of researchers to develop models of corporatism is noticed also by Burda (1997), who relates it to the remarkable imprecision with which the concept is defined. The reticence is even more pronounced with reference to the kind of corporatism we are interested in in this paper.

corporatism does not guarantee that corporatism will be accepted by the parties involved, in particular by the union. In fact, the union preference function includes an additional variable, the real wage rate, which tends to be inversely related to employment. The higher level of employment guaranteed in many cases by corporatism raises the union utility level, but since it implies a lower real wage rate, it can finally reduce the union preference. The analysis of feasibility represents a novelty, since generally previous papers only consider the macroeconomic consequences of corporatism without checking its feasibility.⁴ We show how feasibility is strictly conditional on the weights of different objectives in the preference function of both the union and the Government.

The paper is organised as follows. In section 2 the structural model of the economy, its reduced form and the preference functions of the two agents are presented. According to the recent literature both the cases of a union microfounded preference and an inflation augmented one are considered. In section 3 three non-co-operative and one co-operative (corporatist) regimes are described and inflation and unemployment rates associated with them derived. In section 4 the values, and their effects on social welfare, of unemployment and inflation associated with the corporatist regime are discussed. Section 5 analyses the conditions for acceptability of corporatist solutions to both the government and the union. The next section relates these results to questions of neutrality of monetary policy. The final section presents our conclusions and some general final remarks. Robustness of macroeconomic consequences of corporatism with respect to union preferences is also analysed in an Appendix.

2. The model of the economy and the preference functions of the agents

We consider a model that is a generalisation of Acocella and Ciccarone (1997) and an extension of Di Bartolomeo (2001). There are two agents in our closed economy, a monopoly union and the Government. In our economy we consider only one policy maker, who takes care of both employment and price stability. In a more complex setting, like the one considered in Acocella and Di Bartolomeo (2002), both one government (or more than one government) and the central bank are present. Some of our conclusions could not hold in such a more general setting. In fact, even if the objectives remain the same, the presence of two separate public agents, each one of them having an independent instrument available, can change results. The reason why we refer to a very simple setting is to show that robustness of conclusions derived by using policy games should be checked against possible changes in either the model or the information setting.

The economy is described in a very simple way by the system of equations (1), where all variables are in logs:

$$\begin{aligned} l^D &= a(m - p) \\ l^S &= -b(w - p) \\ l^D &= l^S \end{aligned} \tag{1}$$

where l^D and l^S are, respectively, aggregate demand and supply (in terms of employment), m is the nominal money supply, w is the nominal wage and p is the price level. By hypothesising some “prior” level of prices, we may talk of inflation and current prices interchangeably (Cubitt, 1995: 247).

⁴ Acocella and Ciccarone (1995) is an exception.

This model in structural form can be expressed in a reduced form as follows:

$$\begin{aligned}
 l &= \frac{ab}{a+b}(m-w) \\
 p &= \frac{a}{a+b}m + \frac{b}{a+b}w \\
 u &\equiv \bar{n} - l
 \end{aligned} \tag{2}$$

where u is the unemployment rate and \bar{n} is the given labour force.

The preference functions of the Government and the union are, respectively, indicated by the following expressions:

$$W_G = -\frac{\beta}{2}(\pi - \pi_G)^2 - \frac{1}{2}(l - n_G)^2 \tag{3}$$

$$W_U = \alpha(w - p) - \frac{1}{2}(l - n_U)^2 - \frac{\vartheta}{2}(\pi - \pi_U)^2 \tag{4}$$

where $\pi = p - p_{-1}$ is the inflation rate; $\pi_G = p_G - p_{-1}$ and $\pi_U = p_U - p_{-1}$ are the players' desired values of inflation ($\pi_G \leq \pi_U$); n_G and n_U are the desired values of employment of the two players ($n_G \geq n_U$). Government's utility depends on inflation and employment, whereas the union utility depends on the same arguments and on the real wage. For a more accurate description of such functions we refer to Acocella and Ciccarone (1997) and the references there contained. Here we would like only to note that the union preference depends on inflation, if $\vartheta \neq 0$.⁵

3. Description and derivation of the policy regimes

Policy regimes

With reference to the economy described in the previous section, we consider four possible regimes labelled by numbers running 1 to 4. Three non-co-operative regimes are compared to a co-operative one.

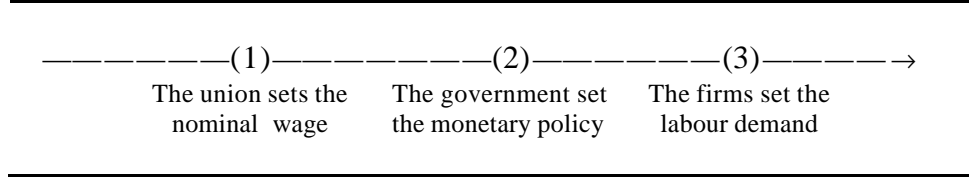
We first present the standard Nash non-co-operative regime (regime 1), which is also our benchmark. In this regime, the union and the Government simultaneously set the nominal wage rate and the nominal supply of money, which maximise, respectively, the union's and the Government's preference function. Then firms set the labour demand and outcomes can be computed.

Afterwards, we consider two sequential games (solved by sub-game perfect Nash equilibrium). In the first such game the Government is able to pre-commit its policy (fixed monetary rule regime, i.e. regime 2), whereas in the second the union sets its wage in advance taking account of the government's reaction. This regime corresponds to a standard game where the union, given its nominal wage, sets its expectations and the Government acts by

⁵ The reasons why unions may be interested in inflation are indicated by Gylfason and Lindbeck (1994) (see, however, Acocella and Ciccarone, 1997, for arguments against the inclusion of inflation in the union preference function) and Cukierman and Lippi (1999).

using a discretionary monetary policy (discretionary monetary policy regime, i.e. regime 3). The timing of the game associated with regime 3 is described in the following figure.

Figure 1 – Discretionary monetary policy regime



Clearly, the timing of regime 2 is obtained by reversing the order of point 1 and 2 of figure 1. The outcomes of the three non co-operative regimes are then compared with the corporatist solution (regime 4), which is our main object of study. In fact, in line with Robin Cubitt's definition of 'Corporatism 4' (see Cubitt, 1995), we define corporatism in a very restrictive way as the solution of a co-operative game between the Government and the union.⁶

The co-operative solution is defined as the joint maximization of a convex combination of the two players' utilities (see, e.g., Gylfason and Lindbeck, 1994; or Cubitt, 1995). Our analysis is restricted to this co-operative solution concept for two orders of reasons. First, we aim to compare our findings to the existing literature, which widely uses, implicitly or explicitly, this solution concept to formalise the definition of corporatism we are interested in. A second order of reasons is shortness since conclusions similar to those we derive can be obtained by using either the Nash bargaining solution or the Kalay-Smorodinsky one. The reason of our generality should be found in the introduction of feasibility. In fact, the main difference between the co-operative solution used here and those just mentioned is the absence of the non-negativity constraints in the latter. However, as we assume an extra requirement for our solution, namely feasibility that is the inclusion of the non negative constraints as condition for the feasibility of the co-operative regime, this difference vanishes.⁷

The Nash non co-operative regime (regime 1)

The Nash non co-operative solution is obtained as follows. Maximising the preference functions of the two agents with respect to their control variables (m for the Government and w for the union) subject to the reduced-form model of the economy (2) gives the following reaction functions:

$$m = \frac{(ab - \beta)b}{a(b^2 + \beta)} w + \frac{b(a+b)}{a(b^2 + \beta)} \bar{n} + \frac{(a+b)\beta}{a(b^2 + \beta)} p_{-1} \quad (5)$$

$$w = \frac{a(ab - \vartheta)}{b(a^2 + \vartheta)} m + \frac{a(a+b)}{b(a^2 + \vartheta)} \left(\frac{\alpha}{b} - \bar{n} \right) + \frac{(a+b)\vartheta}{b(a^2 + \vartheta)} p_{-1} \quad (6)$$

The reader should note that, with no loss of generality for our purposes, in order to make it easier understanding the model, we have assumed that the desired values of

⁶ See also, among others, Gylfason and Lindbeck (1994), Cubitt (1995), and Di Bartolomeo (2001).

⁷ More proofs and numerical examples are available upon request.

employment and inflation of both agents are \bar{n} and zero, respectively. We also assume that all the marginal rates of substitution are finite and positive, unless differently stated.

The Nash non co-operative solution with respect to control variables is obtained by solving equations (5) and (6):

$$m_N^* = \frac{ab - \beta}{b(a\beta + b\vartheta)}\alpha + \frac{\bar{n}}{a} + p_{-1} \quad (7)$$

$$w_N^* = \frac{a(b^2 + \beta)}{b^2(a\beta + b\vartheta)}\alpha - \frac{\bar{n}}{b} + p_{-1} \quad (8)$$

By substituting the latter equations into the reduced form we have the equilibrium values of the target variables:

$$l_N^* = \bar{n} - \frac{\alpha\alpha\beta}{b(a\beta + b\vartheta)} \quad (9)$$

$$\pi_N^* = \frac{\alpha\alpha}{a\beta + b\vartheta} \quad (10)$$

The equilibrium unemployment rate can also be obtained:

$$u_N^* \equiv \frac{\alpha\alpha\beta}{b(a\beta + b\vartheta)} \quad (11)$$

The fixed monetary rule regime (regime 2)

The solution of the game can be easily derived backwards by maximising the Government preference function subject to the reduced form and (6) as well. This results in the following optimal value for money supply:

$$m_{LB}^* = \frac{\alpha\alpha(\vartheta - \beta)}{b(a^2\beta + \vartheta^2)} + \frac{\bar{n}}{a} + p_{-1} \quad (12)$$

and then the optimal wage is:

$$w_{LB}^* = \frac{\alpha\alpha(a\beta + b\vartheta)}{b^2(a^2\beta + \vartheta^2)} - \frac{\bar{n}}{b} + p_{-1} \quad (13)$$

From equation (12) and (13) the Nash perfect sub-game equilibrium values of the relevant variables can be derived, by substituting such values in the reduced-form model:

$$l_{LB}^* = \bar{n} - \frac{a^2\alpha\beta}{b(a^2\beta + \vartheta^2)} \quad (14)$$

$$\pi_{LB}^* = \frac{\alpha\alpha\vartheta}{b(a^2\beta + \vartheta^2)} \quad (15)$$

$$u_{LB}^* \cong \frac{a^2\alpha\beta}{b(a^2\beta + \vartheta^2)} \quad (16)$$

Discretionary monetary policy regime (regime 3)

The solution is derived in a way similar to that of the previous section, by maximising the union utility function subject to (5) and the reduced-form model. This results in the following optimal value for wage:

$$w_{LU}^* = \frac{\alpha\beta(\beta + b^2)}{b^2(\beta^2 + b^2\vartheta)} - \frac{n}{b} + p_{-1} \quad (17)$$

and then the following optimal money supply is easily derived:

$$m_{LU}^* = \frac{\alpha\beta(ab - \beta)}{ab(\beta^2 + b^2\vartheta)} + \frac{n}{a} + p_{-1} \quad (18)$$

By substituting these values into the reduced form, we have the following sub-game perfect Nash equilibrium values for the outcomes of the game:

$$l_{LU}^* = \bar{n} - \frac{\alpha\beta^2}{b(\beta^2 + b^2\vartheta)} \quad (19)$$

$$\pi_{LU}^* = \frac{\alpha\beta}{\beta^2 + b^2\vartheta} \quad (20)$$

$$u_{LU}^* \cong \frac{\alpha\beta^2}{b(\beta^2 + b^2\vartheta)} \quad (21)$$

The corporatist regime (regime 4)

The corporatist solution is obtained by maximising a linear combination of the preference functions of the two agents:

$$W = W_B + (1 - \alpha)W_U \quad (22)$$

where parameter $\alpha \in (0, 1)$ is an indicator of the bargaining power of the Government (Di Bartolomeo, 2001). Furthermore, the solution to the problem must satisfy some non-negative condition (i.e. the utility of both players under the co-operative solution must be higher than their utility under the non co-operative solution). In this section we will abstract from this issue that will be analysed in Section 5.

The value of each control variable in terms of the other control variable derived from the process of maximisation can be expressed as follows:

$$m = \frac{b[ab - \beta - (1 - \alpha)\vartheta]w + (a + b)[\beta + (1 - \alpha)\vartheta]p_{-1} + (a + b)[b\bar{n} - (1 - \alpha)\alpha]}{a[\beta + b^2 + \vartheta(1 - \alpha)]} \quad (23)$$

$$w = \frac{ab[ab - \beta - (1 - \theta)\vartheta]m + (a+b)b[\beta + (1 - \theta)\vartheta]p_{-1} - (a+b)[ab\bar{n} - a(1 - \theta)\alpha]}{b^2[a^2 + \beta + \vartheta(1 - \theta)]} \quad (24)$$

from which we have:

$$m_C^* = -\frac{\alpha}{ab}(1 - \theta) + \frac{\bar{n}}{a} + p_{-1} \quad (25)$$

$$w_C^* = \frac{\alpha}{b^2}(1 - \theta) - \frac{\bar{n}}{b} + p_{-1} \quad (26)$$

The optimal values of target variables are then:

$$l_C^* = \bar{n} - (1 - \theta)\frac{\alpha}{b} \quad (27)$$

$$\pi_C^* = 0 \quad (28)$$

$$u_C^* \cong (1 - \theta)\frac{\alpha}{b} \quad (29)$$

The reader should note that the co-operative solutions for employment and inflation are independent of the degree of inflation aversion of the union. Inflation is however independent of the players' inflation-aversion, simply because both players can reach their common bliss point. With different bliss points, equilibrium inflation would be a weighted average of the players' bliss points, where the weights are a function of the players' inflation-aversion.

4. Effects of corporatism on macroeconomic outcomes and “Social Welfare”

In this section we investigate the effects of corporatism on some macroeconomic variables (more precisely, on inflation and unemployment) by comparing the equilibrium outcome associated with the co-operative solution with those associated with the non-co-operative regimes. By introducing some simplifications that are standard in the literature, the analysis of the outcomes will enable us to make some considerations about the effects of corporatism on social welfare.

Let us first consider the case in which the union is inflation-averse ($\vartheta > 0$). In this case, all non co-operative solutions show a positive inflation rate, whereas the corporatist regime implies zero inflation. Therefore, when the union is inflation-averse, only the co-operative solution guarantees the lowest possible (i.e., zero) inflation. In economic terms this might mean that, when the union cares about inflation, corporatism would eliminate the inflation bias due, in the terms of Barro and Gordon (1983),⁸ to the lack of credibility of non-

⁸ This is not a dynamic model; however, the equilibrium values derive from an implicit dynamic adjustment through the reaction functions of the players. Therefore, we can speak of credibility in the following sense: the union, even when it is at its optimal point in terms of the real wage-employment trade-off relation, will push the nominal wage (rising inflation) to the left of the point in which the Government will not react to its strategy, i.e. the point in which further increases in money supply to deflate the real wage are not credible (because of the loss for the Government's utility).

inflationary monetary policies when the Government has also an objective in terms of employment.

As to unemployment, equation (11) can be written as:

$$u_N^* \cong \frac{a\beta}{a\beta + b\vartheta} \frac{\alpha}{b} \quad (30)$$

This value is lower than that corresponding to the Nash co-operative regime represented by equation (29), according to whether:

$$\frac{a\beta}{a\beta + b\vartheta} < (1 - \alpha) \Leftrightarrow \frac{b\vartheta}{a\beta + b\vartheta} = \Gamma(\beta, \vartheta) \quad (31)$$

This means that the non co-operative solution for unemployment (employment) tends to be lower (higher) than the co-operative one the higher the union inflation-aversion, the lower the inflation aversion and the bargaining power of the Government.⁹

When the Government plays in the fixed monetary regime (regime 2) we obtain the following condition:

$$\frac{a^2\beta}{a^2\beta + \vartheta^2} < (1 - \alpha) \Leftrightarrow \frac{\vartheta^2}{a^2\beta + \vartheta^2} \quad (32)$$

and a similar result holds for the discretionary monetary regime (regime 3):

$$\frac{\beta^2}{\beta^2 + b^2\vartheta} < (1 - \alpha) \Leftrightarrow \frac{b^2\vartheta}{\beta^2 + b^2\vartheta} \quad (33)$$

Conditions (32) and (33) can be commented in a way similar to (31).

By comparing the equilibrium unemployment values given by (11), (16) and (21) we notice that when the union is inflation-indifferent, non co-operative unemployment is always (i.e. in any non co-operative regime) equal to α/b and that inequalities (31), (32) and (33) are never satisfied. Therefore, when the union is inflation-indifferent, unemployment in the co-operative regime is always lower than in any non co-operative one. By comparing the equilibrium inflation rates (10), (15) and (20) it follows that when the union is inflation-indifferent, the co-operative equilibrium price level is the lowest possible. Summarising, when the union is inflation-indifferent, the co-operative solution is socially Pareto dominant with respect to all the non co-operative regimes, in the sense that it reduces any social loss function that is increasing in unemployment and inflation.

In other terms, when the union is indifferent to inflation, the proposition according to which corporatism guarantees an equilibrium that is Pareto superior to the non co-operative solution is robust to the different non co-operative solution regimes. This kind of result is common to those obtained in settings similar to ours (see Cubitt, 1995; Cukierman and Lippi, 1999; and Di Bartolomeo, 2001).

⁹ The reader can easily check that $\partial\Gamma(\beta, \vartheta)/\partial\vartheta > 0$ and $\partial\Gamma(\beta, \vartheta)/\partial\beta < 0$. Then for any given α , the r.h.s. of equation (31) is higher the higher is ϑ and the lower is β .

In the case of an inflation-averse union the positive effect of corporatism on unemployment depends on a comparison between the inflation aversion of the union and that of the government. When the former is relatively larger than the latter, the corporatist regime achieves an unemployment rate lower than that associated with the non-co-operative regimes (regimes 1, 2 and 3). Inflation is always lower in the corporatist regime vis-à-vis all non-co-operative regimes, if the inflation aversion of the government is higher than the union's.

The above results, however, may be dramatically affected by the feasibility issue since corporatism, even when it is associated with a higher level of social welfare, may fail to raise the utility of one of the two players, in particular the union. This would make the co-operative solution unfeasible. The next section will investigate questions of feasibility.

5. Effects on the players' utilities: Is corporatism feasible?

Feasibility of corporatism involves comparing the agents' utilities associated to corporatist outcomes with the utilities the agents derive in the case of a break of bargaining (non-negative conditions). The first problem that we must face in this case is the determination of the agents' outside options. The most intuitive candidates for the outside options are the non co-operative solutions, but it is also possible to consider a different outside option, as in the case of a binding contract with penalties imposed by law. However, this case is less interesting since the outside options would be exogenously given. Therefore, we will focus on the non co-operative solutions as outside options.

Non-negative conditions for the policy-maker and the union can be represented as follows:

$$\begin{cases} \Lambda_G = (W_G^C - \tilde{W}_G) \geq 0 \\ \Lambda_U = (W_U^C - \tilde{W}_U) \geq 0 \end{cases} \quad (37)$$

where W^C are the utilities associated to the corporatist solution values (e.g. π_C , l_C , etc.) while \tilde{W} are the utilities associated to the breaking bargaining values of the agents' target variables (e.g. $\tilde{\pi}$, \tilde{l} etc.). As said above, our outside options are the utilities of the non co-operative regimes.

By using (1) and recalling that $\pi_U = 0$ and $n_U = \bar{n}$, equation (4) can be re-written as:

$$W_U = -\frac{\alpha}{b}l - \frac{1}{2}u^2 - \frac{\mathfrak{G}}{2}\pi^2 \quad (38)$$

Then, after some simple algebra, the non-negative condition for the union can be derived as follows:

$$\Lambda_U = \frac{\alpha}{b}(u_C - \tilde{u}) - \frac{1}{2}(u_C^2 - \tilde{u}^2) + \frac{\mathfrak{G}}{2}\tilde{\pi}^2 = \left[\frac{\alpha}{b} - \frac{1}{2}(u_C + \tilde{u}) \right] (u_C - \tilde{u}) + \frac{\mathfrak{G}}{2}\tilde{\pi}^2 \geq 0 \quad (39)$$

This expression is the sum of two terms: the first measures the impact of the unemployment rate while the second measures the impact of inflation.

First consider the simplest case: a union indifferent to inflation. From the previous section, it is unambiguous that corporatism increases the policy-maker's utility. Then the non-

negative condition for the government is always satisfied. Therefore, the feasibility question is only related to the unions' outside option. When $\vartheta = 0$, u takes the same value for all the non co-operative solutions considered. Therefore, the condition of non negativity for the union no longer holds. In fact:

$$\Lambda_U^* = -\frac{1}{2} \left(\frac{\alpha}{b} \right)^2 < 0 \quad (40)$$

In this case, the corporatist solution seems to be not feasible. However, notice that co-operation improves the policy-maker's utility, thus making it possible to grant transfers to the union. Later we will take this point again.

More generally, i.e., if $\vartheta > 0$, we can also re-write the union non-negative condition (39) as:

$$\Lambda_U = \frac{1}{2} \left[\left(1 + \frac{\alpha}{b} - \tilde{u} \right) (u_c - \tilde{u}) + \frac{\vartheta}{2} \tilde{\pi}^2 \right] \geq 0 \quad (41)$$

Let us analyse the different cases.

First notice that $\left[\left(1 + \frac{\alpha}{b} - \tilde{u} \right) \right]$ is positive for all non co-operative solutions. Let us assume $u_c > \tilde{u}$. In this case – which tends to hold for high values of the union inflation-aversion and low values of the Government bargaining power and inflation aversion – the non-negativity condition for the union is satisfied, but the one for the policy-maker does not necessarily hold. On the contrary, if we assume $u_c < \tilde{u}$, the non-negativity condition for the policy-maker always holds, whereas the union's one can hold only if the union puts much emphasis on price stability

Thus a union neutral with respect to inflation or with a low preference for price stability is not interested in co-operating with the government, since this would lower its utility. However, co-operation unambiguously increases the policy-maker's utility. Therefore, there could be an interest for the policy-maker to compensate the union for the reduction in its satisfaction deriving from acceptance of corporatist solutions implying a lower wage rate. A mechanism of transfers in terms of public tariffs, higher pensions, welfare state provisions,¹⁰ etc. might be devised.

These transfers could be used by the policy-maker for a political exchange to gain union's co-operation, a possibility already emphasised by Tarantelli (1982) a long time ago when he proposed to link a housing price regulation and other real wage-enhancing policy measures to wage bargaining (see also Acocella and Ciccarone, 1995).

However, our model cannot take account of transfers and side payments and compensation is only a possibility which we cannot either rule out or support in the terms of our model.

¹⁰ On this point notice that in the last year trade unions have assumed the role of the "last defender" of the Welfare State in several countries.

6. Feasibility of corporatism and non-neutrality of monetary policy.

The results obtained in the previous section need some explanation. Let us consider the case of an inflation-neutral union first. In a framework like ours this makes monetary policy neutral, i.e., the equilibrium level of employment does not depend on the government's preferences (Gylfason and Lindbeck, 1994).¹¹ The Government cannot influence the game outcome in terms of employment (or real wage). The union can always maximise its preference function without being conditioned by its opponent.¹²

Alternatively, one could say that in the case of a union neutral to inflation, its preference function can be expressed in terms of real wages *or* employment only. Since the Government cannot influence employment (and real wages) in this case, the union can always get full satisfaction, being unaffected by monetary policy. Co-operating with the Government can thus add nothing to its satisfaction.

Assuming an inflation-averse union, monetary policy is no longer neutral. It can thus influence the unemployment level and be geared according to the regime. In particular, in the co-operative case, the Government can create externalities for the union and thus improve the union's level of satisfaction.

Let us refer to the two possible sub-cases envisaged in the previous section and consider first the sub-case where corporatism involves an increase in unemployment. The union's preference will certainly rise whereas the Government will be satisfied only if it put a very high weight on the price objective. In this sub-case, although corporatism is feasible, it might not induce a social welfare improvement since the weight of the social welfare function may be different from the Government's inflation aversion. Second, when the corporatist solution is associated with a level of unemployment lower than those of the non co-operative regimes, it is always feasible for the Government (and it is always a social improvement), but the union non-negativity constraint will be satisfied only for a (relatively) high degree of inflation-aversion.

In both sub-cases the reason of the results has to be found in the non neutrality of monetary policy that characterises the game when an inflation-averse union is assumed. In the non-co-operative regimes, since monetary policy is not neutral, the employment level is no longer the first best for the union but will be lower according to how much the Government takes account of inflation (which is the cost that the Government now faces when reducing unemployment). Therefore, a corporatist solution associated with unemployment rates higher than those of the non-co-operative regimes definitively raises union's utility both because of the higher unemployment (that raises the overall utility associated with the real wage and employment) and the lower prices that are always associated with a corporatist regime. On the contrary, corporatist solutions associated with unemployment rates lower than those resulting in the non-co-operative regimes have an ambiguous effect on the union utility, since the low unemployment tends to decrease it whereas the lower prices have an opposite effect. The prevailing force will depend on the relative weight that the union puts on price stability. *Ceteris paribus*, the higher is the union inflation aversion, the higher is the gain of utility with respect to the cost and, therefore, the likelihood of the corporatism to be feasible.

Our results are rather robust since our claims have been tested against different non-co-operative regimes and different specifications of the union preference in both arguments and form (see, e.g., the Appendix to this paper). In addition, other analytical and numerical

¹¹ The issue of neutrality is more extensively discussed in Acocella and Ciccarone (1997), Acocella and Di Bartolomeo (2002).

¹² In other terms, the union will be able to set a level of nominal wages such as to maximise its real wages subject only to (1)

exercises, not reported here but available on request, show that results are also rather robust with respect to different co-operative solutions and more general modelling.

7. Conclusions

In this paper we have analysed questions concerning both the macroeconomic performance and feasibility of corporatism. A specific aspect of corporatism has been considered (i.e. the co-operation between the Government and the union). This kind of co-operation has often been observed in recent years, but, apart from some exceptions, it has been little studied. We have first compared the macroeconomic effects of corporatism with those associated to different non-co-operative policy regimes by considering its effects on inflation, unemployment and social welfare. We have also tested our result with respect to many alternative assumptions. Afterwards, investigating the feasibility of the corporatist solution we have introduced a novelty with respect to previous studies.

Regarding the macroeconomic effects of corporatism, in our setting we can remark the following three observations. First, corporatism always succeeds in lowering inflation vis-à-vis all types of non co-operative solutions. Second, when the union is indifferent to inflation, corporatism also results in a level of employment higher than in any non co-operative solution. Third, when the union cares about inflation, superiority of corporatism in terms of employment is more likely to be guaranteed the higher the relative bargaining power and the inflation-aversion of the Government and the lower the union's degree of inflation aversion.

We might then argue that in our macroeconomic setting (where employment is an inverse function of the real wage), if the union does not care about inflation, corporatism always has positive consequences on both inflation and unemployment. Then, the corporatist solution is always Pareto superior with respect to all the non co-operative regime, i.e. it reduces any social loss function increasing in unemployment and inflation. The implications of co-operation for employment are indeterminate when the union, in addition to real wage and employment, has inflation as an argument of its preference function; inflation, however, would always be lowered by co-operation in the case of such a preference function, since it is (one of) the objective(s) of the Government.

Although these conclusions are robust to both different non co-operative solutions and union preference functions either quadratic or linear in real wages, they are rather difficult to be of practical relevance unless feasibility of corporatism is taken into account. Our analysis has shown, in fact, that acceptability of corporatism by the parties involved is always conditional since it implies satisfaction of appropriate conditions that are derived from the non-negative constraints imposed for both the union and the Government.

The corporatist solution is in fact not feasible if the union is indifferent to inflation. Due to monetary policy neutrality, the union is fully satisfied with non co-operative solutions and would gain nothing from corporatism.

On the contrary, when the union cares about inflation corporatism has more chances to be feasible. Monetary policy is no longer neutral. The union is thus not fully satisfied with the outcomes of non co-operative games. In addition, it shares with the Government the objective of price stability. A possibility then arises of a fruitful co-operation with the Government. Feasibility is however associated with very strict constraints.

Corporatism then seems to be compatible with the following scenarios. First, it is likely to be feasible when the union is inflation averse and the Government has a relatively high inflation aversion. In this case a relatively high (low) unemployment (inflation) rate would be associated with the corporatist solution. Second, corporatism is feasible in a scenario where the union largely dislikes inflation. Third, in a scenario where the union does not care about inflation (or it does so moderately) a complex transfer system might exist. In this case

feasibility is not guaranteed in terms of the macroeconomic outcomes we have considered and the only way to support the corporatist solution would be through a compensating system of transfers from the Government to the union, which might however be difficult to design.

We conclude by emphasising two possible lines of future research. One is related to the analysis of conditions which in real situations favour the emergence of pre-conditions for corporatism in terms of union's preferences. From this point of view one could test the prediction stemming from our analysis that corporatism can only arise from union's sharing of common objectives with the Government (in our case inflation), apart from employment. Another line of future research is related to the explicit modelling of a transfer system, which could be done by inserting taxation and money transfers in the model or considering an issue linkage approach. The latter approach, largely used in environmental policy, seems to be very promising and particularly suited for our context.

Appendix – Robustness to union preferences

All our claims also hold for a union preference function quadratic in the real wage, employment and, possibly, inflation. This is the case considered by Gylfason and Lindbeck (1994). Since these authors are interested in questions of monetary policy neutrality, they stress the result that corporatism does not eliminate the unemployment bias, while doing so for the inflation bias. However, it is easy to show that in their model the unemployment level – while still being positive – is lower in the co-operative case, if the union cares only about the real wage and employment. For simplicity, here we will show co-operative and non co-operative results in terms of unemployment only, since Gylfason and Lindbeck (1994)¹³ do not stress such results.

In fact, let us substitute the following expression to (4):

$$W_U' = -\frac{\alpha}{2}(w - p - w_U)^2 - \frac{1}{2}(l - n_U)^2 - \frac{\vartheta}{2}(\pi - \pi_U)^2 \quad (\text{A1})$$

In the Nash non co-operative case we get:

$$u_N' = \frac{\bar{n} - ab\alpha\beta w_U}{a\alpha\beta + b^2(a\beta + b\vartheta)} \quad (\text{A2})$$

whereas co-operation gives:

$$u_C' = \frac{\alpha(1 - \beta)(\bar{n} - bw_U)}{a(1 - \beta) + b^2} \quad (\text{A3})$$

By subtracting (A2) to (A3) we get that the condition for the co-operative unemployment solution to be lower than the non co-operative one is the same as (31). In the case when the union does not care about inflation, equation (31) can never be satisfied: also for a union preference function quadratic in the real wage, the co-operative solution is Pareto superior to the non co-operative one.

¹³ Other results are available upon request.

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