

Adjustment in EMU: a macro-economic impact evaluation of the degree of coordination between national trade unions. *

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I. Introduction

The EMU defines a new framework of macroeconomic adjustment between the countries which make it up. The loss of the nominal exchange rate instrument to confine internal imbalances is the characteristic feature which is binding to the 11 current members of the Euro area. In this context inevitably arises the question of knowing what can be the substitutes to ensure the role of stabiliser within EMU.

For a long time the economic literature has privileged the optimal currency areas theory (Mundell, 1961) to answer these problems. This theory suggests that the adjustment costs (in terms of unemployment) within a union are all the more weak as the economic structures are homogeneous. Precisely, in the absence of labour mobility, Mundell makes wage flexibility the requirement to ensure the union viability.

Various comparative studies of the European labour markets highlighted the prevailing role of the trade unions in wage setting. Thus from now, two main issues arise. First, what is the impact of the increase competition within EMU on trade union claims ? Second, in this new environment, how trade unions are going to organise themselves in Europe ?

* Without wanting to implicate any one of them, I am grateful to Isabelle Cadoret and Christophe Tavéra for helpful comments and suggestions.

Apparently, recent observations (Fajertag et Mermet, 1999) indicate that trade unions wish to internalise in their decisions the harmful effects on economy competitiveness from excessive revalorization, and to negotiate real remunerations according to productivity growth. The European trade-union confederation (ETUC) General Secretary Emilio Gabaglio ensures on his side that "Current and projected wage behaviour poses no threat to the EU's economic stability ¹". At the same time, new organisations of wage determination aiming at harmonising the wage policies in Europe are emerging. In that context, Sweden introduces a model which limits in the long run wage increases to the evolution of the European wages (Andersen *et al.*, 2000). In the same way, Belgium intends to copy wage revalorization on those of its main trading partners (France, Germany, Netherlands).

EMU thus introduces upheavals into the labour markets and the wage setting procedures. The question arising then is to determine the organisation shape of these markets that are likely to ensure the macro-economic regulation between the Member States of the Union. Is the wage bargaining coordination a partial substitute for the nominal exchange rate ? What is the macro-economic impact of the degree of coordination between trade unions in a monetary union?

We try in this paper to bring a response by evaluating the capacity of the labour markets to absorb various types of shocks. For that, we build up a simple five countries model (Germany, France, Italy, Spain, United-Kingdom). Each economy is represented by a VAR model in which we integrate an error correction mechanism. The latter represent long run wage equation coming from standard wage bargaining literature. The error-correction mechanisms introduced were estimated into a preceding work (Guigo and Tanguy, 1999). Simulations are then considered by differentiating the types of shocks (global or country specific shocks). We first compare these various scenarios in the case of a monetary union where the wages are given in a noncooperative way (Nash equilibrium), and then by considering cooperative equilibrium.

Section 2 reviews theoretical insights relating to wage bargaining coordination justification. It deals with the impact of the good markets and monetary integration on the national trade unions behaviour. Section 3 presents the five countries model used as well as the formalisation of the Nash and cooperative equilibria. The fourth section contains simulations and the main results.

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¹ Press release, Brussels, 02/02/2000.

II. The justification for coordinated wage bargaining

1. Theoretical backgrounds

The effects of economic integration on the wage determination, and the discussions relating to the establishment of a wage coordination can be introduced starting from initial works of Calmfors-Driffill (1988). The main contribution of their model is to provide, within the framework of a closed economy, an explicit link between the degree of goods substitutability and the trade unions behaviour as regards wage claims. At the firm level, where competition is assumed to be high, market forces to which companies are exposed prevent those from reflecting any wage increase on the output prices. The labour demand is strongly elastic. The competitive position of the company confers on the trade union a weak bargaining power, that moderate wage claims. If one considers now wage negotiations organised at intermediary level, the incentive with wage moderation is somewhat reduced. The labour demand elasticity is indeed quasi inelastic since interindustry goods are supposed to be poor substitutes. This raises the trade union bargaining power and the wages. It leads to inefficient macro-economic performances, because trade unions do not fully internalise the effects of their decisions in terms of inflation and wage skid. Lastly, the incentive with wage moderation is progressively accentuated with bargaining centralisation. The more the co-operation between trade unions intensifies, the more the rises of money wage are reflected in the consumer prices, the less the real gain that benefits to the employees are significant.

Trade-unions can then reach the same result by claiming a weaker money wage compatible with a moderate inflation. Taking into account these arguments, the two authors determine a U-shaped relation between the degree of centralisation of collective bargaining and the real wages.

The Calmfors-Driffill model has been subject to several criticisms, in particular on the validity of such a relation in an open economy. In addition, the effective systems may not correspond to the theoretical models. An officially decentralised system can hide in fact a hybrid system with a strong implicit co-operation. The fact remains that their analysis is of capital interest : first, it highlights the moderating effect of coordination ; second, it relates the union bargaining power to the labour demand elasticity, i.e. to the degree of competition which prevails on the good market.

2. The ambiguous impact of economic integration on wage formation

The Calmfors-Driffill model is a starting point from which have emerged theoretical research relating to the impact of European economic integration on the wage determination. In an open economy, trade unions fix the money wages not only on the basis of domestic prices but also of foreign prices. From now on, the goods markets integration will create links between the various national bargaining systems through the trade-union behaviours. These interactions have been formalised by Cornéo (1995), Danthine and Hunt (1994), Driffill and Van der Ploeg (1995), Jensen (1993), Rama (1994), Zervoyianni (1997) inter alia. It comes out from these works an ambiguous effect of economic integration on the trade unions behaviour.

On the one hand, the intensification of international competition should discipline national trade unions and limit wage claims (Danthine and Hunt (1994), Driffill and Van der Ploeg (1995), Burda (1999)). The argumentation can be shown simply from the following figures.

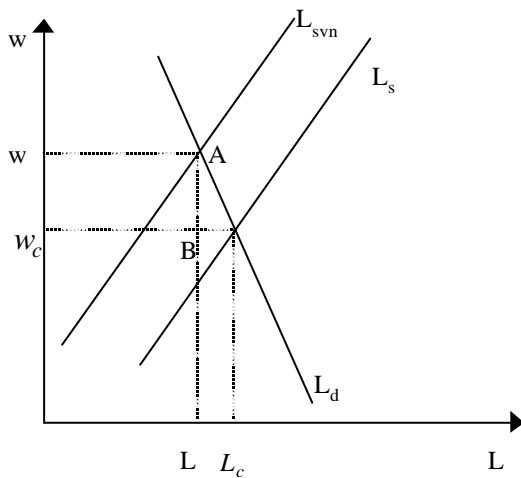


Figure 1 : low international competition

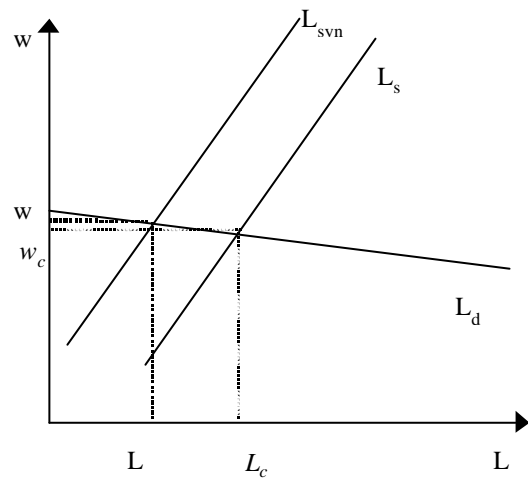


Figure 2 : high international competition

Fig. 1 describes an economy which faces low international competition. The labour demand elasticity with respect to real wages is low. The L_s curve is the labour supply which would prevail in the absence of trade union. W_c is the competitive equilibrium. The trade union influence is symbolised by the L_{syn} curve. The more powerful is the trade union, the more the L_{syn} curve moves upwards. W is the negotiated wage, and is greater than W_c for an employment level L lower than L_c . Fig. 2 shows the same economy in an economically integrated area. The labour demand elasticity is stronger under

the competition effect. The trade union cannot any more benefit from any firm monopoly power to fix wages beyond its competing level. Any trade union wage claim results in a substantial fall of employment without significant increase in the wages. In this context, economic integration implies a modification of the game rules between trade unions and firms, which weakens the employees' bargaining power to prevent unemployment from growing too much (Lsyn slips to the right). Trade unions will be unaware both of the intensity of competition and the impact of their wage claims on employment only if there is an accommodating social protection likely to compensate for the job losses. The fiscal constraints imposed on the Union countries should strongly limit nevertheless this case of figure (Burda (1999)).

On the other hand, markets' integration implies a downwards mechanical slip in the scale of the centralisation of negotiations which could increase wages. Wages that used to be negotiated at the national level take place now at an intermediate level when the European labour market is considered. Each national trade union makes its decisions not only on the basis of domestic prices but also of foreign prices as far as the consumer price index is a weighted average of national and foreign prices expressed in national currency. Trade unions thus mutually impose to each other negative externalities during the wage negotiations. A rise of the foreign money wages increases domestic consumer prices through import prices. The real wages decrease, which leads the national trade union to claim higher money wage (Jensen (1993), Zervoyianni (1997)). This adverse effect comes owing to the fact that the national trade union and the foreign trade union act in a non-cooperative way. Each trade union regards the wages of the competitor as given and tries to influence the rate of real exchange in its own interest. The competition between the two trade unions results in a wage inflation induced by a strategic complementarity between the national wages, and in an employment decrease. This theoretical schema justifies the setting up of a (European) supranational organisation aimed at coordinating the national wage claims. An international trade union would indeed internalise the negative externalities produced by the national wage increases on the foreign trade unions utility, and would likely moderate trade union claims.

A similar mechanism of strategic complementarity between national wages is described by Cornéo (1995), and also results from a coordination failure between actors decisions.

On the whole, European economic integration has two ambiguous effects on the wage determination process. It is then advisable to determine which effect will supplant the other. The main criticism we can address to the most pessimistic economists is that they underestimate the impact

economic integration on the trade unions bargaining power. Moreover, the bargaining harmonisation between Belgium, Germany, Luxembourg and the Netherlands in some industrial sectors (metallurgy, chemistry, construction, private and public services) confirms in the facts the trade unions' fear to see their power weakened. "By attuning their wage policies, the participating organisations aim principally to prevent a bidding down of collectively bargained incomes between the participating countries... " (Fajertag and Mermet (1999), p. 10). One can thus expect that the effect induced by the reduction of the trade-union power dominates that discounted with the national wages' strategic complementarity. Moreover, the loss of the monetary autonomy prevents the countries from devaluating their currency to compensate for wage rises. This instrument loss likely should discipline the trade unions being aware of the harmful effects of a real wage increase.

3. The impact of monetary integration on wage formation

A last dimension must be brought to the analysis. It relates to the impact of monetary integration on the trade unions claiming behaviours. We rule out the implications of economic integration mentioned before. The question can be tackled under two complementary angles. The interaction between the ECB behaviour (its degree of conservatism) and the collective bargaining organisation is crucial in the employment and wage determination.

The first angle aims at wondering about the definition of the ECB behaviour and the control of the European Union monetary policies. In particular, the questions of the ECB's "conservatism degree" and the formulation of its reaction function are not clear-cut (Allsopp and Vines, 1998). Will the European monetary policy be more anti-inflationary than that carried out by the German central bank? It is known that the monetary authorities behaviour is not neutral on the wages formation, and induce a more or less claiming behaviour of the trade unions (see for example, Gylfason and Lindbeck, 1991). The coexistence of a new European monetary policy and specific wage formation systems delimits a new context that has to be internalised by the wage bargaining protagonists.

The second angle examines the direct consequences of the delegation of the national monetary policies at a supranational authority (the ECB). By definition, the European prices are a weighted average of the national prices. The relative weight of a country in the European price index is all the more weak since the monetary union counts members. In fact, the dilution of domestic inflation in European inflation can lead to inflationary pressures. Indeed, Grüner and Hefeker (1999), Cukierman and Lippi (1999) show that monetary integration increases the national money wages,

inflation and unemployment. The underlying explanations deal with the trade-union coordination failure highlighted by Calmfors and Driffill (1988). The trade unions centralised at the national level slip on an intermediate level within the EMU framework. They do not internalise any more the impact of the wage rises on the general level of the European price, which exacerbates their claiming behaviour. This non co-operative wage fixing results from a "prisoner dilemma" situation : each trade union has interest so that all the others set weak money wage to benefit from low prices. One leads to an inefficient equilibrium since each trade union adopts a non co-operative attitude and claims a higher money wage.

Works of Hall and Franzese (1998), Iversen (1998), Soskice and Iversen (1998) are in full agreement with those results. A lack of wage coordination at the European level leads us to predict a rise of the money wages, inflation and unemployment. National trade unions coordination could internalise the external effects induced by the wage increases, and could limit the inefficiency of the national collective bargaining systems. The main argumentation of Hall and Franzese (1998) is founded on the effectiveness of the signal sent from the central bank to affect the level of wage settlements. This effectiveness rests on the degree of trade unions coordination. Where the wage bargaining is uncoordinated, a central bank cannot respond directly to a small bargain unit's wage increase, so that there is no incentive to wage moderation. On the other hand, when trade unions are coordinated, inflationary impact of a wage rises may be counter by a national restrictive monetary.

A coordinated structure of the wage negotiations thus gives at the central bank a notable influence in the wage settlements. The independence and the credibility of the monetary authorities enable it moreover to pursue its price stability goal by influencing the wage formation process without increasing unemployment, simply by signalling its policy intention. Conversely, when the negotiations are decentralised, the central bank objective imposes unemployment costs induced by the inefficiency of the monetary policy signal in the wage formation.

According to their empirical work, the data support strong evidence of their hypotheses. Bargaining coordination has a negative and significant impact on inflation. Moreover, the unemployment costs associated with an increase in central bank independence decrease when trade-union coordination is high. Or, in other words, coordinated negotiations allow the central bank to pursue its price stability goal without decreasing employment.

The implications of these results for the UEM are interesting. They suggest on the one hand that the ECB objective, copied on that of Bundesbank, could involve unemployment in the countries

where the labour market are not coordinated. In addition, the lack of national trade unions coordination is likely to undermine the price stability in Europe, according to the theoretical developments introduced.

III. The model

1. A five countries monetary union

Empirical strategy

The application focuses in this study on four current members of the Euroland (Germany, France, Spain, Italy) and the United Kingdom. The choice of these countries results from the weight of these economies within the European Union. Moreover, the United Kingdom is likely to join the monetary union.

To consider the impact of wage coordination, we apply a bargaining model common from literature (Layard, Nickell and Jackman, 1991). Real wages are there a function of productivity, unemployment rate and a whole of determinants modifying the trade-union bargaining power (labour markets regulation, replacement rate, degree of opening of the economies...). The unavailability of these series in a quarterly frequency led us to estimate a wage equation including only real wages, labour productivity and the unemployment rate. Employers bargain with trade union as a standard Nash solution. Union loss function (V_i) depends on the gap between current wages and an exogenous target, and unemployment. $V_i = V(w - \phi; u)$.

Since bargaining power is unobservable, we assume that it depends negatively on the unemployment rate. In its most general form, the wage setting schedule is :

$$W - p_c = \beta_y y + \beta_u u \quad (1)$$

We should have $\beta_y \geq 0, \beta_u \leq 0$. Moreover, we could expect long run homogeneity between labour productivity and real wages such that $\beta_y = 1$. The first step of this study is thus to estimate a long run relation like (1) with the VAR methodology, following Tyrväinen's work (1995).

For each country, we consider a VAR system (constants and deterministic variables are omitted for simplicity) estimated over the 1983:1-1996:4 period :

$$A^i(L)X_t^i = \varepsilon_t^i \quad \text{avec } \varepsilon_t^i \sim N(0, \Sigma^i), i = \text{ger, fra, spa, ita, uk} \quad (2)$$

where X is a (3×1) vector. It contains the (log of) labour productivity, y , the (log of) real wages, w , and a unemployment variable, u . We use the approximation $u = -\log(1-U/100)$, where U is the standardised unemployment rate. Under the assumption that the roots of $A(L)$ lie outside the unit circle, the VAR model can be written as a vector moving average VMA(L) :

$$\begin{pmatrix} y_t^i \\ w_t^i \\ u_t^i \end{pmatrix} = B^i(L) \begin{pmatrix} \varepsilon_t^{y,i} \\ \varepsilon_t^{w,i} \\ \varepsilon_t^{u,i} \end{pmatrix} \quad i = \text{ger, fra, spa, ita, uk} \quad (3)$$

where $B_i(L) = A_i^{-1}(L)$. $B_i(L)$ is a polynomial in the lag operator L . The VMA representation is of special interest in that it allows to trace out the time path of various shocks on the variables included in the VAR system without imposing restrictions.

If the series are first order integrated, the multivariate VAR approach developed by Johansen (1988) can be used to test for the existence of a time invariant long run relation like (1). System is first rewritten as a VECM :

$$\Delta X_t^i = \sum_{j=1}^{k-1} \Gamma_j^i \Delta X_{t-j}^i + \Pi^i X_{t-k}^i + \varepsilon_t^i \quad i = \text{ger, fra, spa, ita, uk} \quad (4)$$

where Δ is the lag operator. The system contains information on short run dynamic *via* the estimates of Γ_j and on long run adjustment *via* the estimates of Π ².

The interdependence between economies is introduced by an identity defining the consumer prices P_c (the variables are expressed in log) as a weighted average of producer prices of the union countries. We assume moreover that the producer prices of each economy are defined as a (time invariant) mark up over nominal wages (noted W). By using the $W=w+P_c$ identity, consumer prices are defined for each country by :

$$\begin{pmatrix} P_c^{\text{ger}} \\ P_c^{\text{fra}} \\ P_c^{\text{spa}} \\ P_c^{\text{ita}} \\ P_c^{\text{uk}} \end{pmatrix} = \begin{pmatrix} \lambda_1^{\text{ger}} & \lambda_2^{\text{ger}} & \lambda_3^{\text{ger}} & \lambda_4^{\text{ger}} & \lambda_5^{\text{ger}} \\ \lambda_1^{\text{fra}} & \lambda_2^{\text{fra}} & \lambda_3^{\text{fra}} & \lambda_4^{\text{fra}} & \lambda_5^{\text{fra}} \\ \lambda_1^{\text{spa}} & \lambda_2^{\text{spa}} & \lambda_3^{\text{spa}} & \lambda_4^{\text{spa}} & \lambda_5^{\text{spa}} \\ \lambda_1^{\text{ita}} & \lambda_2^{\text{ita}} & \lambda_3^{\text{ita}} & \lambda_4^{\text{ita}} & \lambda_5^{\text{ita}} \\ \lambda_1^{\text{uk}} & \lambda_2^{\text{uk}} & \lambda_3^{\text{uk}} & \lambda_4^{\text{uk}} & \lambda_5^{\text{uk}} \end{pmatrix} \begin{pmatrix} w^{\text{ger}} + P_c^{\text{ger}} \\ w^{\text{fra}} + P_c^{\text{fra}} \\ w^{\text{spa}} + P_c^{\text{spa}} \\ w^{\text{ita}} + P_c^{\text{ita}} \\ w^{\text{uk}} + P_c^{\text{uk}} \end{pmatrix} \quad (5)$$

² Full details are in Guigo et Tanguy (1999).

I_j^i is the share of the imports of country i , coming from country j ³. System (5) can thus be written as :

$$\begin{pmatrix} P_c^{ger} \\ P_c^{fra} \\ P_c^{spa} \\ P_c^{ita} \\ P_c^{uk} \end{pmatrix} = \begin{pmatrix} A \end{pmatrix} \begin{pmatrix} W^{ger} \\ W^{fra} \\ W^{spa} \\ W^{ita} \\ W^{uk} \end{pmatrix} \quad (6)$$

Consumer prices in each country are defined by a linear combination of the real wages of each Union member. The shocks' transmission is thus ensured by the impact of domestic and foreign real wages on consumer prices. The latter induce themselves an adjustment process of the macro-economic variables considered.

Data sources and series integration order

The series are quarterly (seasonally adjusted) data from OECD and IMF (Datastream database). Nominal wages correspond to hourly earnings perceived by the manufacturing industry employees. Labour productivity is measured by the industrial output-employment ratio. U is the standard unemployment rate. To test for the presence of unit roots in the series, we use the Dickey-Fuller and KPSS tests (the results are not presented here but available from the author). They reveals that one can reasonably admit as $I(1)$ the W , U , y variables. We introduce therefore these variables in first difference into the VAR.

In addition, the retained lag-length in the model is 4 quarters for the five countries in order to facilitate the comparison of the results. The VAR lag-length is determined starting from a sequence of stacked tests of the likelihood ratio type. The VAR model is successively estimated for a number of lag K ranging between 1 and 8. With each stage, we test the nullity of the coefficients associated with the last lag. By reducing the length of the system gradually, the number of lags finally retained is given by the first shift for which the null hypotheses is rejected.

³ Data come from European Economy, n° 62, 1996, p. 149.

2. Nash and cooperative equilibria

The comparison of the cooperative and non cooperative bargaining systems and their macro-economic impact supposes first of all to present the modelling strategy associated with the definition of these two equilibria.

Nash equilibrium

In this study, we suppose implicitly that the estimated long run relations in each country are defined within a non cooperative framework. This assumption seems to us justified insofar as the national wage policies were not coordinated over the studied period. The data should theoretically display suitable information for uncoordinated national bargaining systems. The Johansen procedure allows us to retain the following long run relations (Guigo and Tanguy, 1999) :

$$\begin{aligned}
 mce^{ger} &= W^{ger} - pc^{ger} - y^{ger} + 4.0u^{ger} \\
 mce^{fra} &= W^{fra} - pc^{fra} - y^{fra} + 3.7u^{fra} + 4.255 \\
 mce^{spa} &= W^{spa} - pc^{spa} - y^{spa} + 3.4u^{spa} + 3.843 \\
 mce^{ita} &= W^{ita} - pc^{ita} - y^{ita} + 5.9u^{ita} + 0.002 * t \\
 mce^{uk} &= W^{uk} - pc^{uk} - y^{uk} + 6.6u^{uk} - 0.008 * t
 \end{aligned}$$

The restrictions which impose long run homogeneity between labour productivity and real wages were not rejected at usual significance level.

Cooperative equilibrium

Wage bargaining coordination is often advocated in the literature to internalise the spillover effects due to trade-union claims. The introduction of a planner aimed at coordinating the wage policies is theoretically justified, because it leads weaker wages determination and limits wage overbid. Such a cooperative equilibrium is obtained through the joined minimisation of the weighted individual loss functions. Precisely, we make in our study the assumption that there is a supranational organisation (ETUC ?) whose aim is to minimise the following collective loss function:

$$L = \sum_i \beta^i V^i(w - \phi; u) + \frac{c}{2} (P_c^{eur})^2 \quad i = ger, fra, spa, ita, uk \quad (7)$$

where β^i is the weight for country i . For simplicity, we assume the same weight for each country. We have moreover $\sum_i \beta^i = 1$. P_c^{eur} is the European consumer price level. It is defined as :

$P_c^{eur} = \sum_i \gamma^i P_c^i + \gamma^{rdm} P_c^{rdm}$. The γ 's are the relative weight of the countries in the monetary union. P_c^{rdm}

is an exogenous variable that we will use to simulate the macro-economic impact of a Euro depreciation or an increase in the rest of the world prices.

Given system (6), P_c^{eur} is a linear combination of the countries' real wages :

$$P_c^{eur} = \sum_i e^i w^i + \gamma^{rdm} P_c^{rdm}$$

The introduction of the European consumer prices into the collective loss function is justified by the will of the European trade-union confederation to increase wages while preserving the Union's price stability objective. The European price stability thus can be seen as a public good which increases the national trade unions utility. The inflation control and the search for a competitive Union may legitimate the use of this collective loss function. In addition, Grüner and Hefeker (1999), Cukierman and Lippi (1999) also introduce inflation into the function of trade-union utility because the rises of the prices reduce the saving, the financial and non-financial assets. The program becomes from now on:

$$\text{Min}_{w^{ger}, w^{fra}, w^{spa}, w^{ita}, w^{uk}} L = \sum_i \beta^i V^i + \frac{c}{2} (P_c^{eur})^2$$

The first order conditions give the long run relation defined in a cooperative context. They are of the type :

$$w^i = w^i(y^i, u^i; w^j) \quad j \neq i \quad i = ger, fra, spa, ita, uk$$

The real wages of each country react to the productivity and the unemployment rate of the country considered, and to the real wages of the other economies. The computed coefficients are synthesised in the following table :

Tableau 1 : computed parameters of long run relation ; cooperative equilibrium

Long run relation of :	y^i	u^i	w^{all}	w^{fra}	w^{esp}	w^{ita}	w^{ru}	
Germany	$w^{all} =$	0.22	-0.87	-	-0.43	-0.17	-0.38	-0.37
France	$w^{fra} =$	0.48	-1.76	-0.95	-	-0.20	-0.46	-0.44
Spain	$w^{esp} =$	0.86	-2.91	-0.66	-0.37	-	-0.32	-0.31
Italy	$w^{ita} =$	0.54	-3.20	-0.94	-0.52	-0.20	-	-0.44
United-Kingdom	$w^{ru} =$	0.56	-3.68	-0.94	-0.52	-0.20	-0.46	-

One realises first that the German real wages largely influence the wages of the monetary Union countries. Moreover, under the effect of the wage bargaining coordination, each national trade union reacts negatively to the other countries wage increases. The respect of the price stability objective indeed implies a readjustment with a fall of the domestic real wages vis-à-vis to an inflationary wage shock of one or more Member States.

The theoretical framework being set, some simulations will enable us to assess the gain from establishing trade union coordination in the economic regulation of the monetary union.

IV. Simulations and results

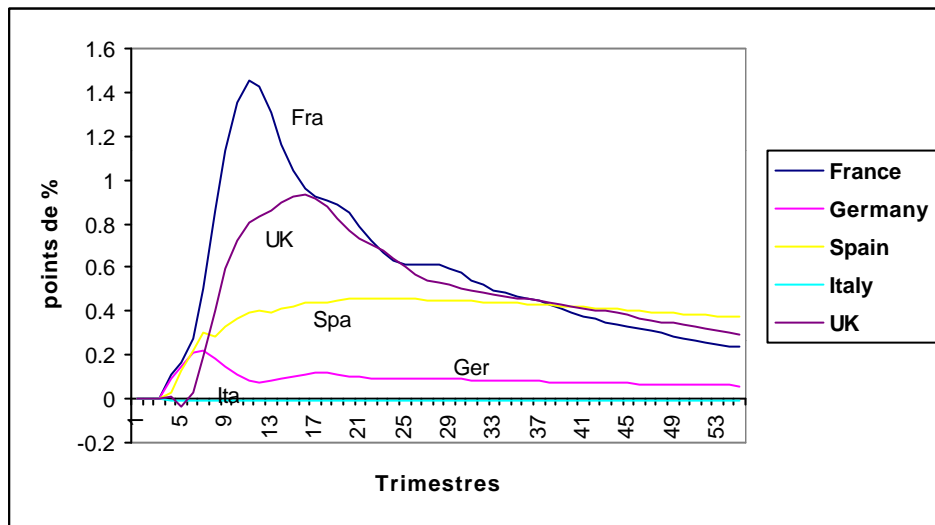
In order to perceive the macro-economic impact of the degree of wage bargaining coordination within the monetary union, one considers successively three types of shocks. The first affects symmetrically and simultaneously the set of the Union countries. It corresponds to a Euro depreciation or a rise in the rest of the world prices, and alters in fact the purchasing power of the European employees. The other shocks are asymmetric, i.e. they strike the Union countries differently, by their nature or their magnitude. We consider two types of asymmetric shock.

- The first aims at analysing the impact of the wage bargaining coordination on the union macro-economic regulation, when only one country is struck by a shock.
- The second shock aims at determining the benefit of a wage policies coordination in the case of heterogeneous wage claims within the monetary union. A fear often expressed in the literature is the consequence of the coexistence in the union of structurally different labour markets. Many theoretical and empirical works show for example how the degree of centralisation of the negotiations affects the level of wage fixing. In addition, the wage correction of the least developed countries towards the earnings of the European "core" countries may be also a concern, in particular when wage revalorization exceed productivity improvements. Through simulations, we try to identify the wage coordination ability to manage the wage impulses' heterogeneity.

1. The case of a symmetric shock

One is interested first in the macro-economic consequences of a common shock affecting the five Union countries. Fig. 3 recalls the time path followed by the unemployment rates when the five countries are struck by a 10 % exogenous rise of the rest of the world prices (in the third quarter). It gives us an idea of the diversity of the labour markets reactions in Europe following shocks, and their induced effects on the under-employment.

Figure 3 : unemployment effect of a 10 % increase in the rest of the world prices



The price rise induces disparate situations of unemployment rates. The unemployment rise reaches a peak of 1.45 point in France at the end of 2 years and of 0.93 point in the United Kingdom in 4 years approximately. The German and Spanish scenarios are characterised by a moderate unemployment growth ranging between 0.2 and 0.4 point. German unemployment is then partially reabsorbed over the period whereas under employment in Spain remains on its impulse level. Lastly, the Italy case is atypical. This country presents an insignificant unemployment evolution following the shock.

Fig. 4 to 8 illustrate the impact on the macro-economic variables of the wage coordination such as it has been defined in section 2.

Figure 4

France
symmetric shock

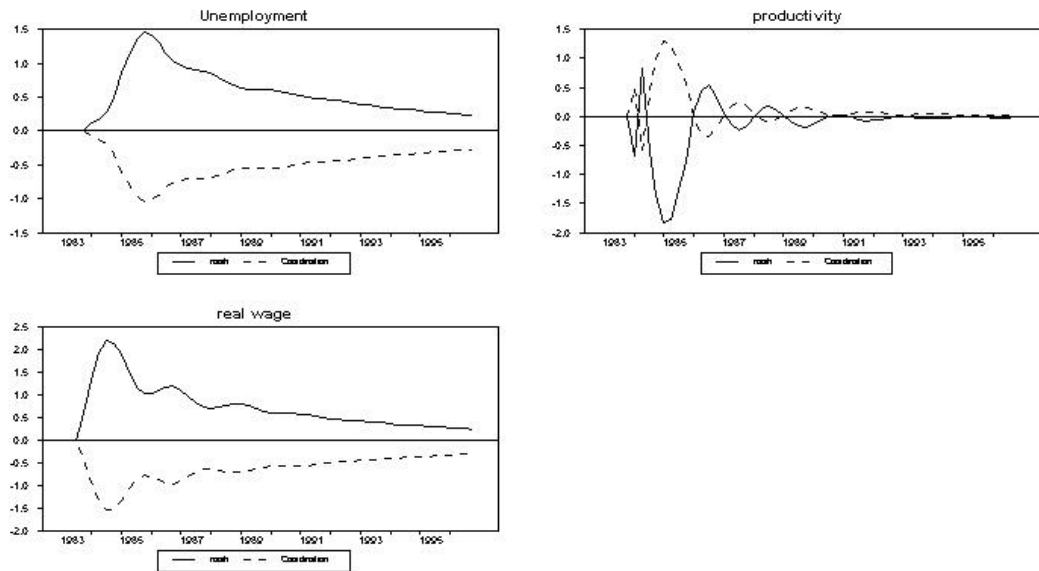


Figure 5

Germany
symmetric shock

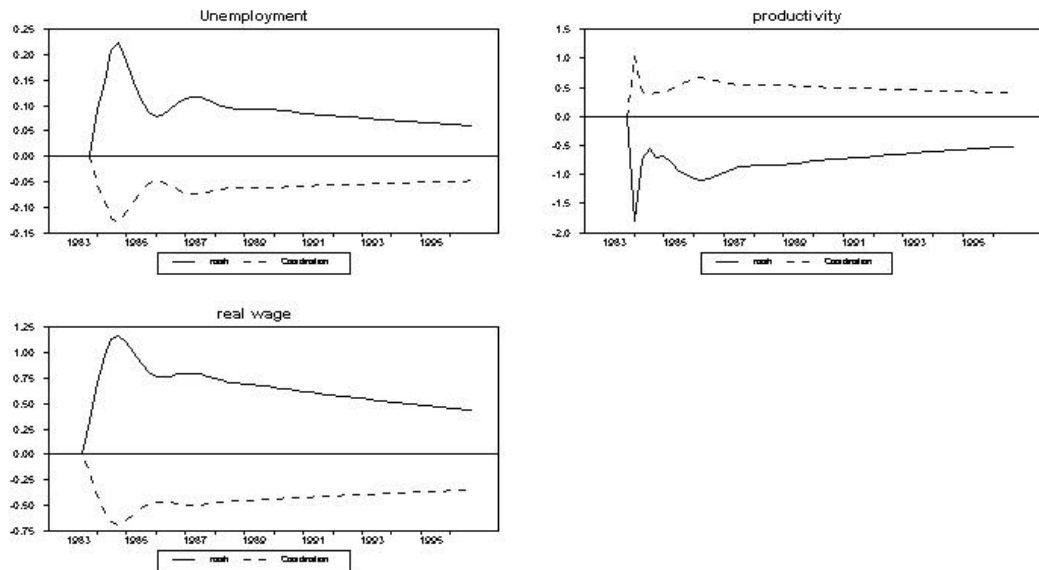


Figure 6

Spain
symmetric shock

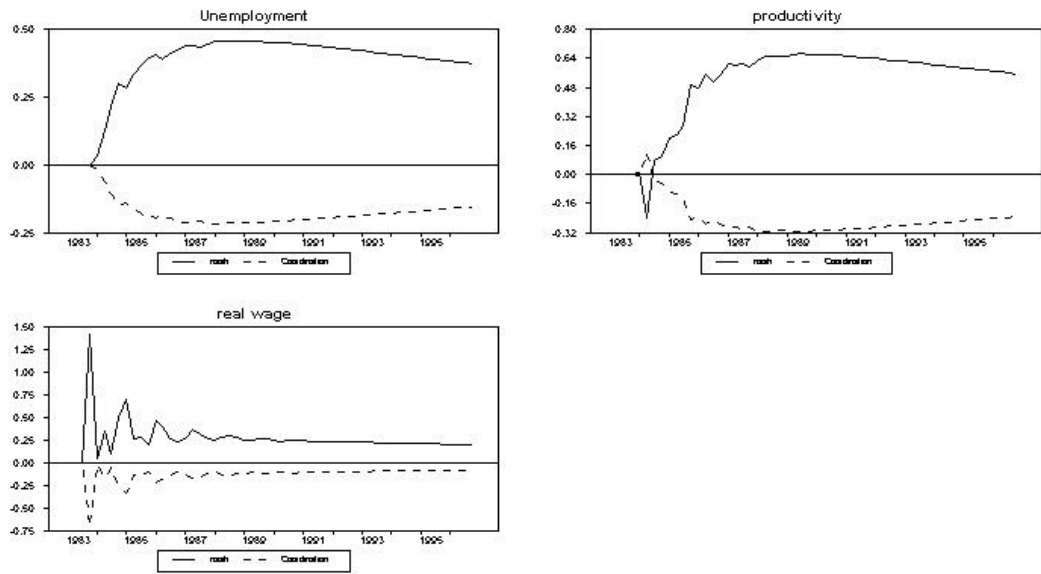


Figure 7

Italy
symmetric shock

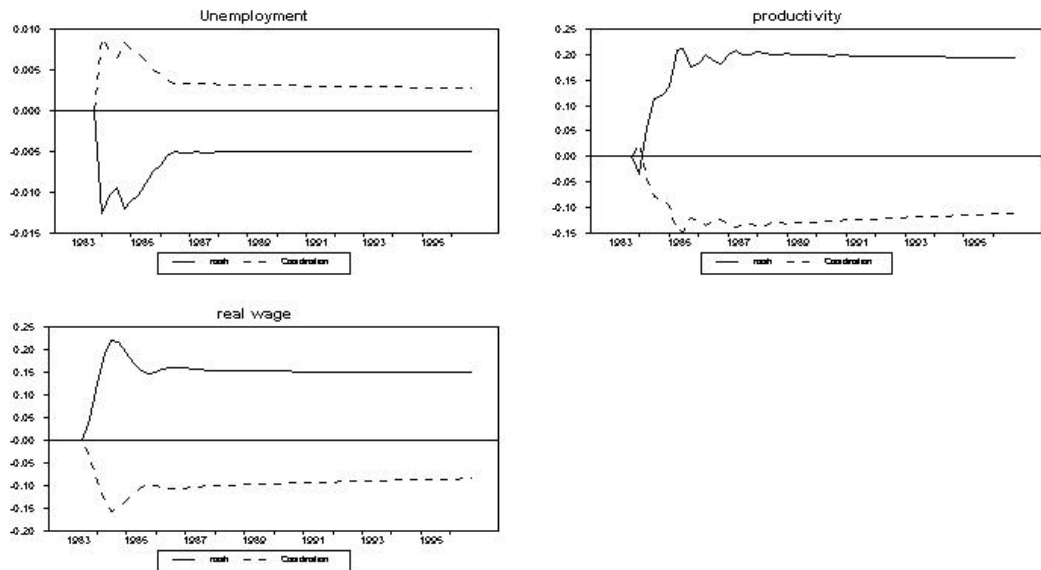
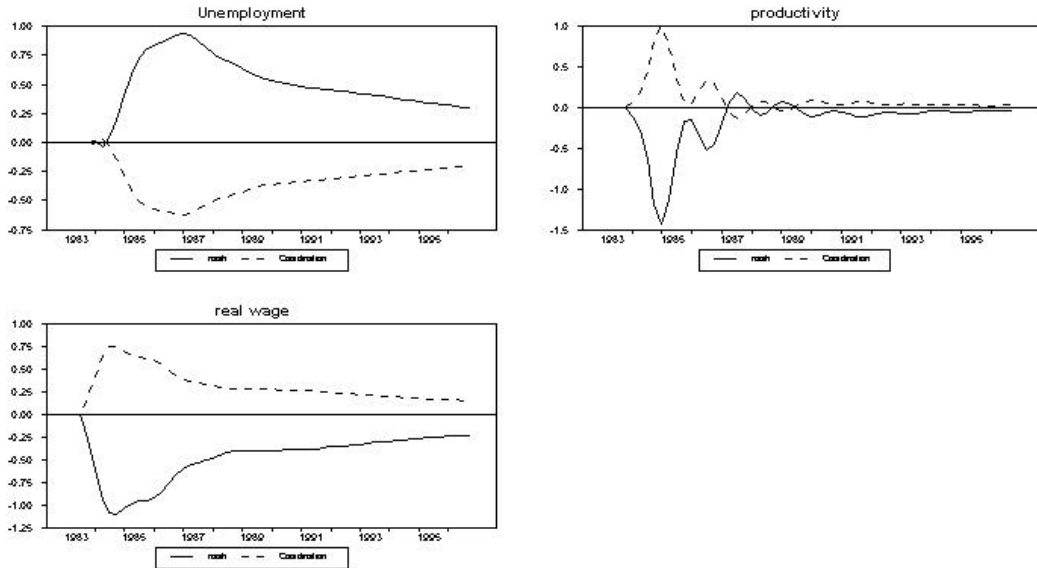


Figure 8

United Kingdom
symmetric shock



The graphs' analysis suggests that the gains we could expect from bargaining coordination are not negligible in the case of a symmetric shock. The introduction of a coordinated labour markets organisation leads indeed to a wage claims moderation and to an unemployment decrease. It is particularly the case in France, Germany and Spain. The underlying explanation results from the taking into account of the imported inflation in the wage formation. With the Nash equilibrium, the inflation push reduces the real wages of the employees, which leads the trade unions to claim money wages rises. Inflation raises in the monetary union and the real earnings increases raise unemployment. On the other hand, the introduction of a cooperative form between national trade unions, and in particular the introduction of the inflation aversion into the collective utility function, leads the trade unions to compensate for the inflation imported by real wages decreases. Employment is then improved in these three countries.

These first results suggest that the wage bargaining coordination at the European level could increase the effectiveness of an expansionist policy (monetary for example) and grants the ECB an ability to act on real wages and employment. A rise of money supply aimed at improving economic activity is amplified by the trade unions moderating behaviour. The initial inflationary impact is indeed thwarted by wage moderation, which exerts a second beneficial effect on employment. A similar mechanism is highlighted by Alogoskoufis and Manning (1988).

The Italian and British cases are a little more difficult to interpret. With co-operative equilibrium, Italy combines a wage moderation with a rise of unemployment. This one is nevertheless insignificant and is perhaps ascribable to the productivity fall. The situation in the United Kingdom is reversed. One observes simultaneously a productivity and real wages rise, and an employment improvement.

2. Wage bargaining coordination and asymmetric productivity shock

Impossibility of resorting to a common monetary policy to counter a specific (single country) shock raises with acuity the problem of the alternative stabilisation modes for the macro-economic activity in a monetary union. The objective here is to appreciate up to what point the bargaining coordination can mitigate the spillover effects induced by wage externalities of a country on its neighbours, when this country is struck by a specific shock. We consider for this purpose the case of a 5 % productivity shock in Germany. The choice of this country is due to the importance of trade between European economies and Germany. The simulations results are presented in fig. 9 to 13.

Figure 9

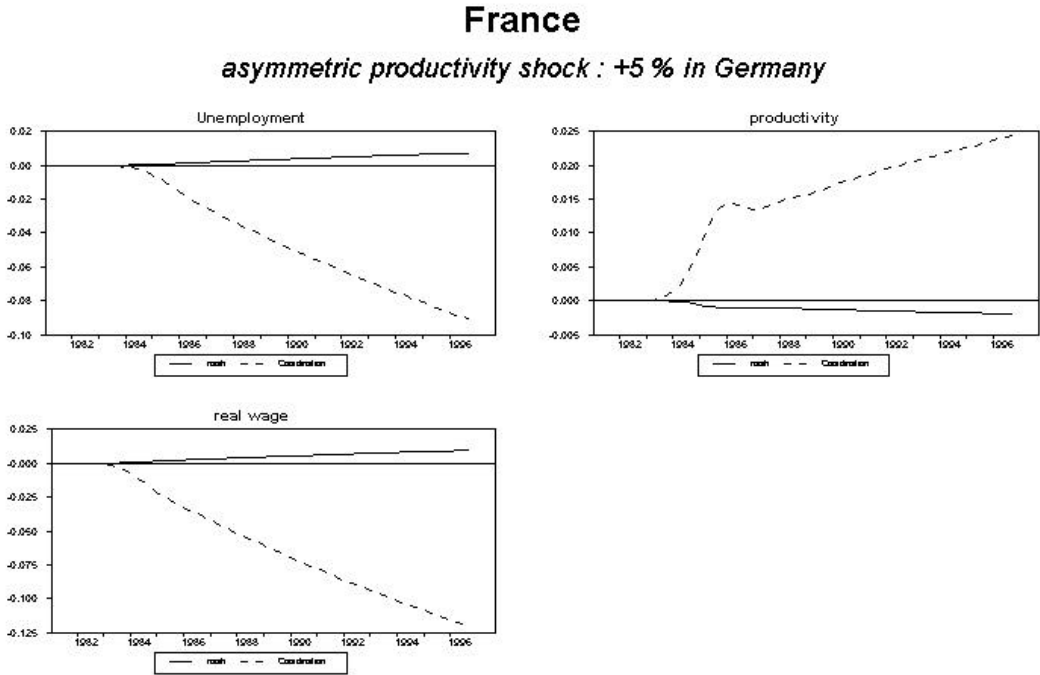


Figure 10

Germany

asymmetric productivity shock : +5 % in Germany

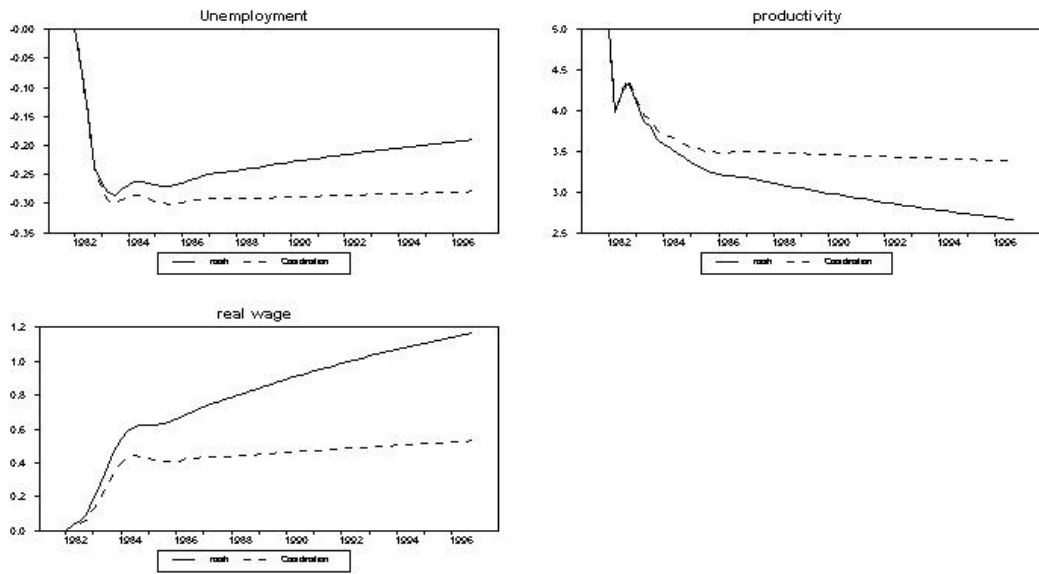


Figure 11

Spain

asymmetric productivity shock : +5 % in Germany

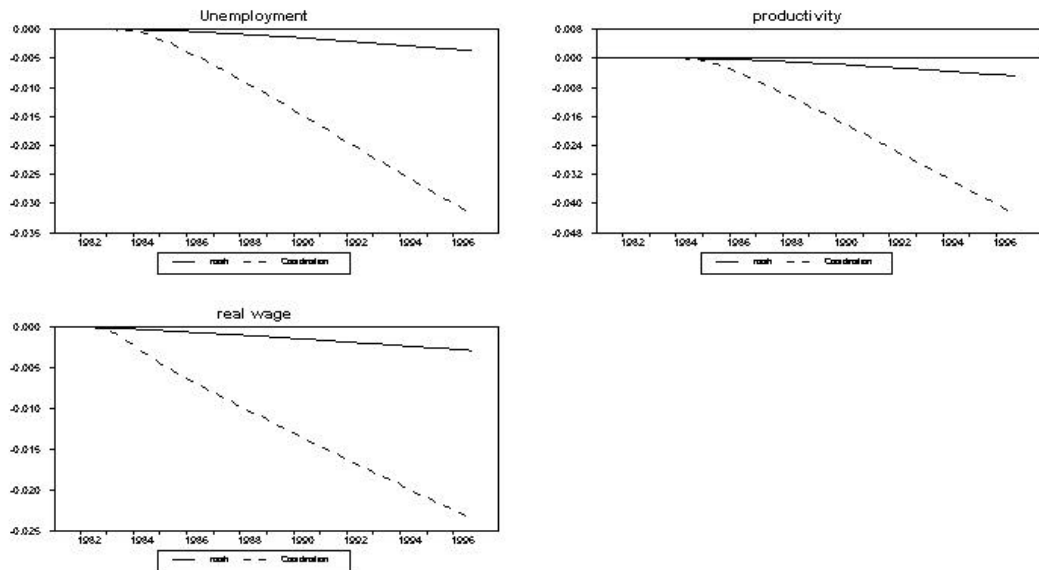


Figure 12

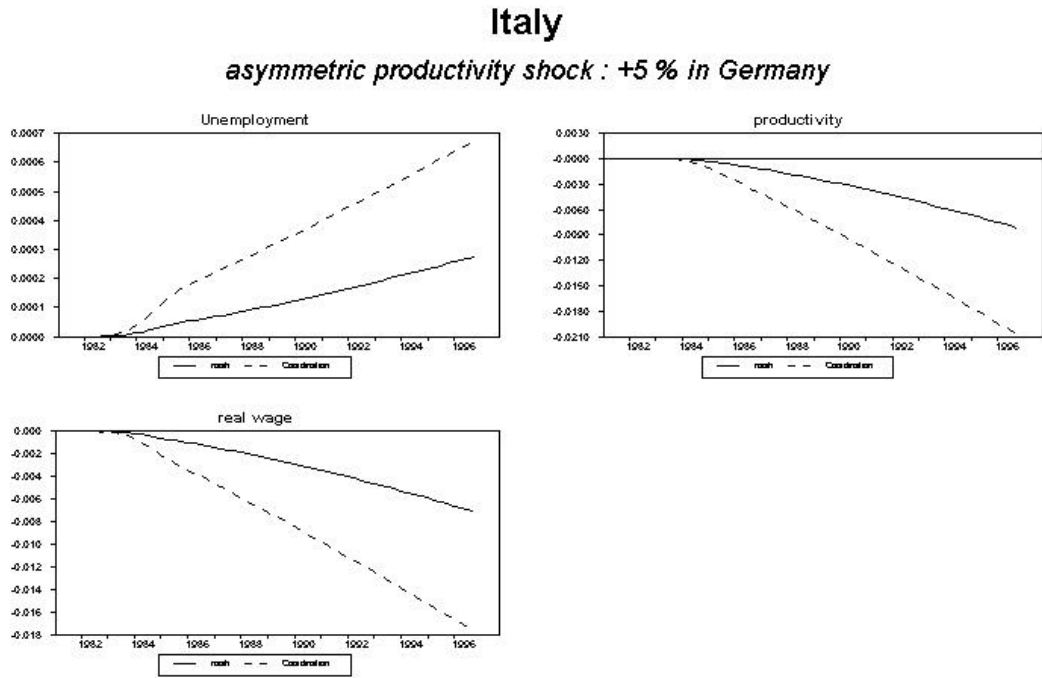
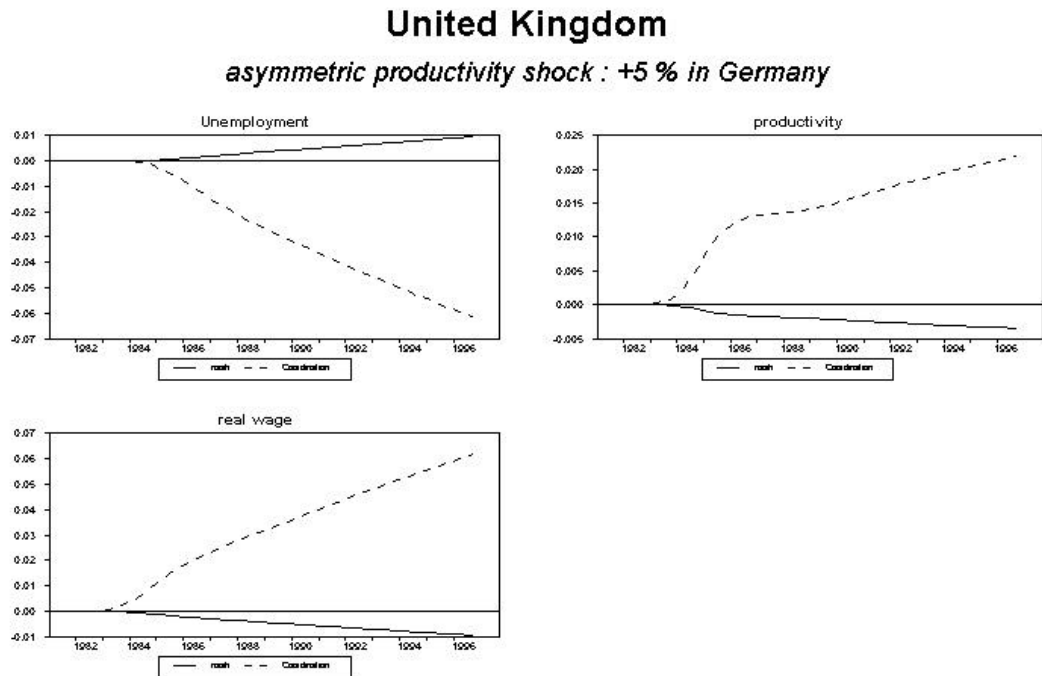


Figure 13



The graphs consolidate first the wage moderating effects of bargaining coordination. An increase of the German productivity causes a real wage revalorization in this country. This wage increase pushes up European inflation and erodes the European employees purchasing power. With

the Nash equilibrium, this inflation rise leads to wage claims that are damaging to employment in France. The introduction of inflation into the collective utility function upsets the trade-union behaviours. German wage revalorization are compensated by wage moderation in France and Spain in order to contain European inflation. The benefit on employment are nevertheless mitigated. Unemployment drops only by 0.1 point in France and 0.03 point in Spain.

It should be stressed also the influence of the national trade unions coordination in the country struck by the initial shock. The German trade union internalises the inflationary impact of its claims and consequently moderates the wage rises. The productivity shock makes the employment improvement persistent and leads to a 0.3 point unemployment decrease.

3. Wage bargaining coordination and heterogeneous wage formation systems

The national labour markets organisation and the wage formation systems strongly differ in Europe despite the structural reforms engaged by many countries these last years. For example, wage negotiations can take place at firm, industry or at national level. Thus, one of the EMU concern relates to the wage determination when trade unions' organisational structures are very heterogeneous. The incurred risk is that a not very inclined country with wage moderation could slacken the competition exerted on its partners and produce a mimetic behaviour (Cornéo, 1995). In addition, the catching up of low wages countries towards highest also represents a risk when wages grow faster than productivity. The objective of the simulations carried out in this section is to inform us about the effectiveness of the collective bargaining coordination when the Member States are struck by heterogeneous wage shocks. The latter represent for example unanticipated impulses from the public authorities (rise of the minimum wage...). We assume on a purely illustrative basis that French real wages increase by 2 %, the German and English wages by 1 %, the Italian wages by 3 % and the Spanish wages by 5 %. Fig. 14 to 18 illustrate these simulations.

Figure 14

France

asymmetric wage shock : + 2 %

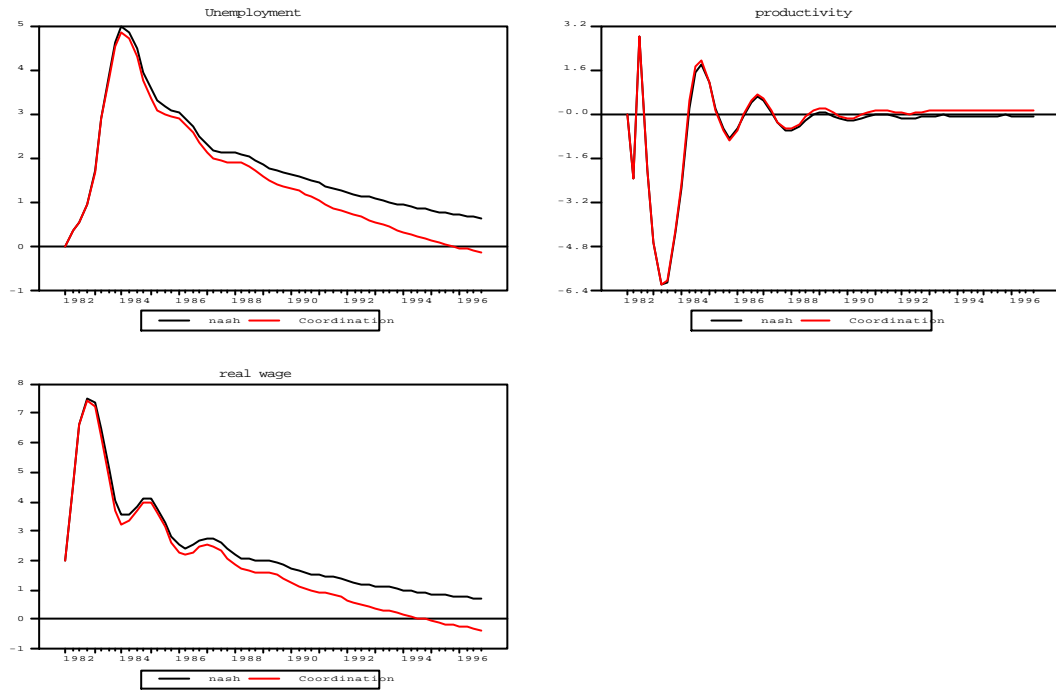


Figure 15

Germany

asymmetric wage shock : + 1 %

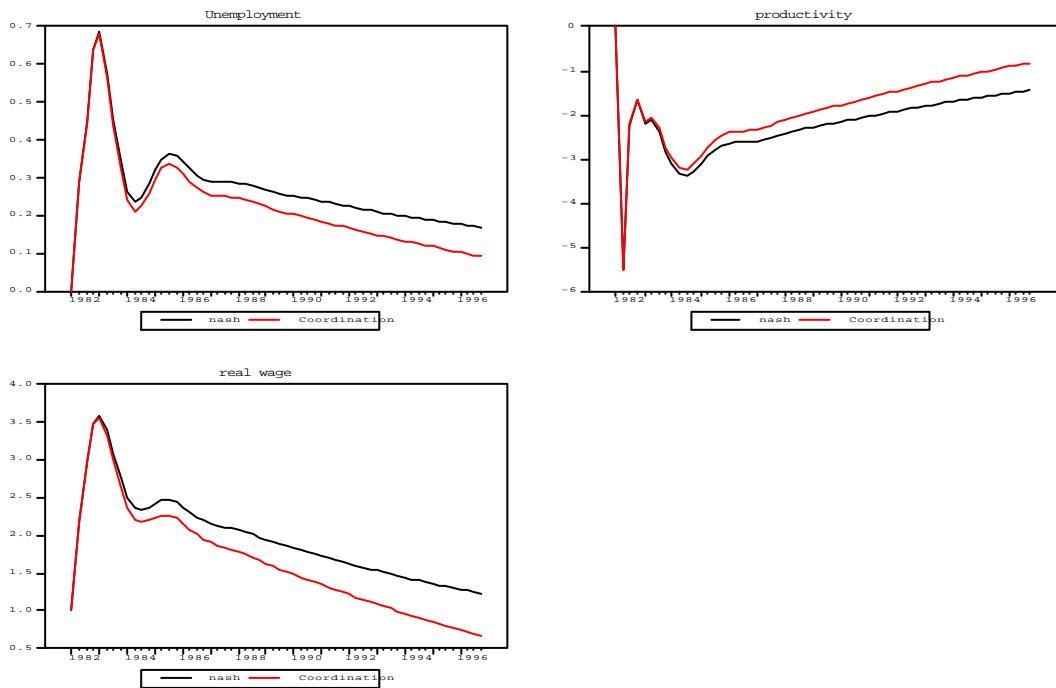


Figure 16

Spain

asymmetric wage shock : + 5 %

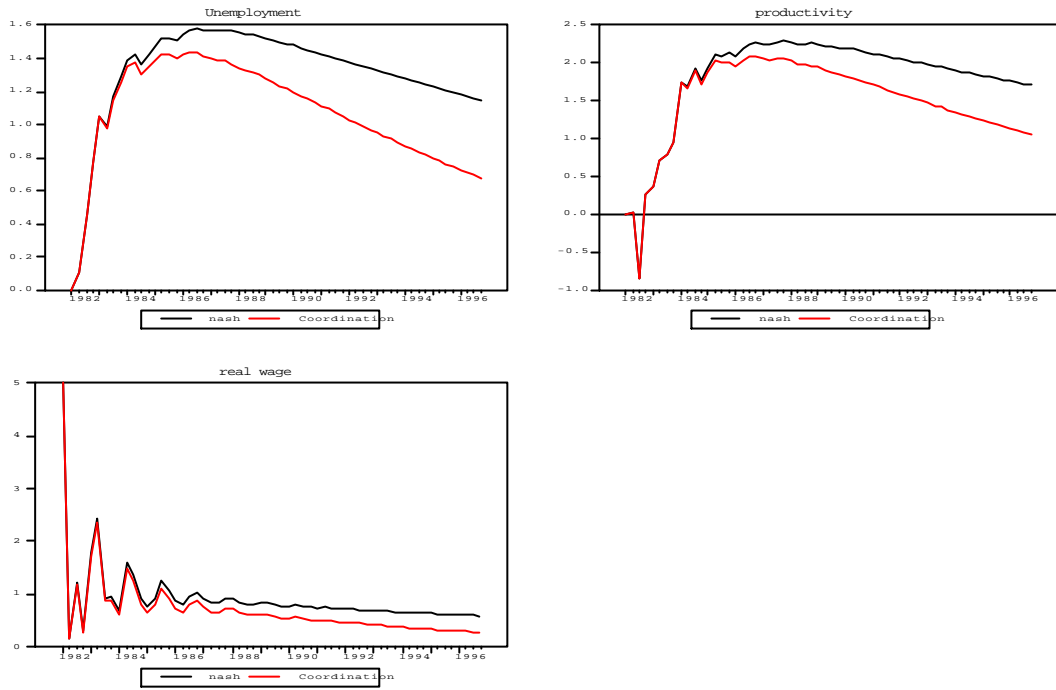


Figure 17

Italy

asymmetric wage shock : + 3 %

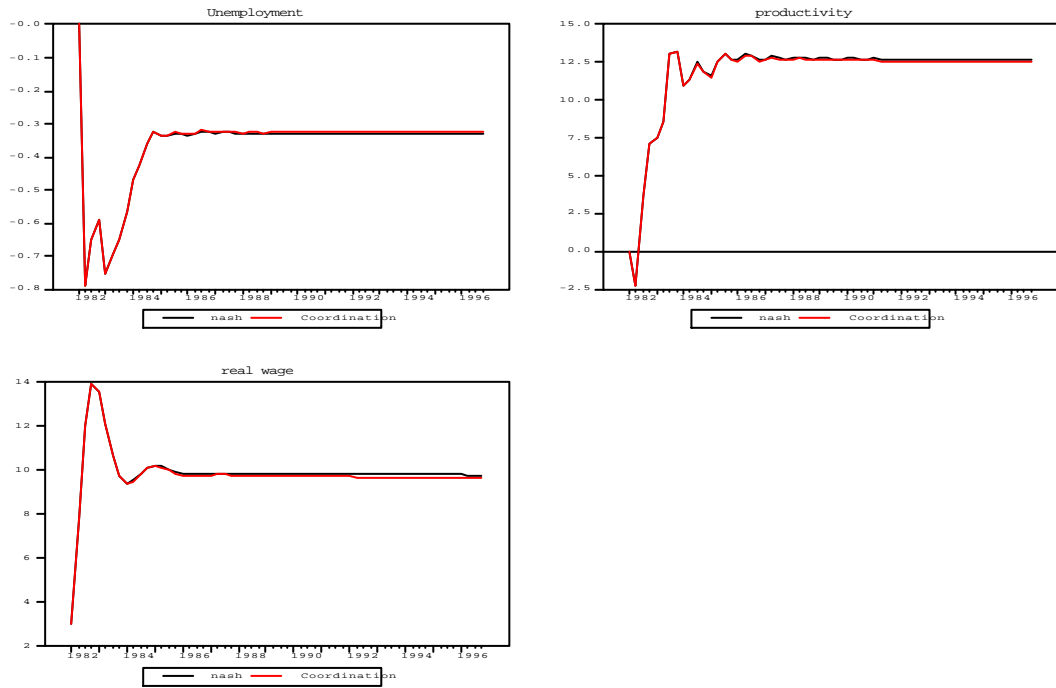
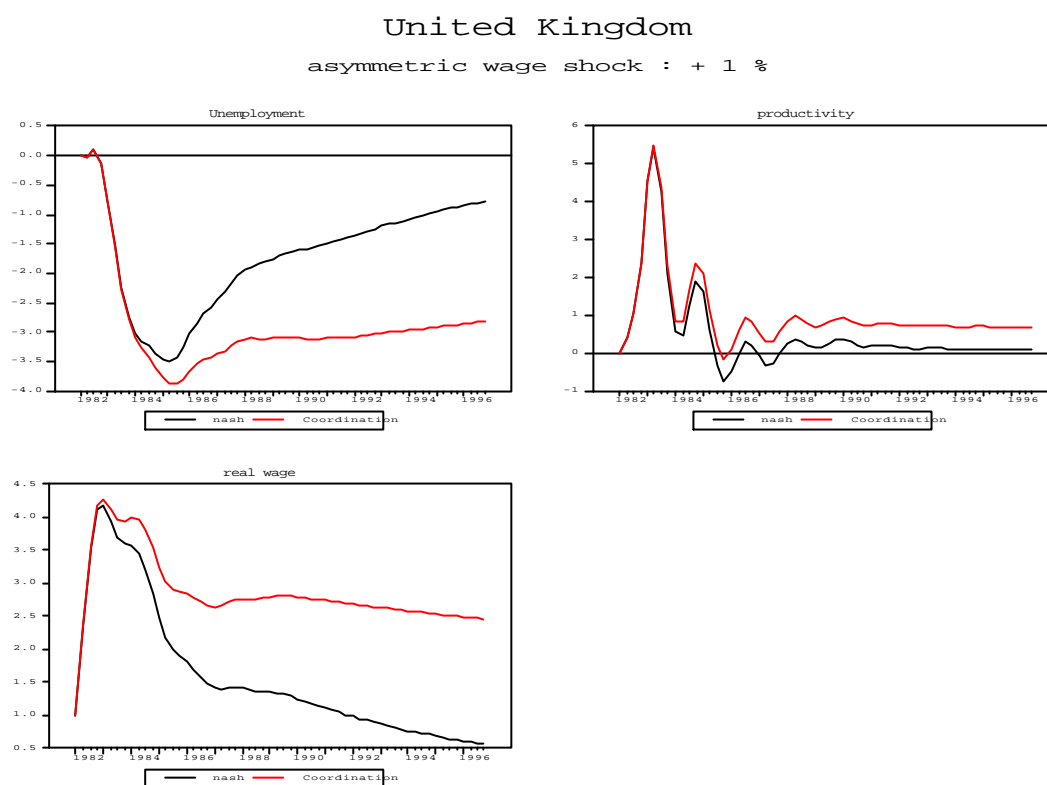


Figure 18



We can first note the contrasted reaction of the unemployment rates induced by the wage shocks. Unemployment increases in France, Germany and Spain, while it decreases in Italy and in the United Kingdom. This under-employment appears atypical and can not be easily explained by a productivity rise compensating for the real wages growth. Nevertheless, these figures provide some interesting lesson. French and Spanish unemployment time paths display inertia due to wage rigidities. In France, the initial wage impulse generates the following quarters a wage inflation which leads unemployment to a 5 points peak. The error correction mechanism and the rate of unemployment play little role on real wages to quickly bring back unemployment towards initial equilibrium. In Germany, the scenario is different. The initial wage shock leads to a weaker employment decrease (0.7 point). The unemployment rate moreover is brought back to a lower rate more quickly.

Finally and especially, these simulations suggest that coordination attenuates the negative impact of wage shocks, but in smaller proportions than preceding simulations. The graphs 14 to 16 show the expected benefit compared to the Nash equilibrium of the wage negotiations coordination in terms of unemployment decrease. The coordination gain is felt after few quarters and grows with the temporal horizon. Unemployment improvement induced by the co-operative trade unions behaviour is mainly ascribable to less aggressive wage claims. Inflation erodes the purchasing power

of the employees, who seek to compensate for it by wage revalorization. Real wages increase and affect employment. Wage bargaining coordination limits these wage rises, because trade unions internalise the harmful effects of excessive revalorization on consumer prices and unemployment. One perceives this scenario in France, Germany and to a lesser extent in Spain. The case of the United Kingdom is less easily interpretable. It seems that the additional reduction of unemployment permitted by coordination is ascribable to productivity growth. Lastly, bargaining coordination does not play in Italy.

V. Conclusion

The adhesion of countries to the EMU starts the build up of a new wage formation organisation. Increasing economic integration and the competition the firms have to face, the taking into account of a common monetary policy and wage policies of the countries partners constitute new factors that the wage bargaining protagonists must internalise in their decisions. For the moment, this monetary regime upheaval has been translated in the facts by the emergence of new international cooperation schemes in some industries. Many countries even intend to copy the wage claims on those of the trade partners in order to control wage costs and to remain competitive.

The objective of this paper was to bring new insights into the kind of labour markets organisation that are likely to ensure the macro-economic regulation of a monetary union. Many econometric works at the national level have highlighted the virtues of a labour markets coordinated structure. We wished in this work to empirically check the macro-economic impact of the degree of national trade unions coordination within a monetary union.

Starting from VAR models, several symmetric and asymmetric shocks were simulated at ends of comparison of Nash and co-operative equilibria. The results must be interpreted with caution, so that one cannot draw from definitive conclusions at this stage of the analysis. It would indeed be advisable to analyse the sensitivity of the obtained results, according to the specification choice of the collective utility function. Several lessons arise nevertheless. The wage bargaining coordination leads to wage moderation when the economies are struck by both asymmetric and symmetric shocks. For this reason, national trade unions coordination absorbs economic shocks and seems to constitute a partial substitute at the nominal exchange rate in the macro-economic regulation of a monetary union. It also gives again room to manoeuvre to the control of the economic policies. The inflationary impact

of an expansionist policy according to our simulations is partially compensated by the fall of wage revalorization. Trade-union coordination appears also beneficial when one considers unanticipated impulses on the wages (justified for example by wage policies followed by the national authorities). The introduction of the European consumer price in the collective loss function leads trade unions to moderate their wage claims, for the benefit of employment.

Any way, these partial results call several deepening as well in the specification of the national trade-union reaction functions, as in the search for simple co-operative rules impelled by a supra national organisation. In particular, does there exist an optimal weighting of the national trade-union objectives in the collective loss function? On the basis of which criterion (rate of unemployment, weight of the economy in the Union...)? These questions open new prospects for future research. The Euroland currently knows a positive growth cycle. The prospect for an economic decline and associated macro-economic adjustments problems deserve to concentrate reflections on these new fields.

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