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CREDIBILITY AND MONETARY POLICY: A CASE OF EMU

Y.Doç.Dr. Erdinç TELATAR*

I. INTRODUCTION

The last ten years have witnessed an explosion of articles about international macroeconomics policy coordination. Two areas of research have emerged. One vein attempts to measure with a wide variety of econometric models possible gains from macroeconomics coordination.[1] The other area focuses on national sovereignty, coordination and reputation.[2] It is the latter type of literature this paper addresses. More specifically, it is concerned with the reputation of monetary authorities and the time consistency of monetary policy. It is attempted to demonstrate that by countries coordinating monetary policy, an inflationary bias result, causing the stability of the system to depend crucially upon the value of the target parameters.

Two terms continually appear in the discussion of macroeconomics coordination: International Cooperation and International Coordination. International Cooperation refers to the sharing of information. The term implies that each country establishes its macroeconomic objectives and sets its economic policies independently of all other countries, but that all share information about the world economy. International Coordination, on the other hand, is an agreement by two or more countries to undertake a cooperative set of policy changes where neither would

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* Hacettepe Üniversitesi İ.İ.B.F. Ekonomi Bölümü Öğretim Üyesi

1 For example, Qudiz and Sachs (1984), Canzoneri and Minford (1986).

2 For example, Giavazzi and Giovannini (1989), Canzoneri (1985), Barro and Gordon (1983) and Rogoff (1985).

wish to undertake the policy change on its own, but each expect the package to them better off, relative to the Nash-non-cooperative equilibrium in which each sets its policy taking other's given. However, without perfect information, it is not a trivial task for policy-makers to decide which policy changes are in the best interest of their country. Should a country agree to a set of policy changes based upon a misconceived spillover effect or misjudge the relationship between its economic variables and another country's economic variables. For example, the United Kingdom spent several years attempting to align its exchange rate relative to other European Union (EU) member exchange rates to an advantageous true weight.

When government coordinate macroeconomic policies, private sector behavior can change in such a way that the country is worse off than in the absence of coordination. This line of literature extends ideas concerning the time consistency aspect of government policy, which Kydland and Prescott (1977) pioneered. At its heart is the idea that coordination might create incentive for governments to engage in activities detrimental to the best interest of the private sector.

The purpose of this study is to explore the trade-off between the European System of Central Bank's dual objectives of money growth rate and output stabilization. The Maastricht Treaty proposes a very high level of independence to the European System of Central Bank (ESCB) in the pursuit of these objectives. However, in this paper, we will not discuss the ESCB can attain this independence. [3]

This study is organized as follows. Section II gives short summary about history of European Monetary Union. Section III presents the ESCB in a politically unified Europe. Section IV presents the ESCB in the absence of a politically unified Europe, but with each member country having the same target growth rate of output. Section V concludes with a summary of the major results of this study.

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3 We do not intend to examine the independence of the ESCB and voting rules which should be adopted to choose the ESCB board and its president. This subject has been examined by Alesina and Grilli (1991)

II. HISTORY OF EUROPEAN MONETARY UNION

The Maastricht Treaty on Economic and Monetary Union is a result of a long period of evolution. There has been very rapid progress on European Community policies since 1984. One sees a great level of the commitment of European Union (EU) member states to build a single internal market, and more recently the Economic and Monetary Union and European Political Union.

European countries have been thinking about monetary union for four decades. This evaluation was based very much upon the international financial system and concerned with the development of stable system of foreign exchange to replace the fixed peg on the US dollar (Bretton Woods System). According to the Bretton Woods System, the United States was required to buy and sell unlimited amounts of gold at the official price of 35 $/oz. It was a reflection of the recovery of European economies which had previously been dominated both trade and payments by the United States. In 1950, the United States's GNP was nearly four times that of EEC (6), whereas by 1969 it was only twice as large. Meanwhile, the European Community's share of OECD export reached 40 per cent by 1969, double of the United States, which declined to 20 per cent.

The main decisions of principle to economic monetary union appear as early as the Werner Report in 1970. The Bretton Woods System finally collapsed in early 1971 at the same time that the Werner proposal were being adopted. In December 1971, the largest trading countries agreed to sign a new agreement which is known as the Simithsonian Treaty. According to this agreement, the dollar was devaluated by 10 per cent and fluctuations between the key currencies were widened from +/- 2 per cent to +/- 4.5 per cent. This arrangement was described as the "Snake" as the European Community member countries exchange rates would move together in a band relative to the dollar. Despite initial enthusiasm about the Snake, this arrangements lasted for only a short period, between April 1972 and March 1973. After that, the European currencies floated freely against the dollar. After that point, the only stable members of the Snake were Germany, Belgium, the Netherlands and Luxembourg.

The European Monetary System (EMS) was set up in December 1978 and became effective in March 1979. Its exchange rate mechanism included all European Community (EC) members except the United Kingdom. The EMS is an agreement between the central banks of the EC countries to control intra-community rates and provide the necessary funds to finance exchange market interventions.

The Maastricht agreement produced a new treaty on European Union to replace the existing community treaties. Originally, when the Hannover Council sets up the Delors Committee in June 1988, it was expected that the treaty would cover the necessary extra provisions to set up economic and monetary union. However, the special Dublin Council of April 1990 confirmed its commitment to political union and set up a parallel intergovernmental conference on the treaty provisions necessary to strengthen the democratic legitimacy of the union. It is also set a deadline to complete their proposal in time for ratification by the member states before the end of 1992.

The result is the Maastricht Treaty on European Union, signed on 7 February, 1992. It emphasizes not just convergence to achieve European Monetary Union but cohesion an progress on other issues for political union. The Treaty sets out the nature, functions and constitution of the central banking system which is to manage the single currency, monetary policy and foreign exchange in the new monetary union. Monetary union is intended to take place in three stages. The first stage has already commenced with free flow of capital and the integration of financial markets under the single market program. The second stage, which begins on 1 January 1994, involves the creation of a new Community Institution, the European Monetary Institute (EMI). By the end of 1996, a decision will be taken on whether stage 3 goes head, on January 1, 1997 as the earliest starting date or January 1, 1999, at the latest. The EMI will replaced by the European Central Bank (ECB) at the beginning of stage 3. The ECB together with the central banks of the member states form the European System of Central Bank (ESCB) from the beginning of stage 3.

III. THE ESCB IN A POLITICALLY UNIFIED EUROPE

Our first assumption is the political unity of Europe. Then the ESCB can be thought of as the national central bank of the politically unified Europe. The rate of money creation is controlled by the ESCB Board and it's President. A quadratic specification for the objective function of the ESCB is adapted. The loss function of the ESCB can be written as:[4]

$$L_{EC} = \min E \sum \beta^t \left\{ \frac{a}{b} (m_t - \overline{m}_t)^2 + \frac{b}{2} (y_t - \overline{y}_t)^2 \right\} \qquad (1)$$

where m=rate of money growth of the unified Europe; y=rate of growth of GNP (output) of the unified Europe; β=discount factor, which is positive but less than one; $\overline{y}$=target rate of growth of GNP of the unified Europe; $\overline{m}$=target rate of money growth of the unified Europe. The economy is described to the following equation:

$$y_t = (m_t - m_t^e) + u_t \qquad (2)$$

where m_t^e is the expected rate of money growth in Europe, i.e., the rational expectation of the growth rate of money in Europe is formed on the basis of the information set available at time (t-1). In (2) we have assumed, without loss of generality, that the natural level of output growth rate is zero. u_t is the random supply shock with mean zero and variance equal to σ_u^2. It is important to emphasize that if the target level of output growth rate of ESCB is greater than the natural level of output growth rate then the ESCB will face the problem of a dynamic inconsistency in the optimal monetary policy pointed out by Kydland and Prescott (1977) and Barro and Gordon (1983). If the target level of output growth rate of the ESCB is higher than the growth rate generated by the market (natural level of output growth rate) then the ESCB has an incentive to create policy surprises in order to approach the target. As Alesina and Grilli (1991) explained, the target level can be justified by the existence of various distortions

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4 A similar model is used by Alesina and Sachs (1988) to explained the objective of political parties in the United States

in the labor market such as income taxation or workers unions. This distortion keeps the level of employment and therefore output below the level which would be achieved in a non-distorted economy.

The model may be solved by substituting (2) into (1) yields

$$L_{EC} = \min E \sum \beta^t \left\{ \frac{a}{2} (m_t - \overline{m}_t)^2 + \frac{b}{2} (m_t - m_t^e - \overline{y}_t + u_t)^2 \right\} \quad (3)$$

The time consistent rate of money growth has to be found by minimizing (3) and taking expectation of money growth rate as given:

$$m_t = \left(\frac{b}{a+b}\right) \overline{m}_t + \left(\frac{b}{a+b}\right) (m_t^e - \overline{y}_t + u_t) \quad (4)$$

Since the public knows the objective of the policy maker, by solving for rational expectation, we get:

$$m_t = \overline{m}_t + \frac{b}{a} (\overline{y}_t - u_t) \quad (5)$$

and the corresponding output growth rate is given by

$$y_t = \left(\frac{a}{b}\right) u_t \quad (6)$$

Equation (5) and (6) represent the well-known time consistency problem in this model. Note that the problem is dynamically consistent if

$$m_t = \overline{m}_t \quad (7)$$

This rule is obtained by minimizing (3), after taking into account of rationality of expectation.

In equation (5), the term $\frac{b}{a} (\overline{y}_t - u_t)$ is inflationary bias introduced into economy by the absence of binding commitment. This bias is zero if and only if either b=0 or $\overline{y}_t - u_t$ is equal to zero. As Barro and Gordon (1983) pointed out, a fall in the rate of growth of output generated by market implies a higher rate of money growth if the reference of the policy makers does not change.

The crucial parameters which characterized the trade-off between average growth rate and variance of output are

$$b^2\sigma^2_{\bar{y}} = a^2\sigma^2_u \tag{8}$$

If b=0 then the inflationary bias is completely eliminated and stabilization is achieved. If $a=b$, but is different from zero, then $\sigma^2_{\bar{y}} = \sigma^2_u$ and the inflationary bias is removed. In this case, the variance of the shock transmitted to output, but stabilization is not achieved. We should arise the question of which a and b the unified Europe should choose for the ESCB.

IV. THE ESCB IN THE ABSENCE OF A POLITICALLY UNIFIED EUROPE AND EACH COUNTRY HAVING THE SAME TARGET GROWTH RATE OF MONEY

Until now we have assumed Europe as being politically unified. In fact, we considered both policy decision and their welfare evaluation which are based on the loss function given in equation (1). However, each country has strong national and political views. Therefore while monetary policy may be set at the unified level, each country will evaluate the consequences of policy according to its loss function, which is given by

$$L^i = \min E \sum \beta^t \left\{ \frac{a^i}{2} (m_t - \bar{m}_t)^2 + \frac{b^i}{2} (y^i_t - \bar{y}^i_t)^2 \right\} \tag{9}$$

where m=rate of money growth of the unified Europe; y^i=rate of growth of GNP (output) for country i; β=discount factor assuming that Europe and country i's discount factors are equal, which is positive but less than one; $\bar{y}^i$=target rate of growth of output for country i; $\bar{m}$=target rate of money growth of the unified Europe. The output is described by the following equation:

$$y^i_t = (m_t - m^e_t) + u^i_t \tag{10}$$

where m_t^e is the expected rate of money growth rate of Europe on the basis of the information set available at time (t-1) and u_t^i is country specific stochastic shock with mean zero and σ_u^2 variance. Substituting the ESCB time consistent policy given by equation (5) and (6) into equation (9) yields

$$L_{EC}^i = \min E \sum \beta^t \left\{ \frac{a^i}{2} \left(\frac{b}{a} (\overline{y}_t - u_t)\right)^2 + \frac{b^i}{2} ((a,b)\, u_t - \overline{y}_t^i)^2 \right\} \tag{11}$$

This equation represents country i's loss value when monetary policies are decided at the unified level according to the rule given by equation (5) and (6). We will compare the loss if monetary policy is decided by national government. By using the procedure is used to derive equation (5) and (6), we obtain:

$$m_t = \overline{m}_t + \frac{b^i}{a^i} (\overline{y}_t^i - u_t^i) \tag{12}$$

and corresponding output growth rate is

$$y_t^i = \left(\frac{a^i}{b^i}\right) u_t^i \tag{13}$$

Therefore, the loss value for country i is given by

$$L_N^i = \min E \sum \beta^t \left\{ \frac{a^i}{2} \left(\frac{bi}{ai} (\overline{y}_t^i - u_t^i)\right)^2 + \frac{b^i}{2} \left(\left(\frac{a^i}{b^i}\right) u_t^i - \overline{y}_t^i\right)^2 \right\} \tag{14}$$

Subtracting equation (14) from equation (11), we obtain the difference in welfare between the situation of monetary policies decided at the European level and monetary policies decided by the national government.

$$L^i_{EC} - L^i_N = \Sigma\beta^t\{ \frac{a^i}{2} \bar{u}^i_t (\frac{b^2}{a^2} - \frac{b^{i2}}{a^{i2}}) + \frac{a^i}{2} (\frac{b^{i2}}{a^{i2}} \sigma^2_u - \frac{b^{i2}}{a^{i2}} \sigma^2_{ui}) +$$

$$\frac{b^i}{2} (\frac{b^{i2}}{a^{i2}} \sigma^2_u - \frac{b^{i2}}{a^{i2}} \sigma^2_{ui}) + \frac{b_i}{2} \sigma_{uui} (\frac{b}{a} - \frac{b_i}{ai})\} \quad (15)$$

where σ^2_u is the variance of u_t and $\sigma_{uu}{}^i$is the covariance between u_t and u^i_t.

It is important to emphasize that equation (15) has two distinct components of the difference in welfare under unified monetary policy and when monetary policy is decided independently. The first component depends upon political differences as represented by a, b, a^i, b^i The second component depends upon economic dissimilarities as given by σ^2_u, σ^2_{ui}, and σ_{uui}.

First consider the case that there is no political differences by assuming $ut=u^i_t$so that

$$\sigma^2_u = \sigma^2_{ui} = \sigma_{uui} = \sigma^2. \quad (16)$$

Then equation (15) becomes

$$L^i_{EC} - L^i_N = \Sigma\beta^t\{ \frac{a^i}{2} \bar{u}^i_t (\frac{b^2}{a^2} - \frac{b^{i2}}{a^{i2}}) + \frac{b^i}{2} (\frac{b^{i2}}{a^{i2}} \sigma^2 - \frac{b^{i2}}{a^{i2}} \sigma^2) +$$

$$\frac{b^i}{2} \sigma^2 + \frac{b_i}{2} \sigma^2 (\frac{b}{a} - \frac{b^i}{a^i})\} \quad (17)$$

Equation (17) illustrate that participation in a monetary union results in improved welfare if

$$\frac{a}{b} < \frac{b^i}{a^i} \quad (18)$$

Next, we will consider the economic differences in the absence of political differences by assuming

$$\frac{a}{b} = \frac{b^i}{a^i} \tag{19}$$

Then equation (15) becomes

$$L^i_{EC} - L^i_N = \Sigma\beta \frac{b^2}{2a}(\sigma^2_u - \sigma^2_{ui}) \tag{20}$$

Equation (20) shows that if the variance of the shock for country i's output rate is greater than the variance of the shock for unified European output rate, i.e.,

$$\sigma^2_u < \sigma^2_{ui} \tag{21}$$

then the ESCB is not stabilizing enough from country i's perceptive. However, if the variance of the shock for country i's output rate is smaller than the variance of the shock for unified European output rate, i.e.,

$$\sigma^2_u > \sigma^2_{ui} \tag{22}$$

then the ESCB is involved in excessive stabilizing from country i's perceptive.

V. CONCLUSION

Our analysis illustrates the costs and benefits which countries incur as a result of participating in a monetary union. Different countries may have different opinions on the conduct of monetary policies. This study classified these differences into two categories.

Each country may have different political opinions on the conduct of monetary policies. There may also be differences in opinion with regard to monetary policies within a country. For example differences in opinion between various political parties.

Each country may face different economic situations than other countries. For example, countries may have different income taxation or worker union. In our analysis some countries may be forced to pay higher costs for being in the unified European monetary union. But there may be some countries that will gain higher benefits in terms of credibility of anti-inflationary policies from being in the union.

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