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# The macroeconomic governance of the European Monetary Union: A Keynesian perspective

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## Abstract

Extending Asensio's closed-economy framework (2005a,b) to a monetary union, we show that the principles of governance which emanate from the so called "New Consensus in Macroeconomics" (NCM), and therefore have been designed for presumed stationary regimes, may cause severe dysfunctions, such as depressive macroeconomic policies and unemployment traps, in non-ergodic regimes. The Keynesian approach, on the other hand, pleads in favour of important changes in the current governance of the eurozone. First, since the European Central Bank can not repress distributive inflationary pressures without having non-temporary depressive effects on aggregate demand and employment, authorities should recognize that the best way for controlling this type of inflation rests on a consensual distribution of income. Second, authorities should abandon any "optimal rule" designed in order to stabilize the economy near to an imaginary "natural" trend. Keynesian uncertainty rather suggests a gradual and pragmatic approach to macroeconomic policy. From this perspective, we show that the European Monetary Union could take advantage of the complementarity between the common monetary policy and the national budgetary and fiscal instruments.

JEL classification: E12, E13, E60, E61, E63, F33, F42

Keywords: Monetary policy, Fiscal policy, Monetary union, Macroeconomic governance,  
Post-Keynesian

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# The macroeconomic governance of the European Monetary Union: A Keynesian perspective

## Abstract

Extending Asensio's closed-economy framework (2005a,b) to a monetary union, we show that the principles of governance which emanate from the so called "New Consensus in Macroeconomics" (NCM), and therefore have been designed for presumed stationary regimes, may cause severe dysfunctions, such as depressive macroeconomic policies and unemployment traps, in non-ergodic regimes. The Keynesian approach, on the other hand, pleads in favour of important changes in the current governance of the eurozone. First, since the European Central Bank can not repress distributive inflationary pressures without having non-temporary depressive effects on aggregate demand and employment, authorities should recognize that the best way for controlling this type of inflation rests on a consensual distribution of income. Second, authorities should abandon any "optimal rule" designed in order to stabilize the economy near to an imaginary "natural" trend. Keynesian uncertainty rather suggests a gradual and pragmatic approach to macroeconomic policy. From this perspective, we show that the European Monetary Union could take advantage of the complementarity between the common monetary policy and the national budgetary and fiscal instruments.

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## 1. Introduction

During the seventies, the floating of the main currencies modified the macroeconomic policy-making significantly: free from the obligation to defend their exchange rate, policies were more reactive, but also more inflationary, causing public deficits, and finally they were less efficient against unemployment. That supported the idea that markets work better without macroeconomic policies, and encouraged academic researches that postulated the efficiency of the competitive mechanisms and delivered of course a negative vision of monetary and fiscal policies: either they were useless, or they were inflation-biased because of the temptation to monetize deficits or get extra output. That literature gave rise to new standards for macroeconomic governance, such as monetary policy conservatism, and strong public deficit limitations.

The new-governance rules of the eurozone aim basically to weaken the discretionary power of economic policy, in order to protect the credibility of the euro against the "inflationary temptation". They work through a two-pillar institutional architecture: the central bank independency and the stability and growth pact. There is a close connection between the clauses concerning monetary and fiscal policies and the theoretical developments of the new Classical and new Keynesian macroeconomics. These developments are fundamentally based on the rational expectation hypothesis, with the result that the rules of governance they recommend have been designed for a world in which uncertainty (not risk) do not have substantial impact on economic decisions. In such a world, to which we will refer as presumed stationary, the competitive adjustment of prices, wages and interest rates is largely admitted to be efficient.

These theories reached much success in the academic and politic arenas; they have today significant effects on the conduct of macroeconomic policies, especially in the European Union where they have been formalized into a Treaty. However, the trials of the European

stability pact in the last few years, as well as the deterioration of the USA public finances, shows that it is difficult to hold the line of conduct in the real world. In both cases, the willingness of counter an unfavourable conjunction of circumstances has been pragmatically invoked in order to depart the policy making from the medium-long run objectives<sup>1</sup>. These events suggest that the NCM governance carries heavy drawbacks when implemented in the real world. They show moreover that discretionary power has not been completely crowded out of European policy making, in spite of the new institutional framework.

The paper presents the theoretical foundations of the anti-inflationary governance with respect to the kind of world for which it has been designed. Extending Asensio's theoretical framework (2005a,b) to a monetary union, it examines the dysfunctions that the new governance may provoke in a Keynesian context, as well as the pragmatic principles that could make macroeconomic policy more adequate. In accordance with Arestis and Sawyer (2003) position, fiscal-budgetary policies will occupy a central place, but attention will be paid to their interactions with the monetary policy of the Union.

Section 2 presents the NCM and Keynesian general equilibrium equations of a two-country monetary union model. Section 3 discusses the consequences of the NCM governance in both systems, and explores the outlines of the Keynesian macroeconomic governance. The conclusion draws some lessons about the current fiscal and monetary rules of the eurozone.

## 2. Modelling monetary unions

Starting with the usual four-macro-market structure of the closed economy, we move towards a two-country monetary union by assuming perfectly integrated market for bonds and unique money. Consequently, the system comprises six markets (the two labour markets -immobile factor-, the two markets for goods - imperfect substitutes -, the market for bonds, and the market for money), which supposes five relative prices (two real wages in terms of goods, the

international relative price of goods, the rate of interest and the real price of money in terms of goods, which inverse is the nominal price of goods). Because of the Walras law, the equilibrium condition for the market of bonds will remain implicit.

Variables are expressed in terms of relative variations from their initial value, excepting the rate of interest and the tax rate, which are expressed as variations. We focus on the short run behaviour of the system, in the sense that productive physical stock of capital is assumed to be constant during the period considered. All the parameters (generally in small Greek letters) have the same value in the two countries so as to make algebra tractable.

The NCM will be analysed first through the equilibrium properties of the supply and demand aggregate behaviours that take place in presumed stochastic stationary regimes. Then, behaviours in front of uncertainty will be considered in order to put forward, within the same macro-market structure, the general equilibrium properties of Keynesian non-ergodic systems<sup>2</sup>.

### 2.1. Monetary union modelling within the NCM

After Keynes had demonstrated the decisive importance of expectations for macroeconomic analysis, the rational expectation hypothesis gave a new impulse to (Neo)Classical economics during the seventies. It was shown that, in presumed stochastic stationary regimes, the main properties of the classical system continued to work, provided that market efficiency was postulated. "New Keynesian Economics" share most of this revitalized New Classical framework, even though it put forward nominal and real rigidities, which prevent the competitive process to work perfectly in the "short run". If nominal wages, for example, are imperfectly flexible, inflationary shocks temporarily move real wages and employment from their natural level. Demand policies may be useful in this case, but only to the extent that they use the surprise-inflation channel. Yet, if money can influence relative prices and other real

variables temporary, it plays a limited role in New Keynesian Macroeconomics because rational expectations make it possible to predict future values of variables without systematic errors. Hence, as far as stochastic shocks are supposed to produce only temporary deviations in presumed stationary regimes<sup>3</sup>, the long run behaviour of the system is basically the same as the new classical one.

### 2.1.1. Labour markets

At equilibrium, variations in real wages and employment compensate for the marginal disutility of labour (supply side) and furthermore insure profit maximisation (demand side). The marginal productivity equalization to the real cost of labour induces a negative relation between employment and real wage:

$$n_i = -\rho(w_i - p_i) + d_i, \quad i = 1, 2$$

$n_i$  is the relative variation in employment level of country  $i$

$w_i$  is the relative variation in nominal wage in country  $i$

$p_i$  is the relative variation in the price of goods in the country  $i$

It is possible to introduce fiscal distortion effects by supposing that in the short run they work through the price of the variable input: replacing the nominal cost of labour ( $W$ ) by  $W(1+\xi t)$ , where  $0 \leq \xi < 1$  measures the (weakened) impact of the tax rate on the labour cost, profit maximisation requires  $\partial Y / \partial N = W(1+\xi t) / P$ . The demand for labour relative variation ( $n$ ) then takes the form of a function of the fiscally-corrected labour cost, which relative variation can be approximated by  $(p - w - \xi \hat{t})$  for small values of  $\hat{t}$  (variation in  $t$ ):

$$n_i = -\rho(w_i - p_i - \xi \hat{t}_i) + d_i \tag{1}$$

We will suppose that labour contracts have been negotiated, at the starting point of the period, on the basis of the expected rate of inflation for the current period ( $p^a$ ). The supply of labour results from the equalization of marginal disutility of labour to the expected real wage, which

supposes a positive relation between  $n_i$  and  $w_i - p_i^a$ . It will be useful to reverse this relation in order to express the (expected) real wage as a function of the level of employment given by equation (1):

$$w_i - p_i^a = \theta n_i \quad (2)$$

From (1) we get:

$$w_i = p_i + \frac{\theta d_i - (p_i - p_i^a) - \theta \rho \hat{\xi}_i}{1 + \rho \theta}$$

$$n_i = \frac{\rho(p_i - p_i^a) + d_i - \rho \hat{\xi}_i}{1 + \rho \theta}$$

If  $p_i^a = p_i$  (which is assumed to be true in the "long run", as a result of rational expectations in presumed stationary regimes), employment (and production; see below) depends on structural and technological data (plus the fiscal distortion effect), but in case of inflationary surprise ( $p_i \neq p_i^a$ ), demand shocks influence the level of employment through the prediction error ( $p_i - p_i^a$ ).

### 2.1.2. Markets for goods

The supply of goods in each country depends on the quantity of inputs, especially labour in the short run, and therefore country's  $i$  technology will be represented as:

$$y_i = \alpha n_i + c_i \quad (3)$$

$y_i$  is the relative variation in output in country  $i$ ,  $c_i$  represents other exogenous technological factors. We assume  $\alpha < 1$  (diminishing marginal product of labour).

From the expression of  $n$  above, we get:

$$y_i = \frac{\alpha \rho (p_i - p_i^a) + \alpha d_i - \alpha \rho \hat{\xi}_i}{1 + \rho \theta} + c_i$$



Apart from taxes and public expenditures changes ( $\hat{t}_i, g_i$ ), the demand for goods varies in both countries with the rate of interest ( $\hat{i}$ ), the international relative output price ( $p_j - p_i$ ), and an exogenous component ( $a_i$ ), so as the market clearing conditions have the form<sup>4</sup>:

$$y_i = -\gamma \hat{t}_i - \sigma \hat{i} + \kappa(p_j - p_i) + \lambda(\phi g_i + a_i), \quad i=1,2, \quad j=1,2, \quad i \neq j$$

which can be expressed as:

$$p_i = p_j - \frac{1}{\kappa}(y_i + \gamma \hat{t}_i + \sigma \hat{i}) - \lambda(\phi g_i + a_i) \quad (4)$$

As far as monetary authorities are credible, expected variations in the national price indexes follow the long run commitment ( $p_i^a = \bar{p}_i$ ), which is assumed to be the initial level (so as  $\bar{p}_i = 0$ ). However short run deviations are allowed for stabilization purposes; hence  $p_i$  may differ from  $\bar{p}_i$ , with the result that  $p_i - p_i^a \neq 0$ . Equation (4) shows how monetary and fiscal-budgetary policy instruments influence the price indexes.

### 2.1.3. Market for money

In the former Classical view, money simply was a transaction device, and demand for money was assumed to vary following the volume and the price of transactions, but more sophisticated (short run) demand for money is often preferred so as to take risk into account<sup>5</sup>:

$$m = \frac{1}{2}(y_1 + y_2) + \frac{1}{2}(p_1 + p_2) - \eta \hat{i} \quad (5)$$

where  $m$  is the quantity of money.

The system turns therefore into an extended two-country IS-LM model (equations 4 and 5), which contains a supply set of equations for endogenous determination of wages and prices. However, as Lavoie (2006) pointed out in recent versions of the new consensus, monetary policies consist in controlling the rate of interest rather than the quantity of money, which has to be considered as an endogenous variable. When the central bank controls  $\hat{i}$ , the LM

function only determines the quantity of money that is equal to the demand for money, and therefore it is possible to solve the model for real magnitudes without it (cf. Romer, 2000)<sup>6</sup>.

## 2.2. Keynesian equilibrium in non-ergodic monetary union regimes

Equation (5) admits different interpretations depending on the definition of uncertainty. In presumed stochastic stationary regimes, risk makes money a useful portfolio diversification device, as we have just mentioned. This is a step towards the Keynesian monetary theory, but it does not capture its essential features. Indeed, there is a fundamental difference in the way to manage uncertainty when dynamic stability is not ensured, compared with a system where agents may predict the future without making systematic errors. The Keynesian concept of liquidity preference is not captured in equation (5); the liquidity preference does not result from any optimal decision concerning risk and return, which could make sense in presumed stationary regimes but does not ensure that it is "the best" solution in a Keynesian world. According to The General Theory (Ch. 12), its magnitude results from the confidence level that people give to their expectations (whatever the distribution of probabilities they may make use of).

This Keynesian specificity will be formally underlined through considering  $\eta_k$  as an exogenous variable which is subject to the kind of volatility that usually affect expectations:

$$m = \frac{1}{2}(y_1 + y_2) + \frac{1}{2}(p_1 + p_2) - \eta_k \hat{i} \quad (5_k)$$

When aggregate demand, and prices, decrease, the need for transaction-money falls, and the rate of interest decreases; that increases the demand and the price of goods and moves the real wages towards their full employment level<sup>7</sup>. But, in Keynesian contexts, the magnitude of the decrease in interest rate (the so-called 'Keynes effect') and of any positive real balance effect (people do not want to hold idle cash balances and therefore increase the demand for

goods) depends on speculative decisions concerning the demand for money, with the result that income and employment depends on the degree of confidence of the moment and on its impact on the demand for money. At equilibrium, there are no competitive mechanisms which could move the economy towards any predetermined "long run" solution.

### 2.2.1. Markets articulation at equilibrium

#### Labour markets

The demand for labour will not be determined here by equation (1), but by equation (3), which gives the variation in labour that makes the better use of the technology for a given demand of goods.

Since the level of labour is fixed by the demand of firms, the supply side equation of the labour market must determine the equilibrium wage. In the Classical world, as well as in the NCM "long run", nominal wages adjustment, together with the real-balance effect, drives the real wages so as to ensure equality between labour supply and demand. The "invisible hand" simultaneously drives the rate of interest so as to ensure that aggregate demand absorbs the full-employment supply of good. In such a world, money only can induce short run "noises", but in a Keynesian world, shifts of the speculative demand for money may keep the "invisible hand" away from full employment. Hence, as far as nothing in these conditions ensures the equalization of the equilibrium real wages and marginal disutility of labour attached to a given level of effective demand, equation (2), which represents the second "Classical postulate", must be abandoned.

How then has the equilibrium nominal wage to be determined? The General Theory pointed out that a decrease in wages does not systematically increase employment, because of the negative demand effects it may provoke through the expected return on capital. Notice that in our autarkic monetary union, positive external demand effects due to wages decrease in

country  $i$ , means negative demand effects in country  $j$ , with the result that the competitive adjustment of wages does not solve the problem at the union level<sup>8</sup>. Equilibrium with under-employment means that the self-regulatory process failed, either the wages decrease have not been able to stimulate the effective demand or have amplified the depression (but in this case wages should continue to fall<sup>9</sup>), or workers have been able to stop the decrease in wages. We will therefore suppose that nominal wages are anchored in an exogenous (but variable) threshold ( $\bar{w}_i$ ). The current wage however may deviate from this threshold when certain events occur, such as a rise in unemployment rate or exogenous disturbances:

$$w_i = \bar{w}_i - \theta_k (n_{\bar{f}i} - n_i), \quad i = 1, 2 \quad (2_k)$$

where  $n_{\bar{f}i}$  is the rate of change of the labour force in country  $i$ .

#### Markets for goods

Since the market equilibrium requires that firms adjust the production  $y_i$  to the effective demand (equation 4), the supply for goods is not necessary consistent with the employment level which results from equation (1). This does not means that firms can not adjust the marginal productivity of labour to the factor real cost, but only that it is not through the choice of the output level that they can do it. Equation (1) actually gives the price index variation that makes firms able to remain on their demand-for-labour curve. When demand increases, it is through inflation that the real wage variation is made equal to the marginal productivity decline, prompting firms to raise their production in order to respond to the increasing demand.

Without changing the formal condition expressed in equation (1), we can rewrite it in accordance with the Keynesian approach to inflation:

$$p_i = w_i + n_i - y_i - \dot{\alpha}_i + \xi \hat{t}_i \quad (1')$$

where  $-\dot{\alpha}_i + \xi \hat{t}_i$  is the rate of variation of the mark-up on unit labour cost<sup>10</sup>.

Inflation may be caused by interest rate variations through their impact on aggregate demand and output, but in contrast to the NCM model, this does not require inflation surprises. In addition, inflation reveals its connection with the labour costs, including taxes, and with the mark-up. Equation (1') also indicates that a positive shift in output, which reduces the productivity of labour in the absence of technological change<sup>11</sup>, does not necessarily imply a decline of real wages; it depends on the mark-up behaviour. Thus real wages may vary pro-cyclically.

### Market for money

Following the post-Keynesian approach to endogenous money, we will suppose that banks deliver the quantity of money that is demanded at the current rate of interest, which is influenced by the central bank decisions. However, despite the formal resemblance, the functioning of the market differs from the NCM one, notably because of the speculative demand instability. Hence, the transmission of short-term interest rates variations, through which the central bank may influence the long-term interest rates, is made uncertain. For example, lower short-term rates (increases in high-powered money) aiming to extend credit do not produce the same decline in long-term rates depending on whether the liquidity preference changes or not. When it rises, banks may be able to sell more credit without having to reduce their interest rates, for non-bank loans rates in this case tend to rise in order to compensate the increasing liquidity preference. Moreover, speculative behaviours also may block the transmission process when the current rates are considered as very low (liquidity trap). Thus automatic monetary rules à la Taylor turn out to be excessively optimistic in a Keynesian context.

### 2.2.2. Formal similarities and fundamental discrepancies

From a formal point of view, the differences between the two models concern equations (2<sub>k</sub>) and (2) as long as equation LM is not explicitly represented. If, as usually supposed, the labour force is constant in the short run ( $n_{fi}=0$ ,  $i=1,2$ ), differences restrict to wages determinants ( $\bar{w}_i$  or  $p_i^a$ ) and parameters ( $\theta$  or  $\theta_k$ ) that have different definitions in the two models.

Thus, apart from the postulate that shocks ( $c_i, \alpha_i, p_i^a, a_i$ ) are temporary deviations from a stationary regime in the NCM model, the short run behaviour modelling of non-ergodic systems seems very similar to the modelling of presumed stationary regimes with rational expectations. However, this formal similarity hides fundamental differences about the general equilibrium properties. First, the volatility of the demand for money (equation 5<sub>k</sub>) threatens the interest rate ability to push aggregate demand up to full employment at the union level (whatever way it might take, spontaneous competitive forces or monetary policy). Second, Keynesian equilibrium is driven by effective demand; there is no force of attraction towards any predetermined "long run" or "natural" position (in that sense, Keynesian equilibrium is not a temporary situation). Third, that unemployment does not tend to reduce nominal wages beyond some exogenous limit is not a cause of unemployment; in certain circumstances, it can even be viewed as a protection against cumulative depressive forces (but a shift in unemployment may weaken the workers resistance, as in equation 2<sub>k</sub>).

Other fundamental discrepancies concern the signification of inflation and the role of monetary policy. We have mentioned the connection between cost pushed inflation and demand led inflation. Indeed, inflationary effects associated to wages, mark-up and/or tax pressures ( $\bar{w}_i > 0, \hat{\alpha}_i > 0, \hat{t}_i > 0$ ) in equation (1'), depend on the way monetary authorities will pass them on effective demand. Since cost pressures comes with higher demand for transaction money, inflation can develop only if the central bank satisfies the additional

demand of money, in order for example to stabilize the rate of interest. If on the contrary monetary authorities aim to stabilize the price index, they do not prevent the rise of interest rates, so as to offset the inflationary effects of increasing costs through a depressive impact on effective demand. Hence, recurrent distributive conflicts, whatever the reason (wage-profit sharing, fiscal pressures), force monetary policy into dilemma: to accept the inflationary consequences and preserve economic activities, or to depress economic activity in order to stabilize the real value of money through a non-temporary pressure of unemployment on wages. In the Keynesian context, monetary policy is involved in the determination of equilibrium and income distribution; it is not a simple stabilization device for self regulated systems.

### 3. Alternative macro-governance approaches

According to the NCM, debt monetization and willingness to get extra output are the primary causes of inflation. Solutions stem from governance principles like central bank independency and public deficit limitation, which aim to prevent central banks to create more money than is needed for making transactions at current prices. Whereas such principles seem suitable in a presumed stationary system, they can deteriorate the situation in the presence of Keynesian unemployment. This section compares the main implications of the NCM governance in both presumed-stationary and Keynesian regimes.

#### 3.1. NCM governance

The type of governance that is suggested by the NCM is based on targets that are defined in relation to the expected trajectory of the economy. Temporary deviations of the rate of interest may be decided for stabilization purposes, in such a way that the quantity of money evolves in concert with the demand induced by the economic growth, without inflation pressures.

Conversely, policies that aim systematically to get extra output through inflation surprise or debt monetization are fully predictable and therefore inefficient; they only feed the inflation core. Consequently, the new consensus pleads in favour of central bank political independence and low inflation targeting. In addition, according to the "unpleasant monetary arithmetic" that Sargent & Wallace (1981) pointed out, public deficit limitations are necessary for the credibility and efficiency of monetary policy.

### 3.1.1. NCM governance within the new consensus representation of the world

In order to draw some analytical conclusions from the model, let assume that credible institutions ensure there is no inflation bias, with the result that active monetary policy aims to stabilize the system by means of (non-systematic) inflation surprise<sup>12</sup>. Since the central bank is credible, private agents anchor their expectation on the announced long run inflation target. However, in front of a shock, monetary authorities deviate from the target in order to stabilize employment at the union level, with a magnitude which depends on their degree of "Conservatism" about inflation.

Governments for their part have long run budget balance targets related to their financial policy and debt management constraints. As well as monetary authorities, they can temporarily deviate from the target for stabilization purposes.

Let suppose that the average price index and budget balances deviations from initial values are decided with respect to employment deviations:

$$\frac{1}{2}(p_1 + p_2) = -\beta \frac{1}{2}(n_1 + n_2) \quad (6)$$

$$b_i = \psi n_i, \quad i = 1, 2 \quad (7)$$

where  $b_i \equiv \varphi(y_i - g_i) + \hat{t}_i$  (see the appendix n°2)<sup>13</sup>.



Equation (6) for example means that, in order to stabilize the economic activity, a positive (negative) temporary deviation of the average price index is accepted in case of a negative (positive) deviation from the natural rate of employment. Parameters  $\beta \geq 0$  and  $\psi_i \geq 0$  represent respectively the monetary degree of "Conservatism" and the fiscal degree of "Orthodoxy".  $\beta=0$  means that there are no short run deviations from the inflation target (full "Conservatism").  $\psi_i=0$  means that the budget deficit (or surplus) in country  $i$  depends only on financial long run considerations, and do not participate in stabilization operations. The two conditions above suppose that the rate of interest and the budget balance move so as to weaken the impact of the shock on employment; considering equations (1'), (2), (3) and (4), they determine the required deviation of instruments  $\hat{i}$  and  $g$  (or  $\hat{t}$ ) at equilibrium. Notice that if, for example, governments adjust expenditures, the impact of the shocks on the budget balances can in principle be controlled by means of the tax rates. Actually, the following monetary and fiscal-budgetary policy rules:

for  $i=1,2$

$$\begin{aligned}\hat{t}_i &= \frac{1}{2} \frac{(\lambda - \gamma) - 4\kappa\xi}{\xi(2\kappa\xi - (\lambda - \gamma))} (p_i^a - \dot{\alpha}_i) + \frac{1}{2} \frac{(\lambda - \gamma)}{\xi(2\kappa\xi - (\lambda - \gamma))} (p_j^a - \dot{\alpha}_j) + \\ &\frac{1}{2} \frac{4\kappa\xi - (1 - \lambda\varphi)\xi - (\lambda - \gamma)}{\xi(2\kappa\xi - (\lambda - \gamma))} c_i + \frac{1}{2} \frac{(1 - \lambda\varphi)\xi - (\lambda - \gamma)}{\xi(2\kappa\xi - (\lambda - \gamma))} c_j + \\ &\frac{1}{2} \frac{\lambda}{\xi(2\kappa\xi - (\lambda - \gamma))} (a_i - a_j) \\ g_i &= \frac{1}{2} \frac{(\lambda - \gamma) - 4\kappa\xi}{\xi\varphi(2\kappa\xi - (\lambda - \gamma))} (p_i^a - \dot{\alpha}_i) + \frac{1}{2} \frac{(\lambda - \gamma)}{\xi\varphi(2\kappa\xi - (\lambda - \gamma))} (p_j^a - \dot{\alpha}_j) + \\ &\frac{1}{2} \frac{4\kappa\xi(1 - \xi\varphi) - (1 + \varphi(\lambda - 2\gamma))\xi - (\lambda - \gamma)}{\xi\varphi(2\kappa\xi - (\lambda - \gamma))} c_i + \frac{1}{2} \frac{(1 - \lambda\varphi)\xi - (\lambda - \gamma)}{\xi\varphi(2\kappa\xi - (\lambda - \gamma))} c_j + \\ &\frac{1}{2} \frac{\lambda}{\varphi(2\kappa\xi - (\lambda - \gamma))} (a_i - a_j) \\ \hat{i} &= -\frac{1}{2} \frac{\lambda - \gamma}{\sigma\xi} (p_1^a - \dot{\alpha}_1 + p_2^a - \dot{\alpha}_2) + \frac{1}{2} \frac{\lambda - \gamma - \xi(1 - \lambda\varphi)}{\sigma\xi} (c_1 + c_2) + \frac{1}{2} \frac{\lambda}{\sigma} (a_1 + a_2)\end{aligned}$$

together with equations (1'), (2), (3) and (4), yield:

$$\frac{1}{2}(p_1 + p_2) = n_i = b_i = 0, i = 1, 2$$

which means that both governments and the central bank reach their ideal output<sup>14</sup>.

That is the reason why, in the NCM, deficits limitations are not really considered as obstacles to stabilization.

### 3.1.2. NCM governance in a Keynesian world

What kind of consequences may have such governance principles in a Keynesian unemployment situation? In order to answer the question, let the exogenous variable  $q_i$  represent the labour force variation that is initially required for full employment in country  $i$ . Since  $n_i$  is the variation in employment for the current period,  $q_i - n_i$  measures the level of unemployment at the end of the period. As authorities think that  $q_i$  reflects the natural rate of unemployment ( $\bar{w}_i, c_i, \alpha_i$ , and  $a_i$  are supposed to provoke temporary deviations from the presumed trend), they do not take it as a stabilization matter, and make the policy discussed in 3.1.1.

The formal results of the previous section can easily be adapted to the present configuration when the labour force remains unchanged during the current period ( $n_i=0$ ), provided we replace equation (2) by equation (2<sub>k</sub>), which only supposes that  $\bar{w}_i$  and  $\theta_k$  replace  $p_i^a$  and  $\theta$ . It follows that, in the most favourable case where authorities can completely stabilize the prices and the activity without budget balance deterioration, unemployment remains blocked at its initial level ( $q_i - n_i = q_i$ ). Thus, as long as the actual level of unemployment is the target level, the policy mix tends to perpetuate unemployment.

In less favourable cases, authorities have not enough room for manoeuvre in terms of taxes-expenditures capacity of adjustment and interest rate control, with the result that effective demand depressions can not be totally offset. The problem is all the more serious

since Keynesian unemployment does not tend spontaneously towards any long run value, contrary to what authorities think, with the result that they take the new rate of unemployment as the new natural one. That suggests a different explanation of what New Keynesians have referred to as unemployment hysteresis<sup>15</sup>: restricted policy-mix reactions to effective demand depressions only weaken the rise of unemployment, but subsequently neither market forces nor economic policy tends to restore the initial level. Actually, as far as wages respond to the variations in unemployment, not to its level, the NCM concludes to real wages rigidity, hiding by the way what in fact is a lack of policy mix flexibility (remember that wage flexibility does not ensure better results in the Keynesian thought).

Things may even be made worse when recurrent distributive tensions exist, because the central bank tends to raise the rate of interest according to the conflict intensity. Indeed, as long as persistent inflationary pressures are interpreted as the result of a "natural" lower demand for money (provided the supply did not rise), monetary policy takes a harder line and becomes a depressive force.

Thus, despite the fact that the two theoretical approaches share the same objectives in the field of macroeconomic governance (i.e. full employment, prices stability, sound public finance), the presumed stationary regime designed governance may be singularly inappropriate in a Keynesian monetary union.

### 3.2. Keynesian macroeconomic governance

#### 3.2.1. Controlling inflation

Even though inflation always comes from a gap between the money supply and the demand for money expressed at current prices, it is instructive to consider the causes of the gap. For example, according to the real balance effect, a decrease in effective demand may produce inflation, insofar as it reduces the demand for money. This is quite different from surprise

inflation or seigniorage; it takes part in the adjustment process towards equilibrium. It develops especially when wages rigidity impedes the adjustment of real wages. It would be strange if monetary policy aimed to fight inflation after a demand depression when wages are rigid. Central banks rather tend to decrease interest rates in such cases, so as to facilitate the adjustment. New and old Keynesians could agree on this, despite the former consider effective demand failures as temporary shocks.

Another source of inflation is the conflict about income distribution. Mainstream economics interprets distributive tensions in terms of stochastic supply shocks or in terms of structural change (if they are recurrent), never as a moving compromise which interacts with other economic decisions. Insofar as, by assumption, economic agents may freely adjust their plan to the perceived market real prices, a disagreement about nominal earnings, given expected future prices, takes the form of a supply-cut at current prices. That comes to an increase in the natural rate of unemployment. If the central bank aims to smooth the depressive effects on output, it can be driven to temporarily create money, so as to compensate the supplementary need for transaction money which is induced by (temporary) tensions. But, in the long run, monetary policy can not avoid the depressive effects of negative supply shocks. As concerns recurrent (then foreseeable) pressures, the central bank could not repetitively smooth the negative effects on the supply side, because recurrent inflationary measures would be expected, and therefore would not deliver real effects.

The Keynesian point of view about this question is quite different, even though the results are similar. First, section 2.2.2 showed that in the presence of recurrent distributive tensions, low inflation targeting may introduce a deflationary bias into monetary policy, with non-temporary higher unemployment, what contrasts with the neutrality of money in the NCM "long run". In addition, when strong tensions compel the central bank to restrict monetary policy, high unemployment may drive the governments to accept high deficits in a context of

high interest rates. On the contrary, safe distributive conditions help monetary policy to contain interest rates and to contribute to the policy mix efficiency (see below).

Hence, monetary policy is not always the unique way, nor is it the best, to control inflation; legal and institutional rules concerning income distribution play a crucial role as well. Actually, the two aspects should not be considered separately.

Inflation control raises additional problems in monetary unions, for the same monetary policy applies in all member countries, regardless of where inflationary pressures started. Furthermore, interest rate interactions with national budgetary-fiscal policies have to be taken into account. The following section discusses this point.

### 3.2.2. Governing according to the context

In non-ergodic systems, macroeconomic governance should not hinge on mechanic rules whose consequences are supposed being well known and able to reach predefined targets. It is always possible to have ideal objectives, but it is not always reasonable to make it the short run target of a policy mix, because economic policy may spark changes in expectations and private economic decisions, which may in turn make the policy inappropriate (as popularized the Lucas critique<sup>16</sup>). Keynesian context requires pragmatic governance, which goes through intermediate targets in order to avoid jolts that could destabilize expectations and private decisions.

Formally, such an approach suggests replacing equation (7), which fixed the government objective in the NCM model, by a condition of the type:

$$n_i = \mu_i q_i, \quad 0 < \mu_i \leq 1 \quad (8)$$

where  $\mu_i$  is a coefficient that the government chooses in accordance to the confidence he has in the success of operations. It is important to bear in mind that this equation, like most equations of Keynesian models, does not pretend to the stability that is usually assumed.

Indeed  $\mu_i$  is subject to various changing factors. Some of them concern the effective demand expected sensitivity to the policy instruments; others depend on financial constraints which may limit the government room for manoeuvre, others may add political considerations (e.g. public opinion)... In this perspective, economic-policy designing hinges as much on the selection of the objective (value of  $\mu_i$ ) as on the adjustment of instruments (value of  $g_i$  or  $t_i$  which solves equation (8), given equations (1'), (2<sub>k</sub>), (3) and (4)).

Nevertheless, since the budget balances depend on the short run employment objectives, the governments may have to limit the increase in public expenditures, unless they are able to adjust taxes. Consequently, employment and budget balance objectives, as well as the concerned instruments, turn out to be interdependent, and therefore must be simultaneously chosen within a country. Hence, let suppose that the budget-balance target depends more or less on the magnitude of unemployment (according to the room for manoeuvre of the period and to the relative importance governments give to employment...):

$$b_i = -\psi_{ki}(q_i - n_i) + z_i \quad (9)$$

where  $\psi_{ki} \geq 0$  represents the "fiscal flexibility" in country  $i$  (the higher is  $\psi_{ki}$ , the less the government adjusts taxes, and the higher the deficit is), and  $z_i$  represents other factors which may interfere in the short run, like deliberate structural deficit due to long run public investments or debt management considerations. Once again, the problem as much concerns the objective selection (value of  $\psi_{ki}$ ) as the instruments adjustment (value of  $\hat{t}_i$  or  $g_i$  which solves equation (9)).

It is then possible to determine the pairs  $(g_i, \hat{t}_i)$  which solve conditions (8) and (9), given equations (1'), (2<sub>k</sub>), (3) and (4). As can be seen from the solutions (see the appendix n°3), the instruments of country  $i$  not only are moved when it has been hit by a shock, but also when the partner has been hit. The reason is of course that shocks transmit across countries, as well as policies do. Economic policies often carry positive or negative externalities, depending on

the type of spillover and depending on the macroeconomic context abroad. For example, in the system formed by equations (1'), (2<sub>k</sub>), (3) and (4), an increase in expenditures of country  $i$  has positive externalities when  $q_1 < 0$  and  $q_2 < 0$  (because  $\partial n_i / \partial g_j \neq 0$ ), and negative ones when  $q_2 = 0$ . Many configurations are possible, according to the initial situation, the type of shock that may arise during the period, the transmission of shocks and policies... There is no general rule that could be drawn, what contrasts with the NCM world, in which initial situation tends always to the natural anchorage, transmission has always the same sign (as long as "structural" parameters remain unchanged), and shocks are reduced to stochastic deviations without any permanent effect. In Keynesian economics, each configuration has to be examined with respect to the context of the moment.

One of the important elements of the context is the central bank behaviour. Let suppose, for example, that it pursues the objective described in equation (6). It can be shown that the system formed by equations (1'), (2<sub>k</sub>), (3), (4) and (6) then exhibits negative international transmission of expenditures variations<sup>17</sup>. More generally, because of effective demand and employment sensitivity to the interest rate, the move of fiscal and budgetary instruments required by conditions (8) and (9) depends on monetary policy decisions (see the appendix n°3). Of course, interest rates also matter for the choice of objectives  $(\mu_i, \psi_{ki})$ . For example, if the governments think that the central bank will accommodate, they can adopt more ambitious plans in terms of employment, or limit the cost of a given increase in employment in terms of deficits, taxes and/or expenditures adjustment. Thus, monetary policy can make it more or less difficult for governments to reach their objectives.

Notice that the central bank participation to economic recovery does not absolutely necessitate lower interest rates. Remember that  $\hat{i} = 0$ , for example, means that banks adjust the supply of money to the demand expressed at the unchanged rate of interest. Thus, even when the central bank can not significantly reduce the interest rates (if, for example, they are

already very low), it can help in a decisive way by controlling the monetary tensions that economic recovery usually provokes.

#### 4. Conclusion

Our discussion of the macroeconomic governance of monetary unions shows that, whereas the NCM principles exhibit a kind of symbiosis between monetary and decentralized fiscal policies in presumed stationary regimes, it causes severe dysfunctions in Keynesian regimes. Indeed, as far as unemployment does not tend to be spontaneously corrected by the market forces, contrary to what authorities believe, both the central bank and national governments "symbiotically" activate their policy so as to maintain the current rate of unemployment, which is wrongly supposed to be a natural one. Hence, the unemployment trap mechanisms identified in Asensio (2005a,b) generalize to monetary unions, and offer new arguments regarding the failure of the European macroeconomic governance as concerns employment.

On the other hand, the Keynesian thought yields key features for macro-policy design in the presence of uncertainty. They plead in favour of important changes in the current principles of the eurozone governance.

First, since the European Central Bank can not repress recurrent distributive inflationary pressures without having non-temporary depressive effects on aggregate demand and employment, unless demand depresses itself or through budgetary-fiscal policy, authorities should recognize that another way for fighting this kind of inflation rests on the continuous pursuit of a consensual income distribution.

Second, authorities should abandon any reference to the natural rate of (un)employment, and other derivative concepts that do not apply to non-ergodic systems. If there is no long run predictable trajectory along which money would have only nominal influence, the ordinary conduct of monetary and fiscal-budgetary policies can not be guided by any systematic



"optimal rule" designed in order to stabilize the European economy near from a predetermined trend. Uncertainty imposes a gradual and pragmatic approach, closely linked to the context. Our modelling of such an approach suggests that the European Monetary Union could take advantage of the complementarity between the monetary policy of the central bank and the national budgetary-fiscal instruments. That certainly would help the governments to fight unemployment without denying their financial constraints. It is not necessary a matter of interest rate reduction; it may simply hinge on avoiding interest rates increases when governments aim to reflate their economy. Besides, the Stability and Growth Pact constraints should not hide the dissuasive impact of the expected liquidity constraint that may result from a reputed non-accommodating monetary policy. Of course such a policy mix could produce some rise in the price indexes, but remember that, even in the NCM, this is a necessary condition for economic recovery when nominal wages are sticky; relative prices adjustment is quite different from inflation.

## Appendix n°1

Let start from the national aggregate-demand functions:

$$Y_{di} = v_i(Y_i - t_i Y_i) - \beta_i(i - p_{+1i}^a) + \left(\frac{P_j}{P_i}\right)^\zeta + G_i + A_i, \quad i = 1, 2, \quad i \neq j$$

where  $Y_i$  represents the output volume in country  $i$ ,  $t_i$  the tax rate (taxes/output),  $v$  the propensity to consume,  $G_i$  the governments expenditures,  $A_i$  an autonomous component,  $P_i$  the price level of goods,  $p_{+1i}^a$ , the expected variation of  $P_i$  till the next period,  $i - p_{+1i}^a$  the real rate of interest.

Through differentiation (assuming  $dv=d\beta=0$  and  $dp_{+1i}^a=0$ ), and dividing by  $Y_0$ , we get:

$$\frac{dY_i}{Y_{i0}} = v_i \frac{dY_i}{Y_{i0}} - v_i t_{i0} \frac{dY_i}{Y_{i0}} - v_i dt_i - \frac{\beta_i}{Y_{i0}} di + \frac{\zeta}{Y_{i0}} \left(\frac{P_{j0}}{P_{i0}}\right)^\zeta \frac{dP_j}{P_{j0}} - \frac{\zeta}{Y_{i0}} \left(\frac{P_{j0}}{P_{i0}}\right)^\zeta \frac{dP_i}{P_{i0}} + \frac{dG_i}{Y_{i0}} + \frac{dA_i}{Y_{i0}}$$

Since  $t_{i0}=T_{i0}/Y_{i0}$ , the equality  $dG/Y_{i0}=t_{i0} dG/G_{i0}$  holds when the budget is balanced ( $T_{i0}=G_{i0}$ ).

Writing relative deviation rates with small letters ( $x_i=dX_i/X_{i0}$ , except  $a_i=dA_i/Y_{i0}$ ), we have:

$$y_{di} = v_i(1-t_{i0})y_i - v_i dt_i - \frac{\beta_i}{Y_{i0}} di + \frac{\varsigma}{Y_{i0}} \left( \frac{P_{i0}}{P_{j0}} \right)^{\varsigma} (p_j - p_i) + t_{i0} g_i + a_i$$

Equilibrium requires  $y_i=y_{di}$ , hence

$$y_i = -\gamma_i \hat{t}_i - \sigma_i \hat{i} + \kappa_i (p_j - p_i) + \lambda_i (\varphi g_i + a_i), \quad i=1,2, \quad j=1,2, \quad i \neq j$$

where  $\hat{t} = di$ ,  $\hat{t}_i = dt_i$ ,  $\varphi_i = t_{i0}$ ,  $\gamma_i = \frac{v_i}{1-v_i(1-\varphi_i)}$ ,  $\lambda_i = \frac{1}{1-v_i(1-\varphi_i)}$ ,  $\sigma_i = \frac{1}{1-v_i(1-\varphi_i)} \frac{\beta}{Y_{i0}}$ ,

$$\kappa_i = \frac{1}{1-v_i(1-\varphi_i)} \frac{\varsigma}{Y_{i0}} \left( \frac{P_{i0}}{P_{j0}} \right)^{\varsigma}$$

As a matter of simplicity, the same set of parameters is supposed to hold in both countries ( $\gamma, v, \sigma, \kappa, \varphi$ )<sup>18</sup>.

## Appendix n°2

The budget balance ( $B$ ) is defined as:

$$B=tPY-PG$$

Differentiating around a solution indexed by 0 yields:

$$dB=t_0 P_0 dY + P_0 Y_0 dt + t_0 Y_0 dP - P_0 dG - G_0 dP$$

and dividing by the initial value of output:

$$dB/(P_0 Y_0) = t_0 dY/Y_0 + dt + t_0 dP/P_0 - dG/Y_0 - (G_0/Y_0)(dP/P_0)$$

Hence, around a situation of balanced budget where  $t_0=G_0/Y_0$  (remember  $g=dG/G_0$ ):

$$b=t_0(y-g)+dt$$

and, with the same notation as in appendix n°1:

$$b = \varphi(y - g) + \hat{t}$$

## Appendix n°3

$$\begin{aligned}
 g_1 = & \frac{\sigma}{\varphi(\lambda - \gamma)} i + \frac{\kappa}{\varphi((\lambda - \gamma) - 2\kappa\xi)} (\bar{w}_1 - \dot{\alpha}_1 - \bar{w}_2 + \dot{\alpha}_2) + \\
 & \frac{(\xi\alpha(\lambda\varphi - 1) - (\lambda - \gamma)(1 - \alpha + \theta_k))\mu_2 + \lambda\xi\psi_{k2}(1 - \mu_2)}{\varphi((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} \kappa q_2 + \\
 & \frac{((\lambda - \gamma)((1 + \theta_k)\kappa + (1 - \gamma\varphi - \kappa)\alpha) + ((2\gamma - \lambda)\varphi - 1)\xi\alpha\kappa)\mu_1 + (\kappa\xi(2\gamma - \lambda) - \gamma(\lambda - \gamma))(1 - \mu_1)\psi_{k1}}{\varphi((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} q_1 + \\
 & \frac{((\lambda\varphi - 1)\xi + \lambda - \gamma)\kappa}{\varphi((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} c_2 + \frac{(\xi((2\gamma - \lambda)\varphi - 1) - (\lambda - \gamma))\kappa + (1 - \gamma\varphi)(\lambda - \gamma)}{\varphi((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} c_1 + \\
 & \frac{\lambda\kappa\xi}{\varphi((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} (a_2 - z_2) + \frac{\lambda(\kappa\xi - (\lambda - \gamma))}{\varphi((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} a_1 + \frac{\gamma(\lambda - \gamma) + \kappa\xi(\lambda - 2\gamma)}{\varphi((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} z_1
 \end{aligned}$$

$$\begin{aligned}
 \hat{t}_1 = & \frac{\sigma}{(\lambda - \gamma)} i + \frac{\kappa}{((\lambda - \gamma) - 2\kappa\xi)} (\bar{w}_1 - \dot{\alpha}_1 - \bar{w}_2 + \dot{\alpha}_2) + \\
 & \frac{(\xi\alpha(\lambda\varphi - 1) - (\lambda - \gamma)(1 - \alpha + \theta_k))\mu_2 + \lambda\xi\psi_{k2}(1 - \mu_2)}{((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} \kappa q_2 + \\
 & \frac{((\lambda - \gamma)((1 + \theta_k)\kappa + (1 - \gamma\varphi - \kappa)\alpha) - (1 - \varphi\lambda)\xi\alpha\kappa)\mu_1 - (\lambda - \gamma - \kappa\xi)\lambda(1 - \mu_1)\psi_{k1}}{((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} q_1 + \\
 & \frac{((\lambda\varphi - 1)\xi + \lambda - \gamma)\kappa}{((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} c_2 + \frac{((\lambda\varphi - 1)\xi - (\lambda - \gamma))\kappa + (1 - \lambda\varphi)(\lambda - \gamma)}{((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} c_1 + \\
 & \frac{\lambda\kappa\xi}{((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} (a_2 - z_2) + \frac{\lambda(\gamma - \lambda + \kappa\xi)}{((\lambda - \gamma) - 2\kappa\xi)(\lambda - \gamma)} (a_1 - z_1)
 \end{aligned}$$

NB:  $g_2$  and  $t_2$  can easily be deduced by permutation of the variable coefficients:  $\psi_{k1}$  and  $\psi_{k2}$ ,  $\mu_1$  and  $\mu_2$ .

Since at equilibrium:  $n_i = \mu_i q_i$  (equation 8), then we have  $y_i = \alpha\mu_i q_i + c_i$  and  $b_i = z_i - \psi_{ki} q_i (1 - \mu_i)$ .

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## Footnotes

<sup>1</sup> It is of interest to note that the two leading countries in the achievement of the European Union were among the firsts to test the excessive deficit procedure. Actually, considering the depressive context of 2003, the decision they made could have been a better way to protect the stability pact than the one recommended by the Commission: restrictive fiscal policies in two major economies of the Union could have harmed the situation and triggered a string of excessive deficits in other countries.

<sup>2</sup> The reader will find more details upon the methodological aspects of our modelling in Asensio (2005a,b).

<sup>3</sup> That supposes that competitive mechanisms anchor the system in a predetermined trajectory. It has been identified as the dynamic stability of a stochastic process (ergodicity). See Vercelli (1991, p. 40, p. 154), Davidson (2002, p. 39, p. 69).

<sup>4</sup> See the appendix n° 1.

<sup>5</sup> Following Tobin (1958), money helps to diversify portfolios in order to optimize the return / risk ratio (the higher the rate of interest, the more one is encouraged to increase the proportion of risky assets, and to reduce the proportion of money).

<sup>6</sup> As Palley (2006) stated, this assessment of endogenous money substantially differs from the post-Keynesian one.

<sup>7</sup> Theoretically, it is possible that flexible nominal wages reach this solution without any variation in the rate of interest (but it is not certain; see *The General Theory*, Ch. 19): through positive effects on the marginal efficiency of capital and effective demand, wage flexibility may produce inflation, reduce real wage and rise production. If on the other hand nominal wages are sticky, the role of interest rate becomes crucial.

<sup>8</sup> It could solve the problem in an open union, but that would suppose that other countries support the negative consequences. Hence it seems reasonable to work with an autarkic union, in order to force the partners to deal with their own externalities.

<sup>9</sup> See Tobin (1975) and Palley (2005) about this kind of instability.

<sup>10</sup> It is not essential to make imperfect competition assumptions in order to obtain a mark-up relation. For example, starting from the production function  $Y = CN^\alpha$ ,  $\alpha < 1$ , competitive pricing requires the marginal productivity to be equal to the real cost of labour:

$\partial Y / \partial N = W(1 + \zeta t) / P \Rightarrow P = W(1 + \zeta t) / (C\alpha N^{\alpha-1}) = (WN(1 + \zeta t) / Y) / \alpha$ ; hence, by differentiation of the associated logarithmic expression (for small values of  $\hat{t}$ ), we have  $p = w + n - y - \dot{\alpha} + \hat{\zeta}$ , where  $\dot{\alpha}$  is the rate of variation in  $\alpha$  (exogenous). Notice that an increasing mark-up on unit labour cost expresses in this case a declining wages-output ratio ( $\dot{\alpha} < 0$ ) and/or increasing fiscal taxes ( $\hat{t} = dt > 0$ ).

<sup>11</sup> From equation (3), we have:  $y - n = (\alpha - 1)n + c$ . Hence, an increase in effective demand and employment reduces the productivity of labour in the absence of technological change (i.e.  $c$  constant), and rises the unit cost of production. This shows that cost pushed inflation and demand led inflation may express the same reality. In fact, whatever apparent causes it has, inflation always requires an increase in demand (see below, section 2.2.2).

<sup>12</sup> According to the no-inflation-bias hypothesis we should have in general  $p_i^a = 0$ , but it may be useful to conserve this variable as an exogenous temporary shock on expected inflation.

<sup>13</sup> These policy rules could be derived by minimisation of a loss function. For example, starting from  $L = (1/2)(\zeta n^2 + b^2)$ , the first order condition requires  $\zeta n(\partial n / \partial g) + b(\partial b / \partial g) = 0$ , which is equivalent to  $b = \psi n$  provided that  $\psi = -\zeta(\partial n / \partial g) / (\partial b / \partial g)$ . This approach sometimes raises difficulties that will not be considered here.

<sup>14</sup> In Dixit & Lambertini (2001, 2003), if monetary and fiscal policymakers agree about the ideal levels of output and inflation, the responses to the shocks are spontaneously driven to this ideal.

<sup>15</sup> About hysteresis, ergodic and non-ergodic regimes, see the Minisymposium in the *Journal of Post Keynesian Economics*, 15(3), Spring 1993.

<sup>16</sup> Keynes raised the question in *The General Theory* (Ch. 15, see the last third of section II). Of course, the meaning and implications of the argument considerably differ owing to the methodological opposition (see Vercelli, 1991).

<sup>17</sup> Since an increase in  $g_i$  reduces the average level of unemployment below the natural rate, the central bank increases the rate of interest in order to stabilise the whole economy, which finally involves a depressive effect in country  $j$ .

<sup>18</sup> Notice that this requires notably  $T_{i0}=T_{i0}^*$  and  $Y_{i0}=Y_{i0}^*$ , an hypothesis we make in order to simplify algebra at a rather high level of abstraction, but which should be abandoned in more sophisticated models.