The European Monetary Union, the Fiscal Policy Restraints and Labor Market Reforms

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This paper analyzes "The Stability and Growth Pact" for countries joining the Economic Monetary Union (EMU) in Europe. In the EMU, the member states face a credibility problem in terms of fiscal policy, to induce inflation. The Fiscal Theory of Price Determination suggests that government deficit and excessive debt cause actual and expected high inflation, and that fiscal restraint, such as The Stability and Growth Pact, is needed to sustain low inflation. However, most Western European countries in EMU face severe unemployment problems, which are caused by labor market institutions and others. The short run unemployment problems there depend on the aggregate demand induced by fiscal policy. This is inconsistent with the rule of fiscal constraint in the EMU. This paper investigates the effect of fiscal restraint on inflation and unemployment under the EMU, where monetary policy is conducted by the European Central Bank, and fiscal policy is determined by each government. The Stability and Growth Pact is effective for keeping inflation low, but may give rise to unemployment in member states.

## 1. Introduction: Fiscal discipline and the monetary integration

In January 1999, the Euro was introduced in a limited form as a currency unit. Accordingly, the European Central Bank (ECB) had the effect of unifying each member states' economy regarding the monetary policy in Euro-Area. A uniform monetary policy in the EMU provides stability against an EMU-wide shock, but not against a

country specific shock. According traditional Keynesian theory, country specific shocks can be absorbed by the fiscal policy of each member state.

Simultaneously, budgetary discipline was adopted by the member states to restrain the strong political bias of the governments in the member countries. According to the political business cycle theory, the preference of the government depends on the results of elections, which are in turn affected by fiscal expenditure stimulating aggregate demand and employment. Therefore, the government tends to run excessive deficits and debts in order for the government in power to win the vote, which causes a bias in the economy. Fiscal restraint guarantees avoidance of this political bias.

Figure 1 shows the situation of EU deficits and debts, 1970-1997. Positive output gaps occurred three times in this period, while EU member states have reacted prudently to severe recessions to loosen discretionary fiscal policy in other periods. Even in "good periods" with positive output gaps, EU member states loosened their fiscal policy, not to reverse the policy. The loose fiscal policy resulted in continuous accumulation of the government debt of EU member states in this period. For this reason, fiscal restraint in EU member states was suggested such as the Maastricht criteria.

Figure 1 EU deficits and debt, 1970-1997
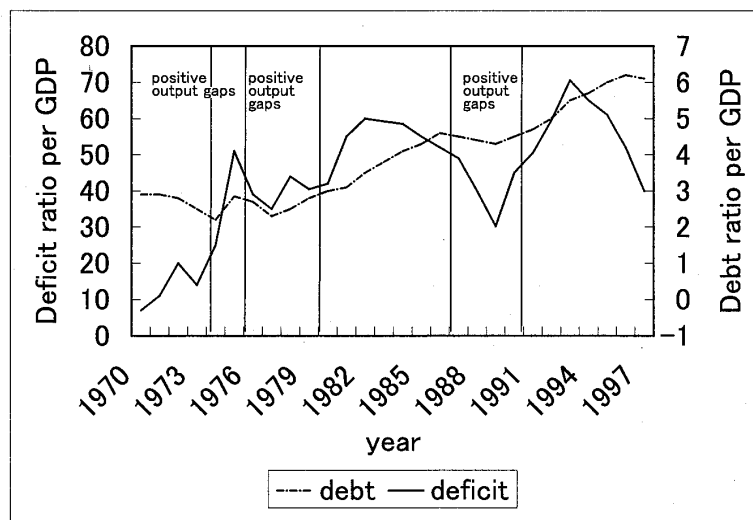
Source) Buti and Sapir, p.86.

The fiscal theory of price determination (FTPD) emphasizes restraining government budget deficit such as the Stability and Growth Pact (Stability Pact herein after). Under the FTPD, fiscal expansion is the most important factor of inflation. The Maastricht Treaty as preparatory for Economic and Monetary Union (EMU) requires lower %or lower inflation rates (3% or lower) and restricted fiscal conditions (3% or lower of the deficit per GDP, and 60% or lower of the debt per GDP). These criteria are based on neo-classical macroeconomic theory, such as the FTPD. Indeed, neo-classical macroeconomics might apply to analysis in the mid- or long-term, but not in the short-term. Keynesian analysis can be applied to an economy in the short-term, which in Europe typically has wage and price rigidity.

The EMU introduced fiscal restraint to induce low inflation in the EMU area, theoretically based on medium or long-term macroeconomics, or FTPD. The fiscal restraint adopted is called the "The Stability and Growth Pact", which was agreed at the Dublin Summit in December 1996 and concluded at the Amsterdam European Council in June 1997. The Stability Pact prescribes sanctions for member states that breach the deficit ceiling. The Stability Pact was introduced to clarify and speed-up the excessive deficit procedure after EMU in order to strengthen the fiscal discipline. Also, the Stability Pact built quasi-automatic sanctions to penalize countries in excessive deficit.

Sustaining the Stability Pact gives credibility to governments. Because discretion in fiscal policy is delegated to each government without the Fiscal Pact under the EMU, each government can decide to increase the deficit easily to accelerate inflation, to destabilize the EMU wide inflation. If this situation occurs, the public would not consider the government credible, resulting in expected high inflation. Therefore, The Stability Pact must resolve the credibility problem to avoid high inflation.

The Stability Pact is effective in a short-term economy, and the de facto European economies with severe unemployment problems. In the long term, EU member states suffer unemployment problems, which are considered structural issues in the EU. The problem may be mitigated after transition to the EMU. Because the economic policies are restricted in the short or medium term along with the Amsterdam

Treaty, unemployment may grow the EMU. The Stability Pact is effective for European economies with severe unemployment problems. The problem may be mitigated after transition to the EMU. Because the economic policies are restricted in the short or medium term along with the Amsterdam Treaty, unemployment in the EMU may grow. We investigated labor market reform as a means of absorbing the shock. Calmfors (1998) studies the relationship between the labor reforms and the EMU, which suggests that monetary integration promotes labor reforms. Although we apply Calmfors' model, the relationship between labor reform and fiscal restraint or fiscal expenditure is explored using our model.

The reminder of the paper is organized as follows. Section 2 shows the unemployment situation in Europe. The analytical framework is presented in Section 3, where we show the modified Barro-Gordon (1986) model. In Section 4, the labor market reform problems are discussed associated with fiscal problem in the EMU. Section 5 concludes, paying particular attention to the relevancy to policy design and labor market reform.

2. The relationship between fiscal deficits and labor markets

Most EU countries share a similar evolution of unemployment since the mid-1970s. When compared to the evolution of unemployment rates in the U.S. and Japan, the evolution of the average rate in EU countries is unique. Unemployment rates in the U.S. are cyclical around the 5 and 6% rate, while the rates in Japan have remained lower than those in the EU and U.S[1]. Unemployment rates in EU countries have increased from 2.5% in the early 1970s to above 10% in 1998 (Figure 2).

While the average rate in the EU is higher, there is a lot of variety among countries (Figure 3). Figure 3 indicates the evolution of unemployment variation across the countries in the EU. The standard deviation of unemployment across EU countries remains stable at around 5% in all EU countries, or around 3% in EU countries excluding Ireland, Spain, and Portugal. The standard deviation of all

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[1] However, the rates in Japan have been higher in recent years.

Figure 2 Unemployment Rates in EU countries
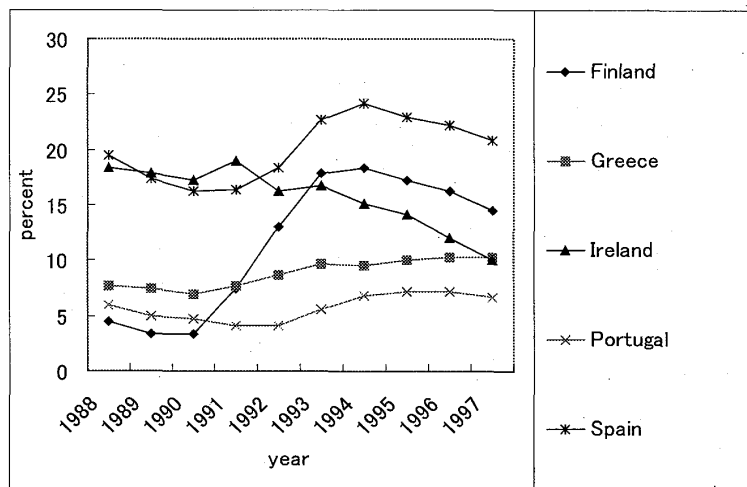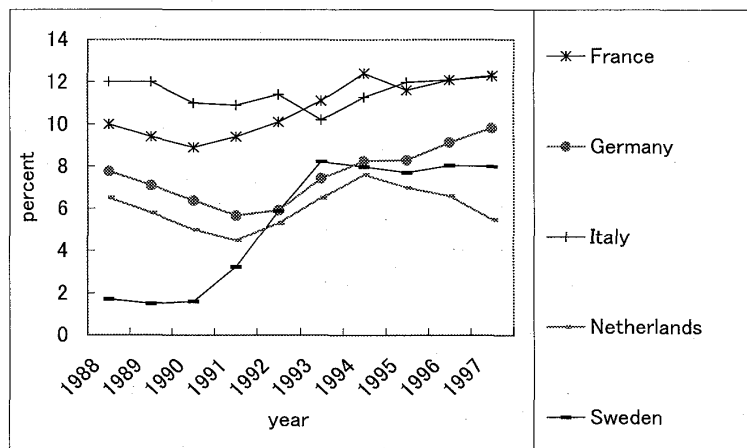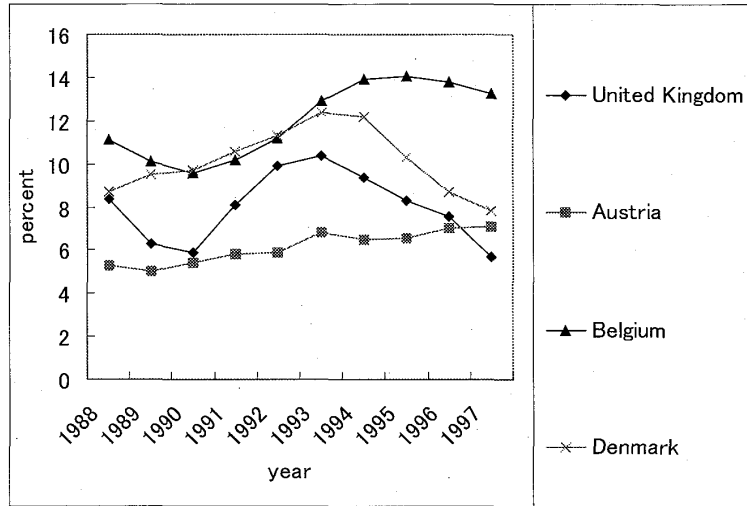
Source: OECD Main Economic Indicators and Euro Stat.

Figure 3 Variation in Unemployment Rates in European Union.
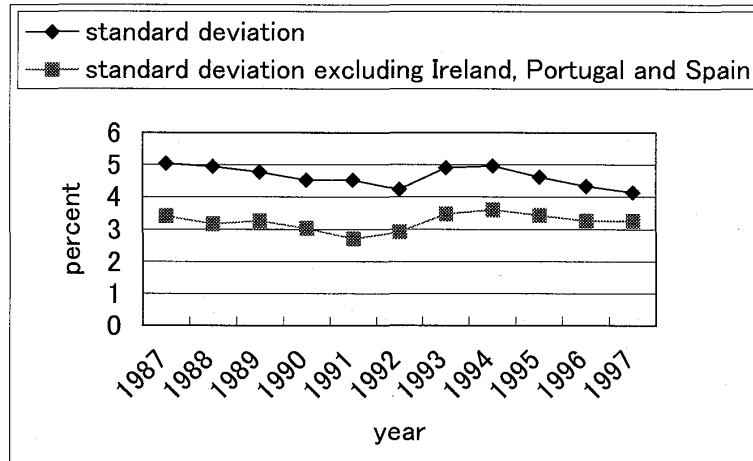
Notes: EU countries include Belgium, Denmark, Germany, Greece, Spain,
France, Ireland, Italy, Netherlands, Austria, Portugal, Finland, Sweden,
United Kingdom.

Source: OECD Main Economic Indicators and Eurostat.

EU countries decreased from 1994 to 1998, while the deviation of countries excluding Ireland, Spain, Portugal remains unchanged. The evolution of unemployment rates across EU countries is heavily influenced by Ireland, Spain and Portugal. In particular, the Spanish unemployment rate has been approximately double that of the EU since the end of the 1980s, shooting up in 1992 and 1993 to heighten the average rates of EU-wide unemployment. From 1995, the Spanish unemployment rate has been declining to decrease the average rates, but the rates excluding those countries has been stable. In conclusion, the unemployment rates in many EU countries are not convergent.

The countries in the EU can be grouped into three types by the unemployment rates in 1998.

1. The low unemployment countries: the group can be defined as the countries whose rates are 7% or below. Luxembourg, Austria, the Netherlands, and Portugal are included.

2. The mid unemployment countries: the group can be defined as the countries whose rates are between 7 and 13%. Germany, Great Britain, Sweden, Belgium, Denmark, Greece, France, Italy are included.

Figure 4 Unemployment rates and Inflation rates in the European Union, 1986. Unemployment rates and inflation rates in 1997.
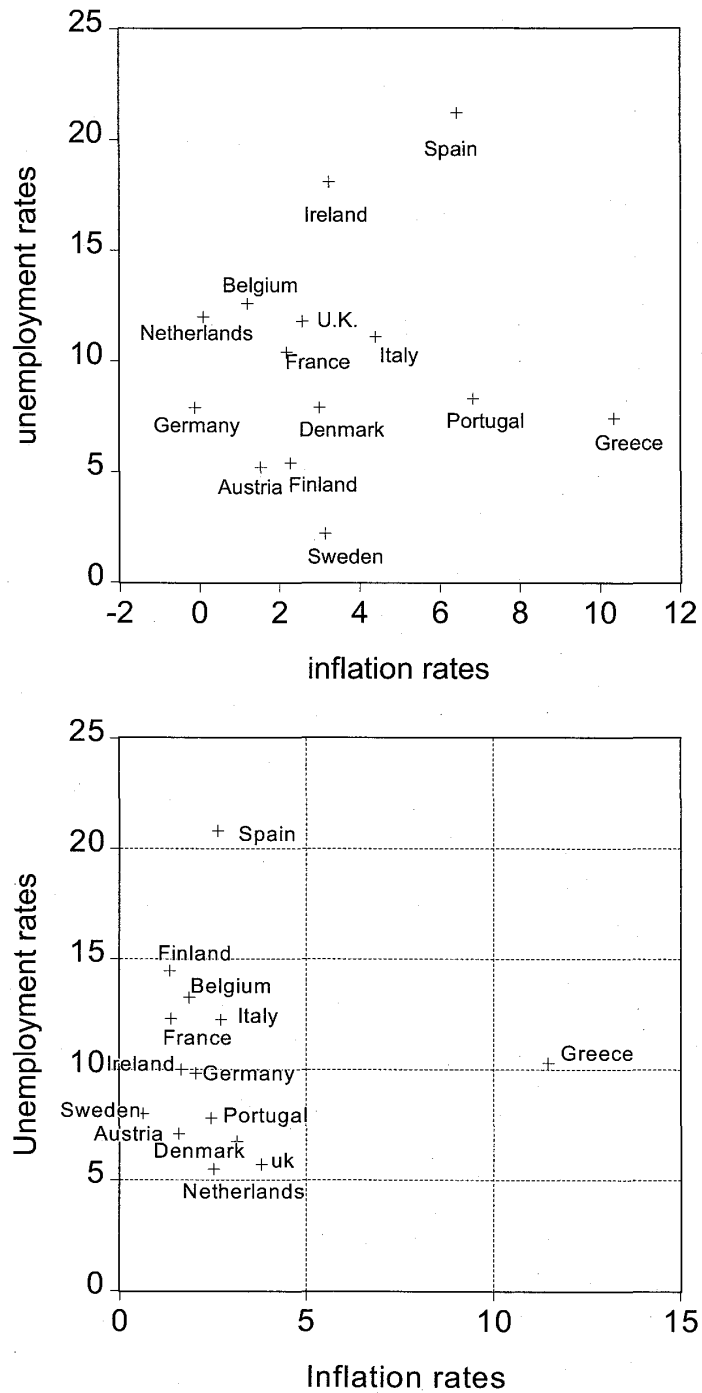
Source: International Financial Statistics.

3. The high unemployment countries: the group can be defined as the countries whose rates are at 13% and above. Finland, Ireland and Spain are included in this group.

Eleven countries in EU suffer from 7% unemployment rates and above, while there are significant differences in unemployment rates. On the other hand, inflation rates in EU countries are stable, as a result of the ERM between 1980 and 1998, and the movement toward monetary integration[2].

While the inflation rates were lower between the 1980s and 1990s in the EU, the unemployment rates on average were higher. A similar evolution of the inflation rates took place in the U.S. However, evolution of the unemployment rates is favorable. Japanese inflation rates were also stable in that era with lower unemployment rates. This suggests that the unemployment rate with stable inflation rate is higher in EU countries than in the United States or Japan. This situation might be caused by the stronger price and wage rigidities in Europe. Low inflation rates resulted in high unemployment rates in West European countries in those eras.

Figure 4 shows the relationship in 1986 and 1997 between inflation rates and unemployment rates in EU member states 9 countries have low inflation rates below 4%, while 5 countries have the higher rates. At that time, Spain, Portugal and Austria did not participate in the ERM. The inflation rates of participants in the ERM were around 3%[3]. Unemployment rates in each country varied The Spanish unemployment rate was above 20%, German, Danish, Portuguese and Greek rates were around 8%. The Swedish rate about 3%.

Excluding Greece, the member states had similarly stable inflation rates in 1997 although they had various unemployment rates, as mentioned above. The inflation rates converged to common rates because the Maastricht criteria require 3% inflation rates of countries that wishing to join the EMU. However, the situation of unemployment rates was different. The rates varied even after Stage 2 of the transition to EMU. From this figure, nominal terms were convergent because of the ERM and Maastricht criteria, but real terms were not

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[2] For example, the Maastricht Treaty decided on the criteria, including low inflation rates.
[3] Although Austria did not enter the ERM, the inflation rates were low.

convergent[4] as mentioned above.

3. The Analytical Model

This section examines an economy with fiscal policy under the EMU. Monetary policy is conducted by the European Central Bank (ECB), and fiscal policy is conducted by the government in each member state. In this paper, the unemployment rate and inflation are assumed to be the policy target. The ECB and each member state's government maximize each object function independently, which includes the unemployment rate and the inflation rate.

We assume that the unemployment rate for this country is determined by:

$$u = u^* - \beta(\pi - \pi^e) + \varepsilon^g - \omega g, \tag{1}$$

where u^* is the structural or equilibrium unemployment rate, π (π^e) is the (expected) inflation rate, the stochastic shock, ε^g, and fiscal expenditure g. The first term of Equation (1) reflects a phenomenon of persistence in the European unemployment. In Europe, unemployment exhibits significant persistence. The literature provides various explanations for this phenomenon, including insider/output relationships[5] and the adjustment cost approach[6]. These theories attribute the problem to persistent or structural inflexibility of labor markets in European countries.

The second term denotes the output effect of surprise inflation. Barro-Gordon (1983) used the same type function as the output function. We apply the Barro-Gordon type function to the unemployment function. The coefficient β reflects the nominal wage rigidities, i.e., the greater the β, the more surprise inflation reduces real wages.

The third term denotes the output effect of fiscal policy. The term expresses the fact that, fiscal expenditure affects the unemployment

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4   Vinals and Jimeno (1998) also indicate geographical classification, core and peripheral countries, is not suitable for analyzing the convergence of the real and nominal term.
5   See Blanchard and Summers (1986), Lindbeck and Snower (1988).
6   See Nickell (1986), Saint-Paul (1995).

rate in the short or medium term. Unemployment can depend on fiscal expenditure through the aggregate demand channel[7], which is the same as the standard Keynesian model. However, alternative effects of fiscal policy on unemployment can be considered. One effect is that fiscal expenditure stimulates aggregate demand, decreasing unemployment. Another effect is that expenditure heightens the real interest rates in the financial market, increasing unemployment rates through decrease of aggregate demand. Here, we postulate that the effect of fiscal policy is negative on the unemployment rate, that is, ω is positive.

The one period objective function of ECB is as follows,

$$L^B = \frac{1}{2}\left\{\pi^2 + \theta_u\left(u^A - \overline{u}\right)^2\right\},\tag{2}$$

where the EMU-wide average unemployment rate, $u^A = u^* - \beta\,(\pi - \pi^e) + \mu - \omega g$. The rate does not include the asymmetry shock υ because the shocks cancel out each other in the procedure of summation.

The ECB is guaranteed a high degree of independence from the member state's government
The one period objective function of the government is as follows,

$$L^g = \frac{1}{2}\left\{\pi^2 + \alpha_u\left(u - \overline{u}\right)^2 + \alpha_g d^2\right\},\tag{3}$$

where the third term represents the cost of the government deficit collection or the political cost of increase of government debts. The budget constraint of the government is

$$g + \varphi\,(d - \overline{d}) = d + \tau,\tag{4}$$

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[7] See Jeanne (1997) as another example of the unemployment function, including the aggregate demand channel by the real interest rate. Also, Valila uses the output function including the effect of fiscal policy on the output.

where d denotes the deficit level, φ $(d - \overline{d})$ t—he penalty cost if the government exceeds the deficit level agreed by Treaty $\overline{d}$. This restraint represents the penalty under the Stability Pact. We assume $\overline{d} = 0$ for simplicity of calculation.

Here, we investigate the discretionary policy of monetary and fiscal policy. The timing of events is assumed to be as follows. The wage setters form rational expectations for inflation first. The actual value of the stochastic shocks υ and μ are known second, the government determines the fiscal policy (fiscal deficits) third, and the monetary policy is determined by the ECB last. The problem can be solved backwards. Given rational inflationary expectations along with equilibrium unemployment, the ECB minimizes Equation (2) with respect to inflation under the constraint of (1). At the same time, the government minimizes Equation (3) with respect to the deficits under the constraint of (1) and (4). These procedures are interpreted as non-cooperative behavior between the government and the ECB. The ECB is guaranteed by the Maastricht Treaty, which includes the political independence of the ECB from the political influence of each government as a provision. Therefore, their behavior is non-cooperative.

These minimizations yield the following actual values for the expected inflation rate, the actual inflation rate, the deficit, and the unemployment rate:

$$\pi^e = \frac{-D}{1+\Delta}\left(u^* - \overline{u}\right), \tag{5}$$

$$\pi = -J_2\left\{J_1\left(u^* - \overline{u}\right) + \mu\right\} + J_3\upsilon, \tag{6}$$

$$d = -J_4\left\{J_1\left(u^* - \overline{u}\right) + \mu\right\} + J_5\upsilon, \tag{7}$$

$$u = \left\{1 + \omega\left(1-\varphi\right)J_1 J_4 - \beta G\right\}u^* - \left\{\omega\left(1-\varphi\right)J_1 J_4 - \beta G\right\}\overline{u} \\ + \left\{\beta J_2 - \omega\left(1-\varphi\right)J_4 + 1\right\}\mu + \left\{1 - \beta J_3 - \omega\left(1-\varphi\right)J_5\right\}\upsilon, \tag{8}$$

where the various coefficients above are as follows;

$$J_1 \equiv \frac{\left(1+2\theta_u\beta^2\right)\alpha_g + \alpha_u\omega^2\left(1-\varphi\right)^2}{1+\Delta} > 0, \quad J_2 \equiv \frac{D}{\Delta} < 0, \quad J_3 \equiv \frac{E\,\theta_u\beta}{\Delta} > 0,$$

$$J_4 \equiv \frac{\omega\left(1-\varphi\right)F}{\Delta} < 0, \quad J_5 \equiv \frac{(1+\theta_u\beta)\left(1-\varphi\right)\alpha_u\omega}{\Delta} > 0,$$

$$\Delta \equiv \left(1+\theta_u\beta^2\right)\alpha_g + \alpha_u\omega^2\left(1-\varphi\right)^2 > 0, \quad D \equiv -\beta\alpha_g\theta_u < 0, \quad E = \alpha_g + \omega^2\alpha_u\left(1-\varphi\right)^2,$$

$$F \equiv \alpha_u\left\{\theta_u\beta(1-\beta)-1\right\} < 0, \quad G \equiv \frac{-D}{(1+\Delta)\Delta}\left(1-\beta^2\alpha_g\vartheta_u\right).$$

The coefficient of F is supposed to be negative because the ECB has a small weighting for the unemployment rate.

The usual inflation bias of discretionary monetary policy arises. Inflation increases with the equilibrium unemployment, that is, the inflation bias of the monetary policy arises, which increases with equilibrium unemployment as with the result of the Barro-Gordon Model.

The sensitivity of the equilibrium unemployment to expected and actual inflation depends on the preferences of the government and the ECB (α_u, α_g, θ_u), the effect of fiscal policy on unemployment (ω), and the effect of inflation on unemployment (β). If, for example, θ_u or the strictest target for the inflation of the ECB, is zero, the expected and actual inflation rates is also zero. This case is interpreted as the politically perfect independence of the ECB from the EU commission and from each government. The Maastricht Treaty decides on this guarantee for the ECB. However, the commission might affect the ECB in future, that is, θ_u rises, which causes inflation. The ECB carries out loose monetary policy for unemployment. If α_u increases, inflation also increases because the coefficient of asymmetry shock becomes larger. If the government raises the weight of unemployment, the expenditure grows, to raise inflation.

Table 1   The results of the parameters of preference to economic variables.

	π		d		u	
	μ	v	μ	v	μ	v
θ_u	+	+	?	?	−	?
α_u	+	+	?	?	?	−
α_g	−	−	?	?	+	+
φ	−	−	?	?	?	?

If, on the other hand, α_g increases, the government decreases the expenditure for the unemployment rate to increase, and also for the inflation rate to decline.

The government deficit also depends on the preference of the government and the ECB (α_u, α_g, θ_u), the effect of fiscal policy on unemployment (ω), and the effect of inflation on unemployment (β). In particular, ω crucially influences the fluctuation of the deficit. If, ω is positive, common shock increases the deficit through expanding the fiscal expenditure. If ω is negative, common shock decreases the deficit through contracting fiscal expenditures because fiscal expansion increases unemployment by raising the real interest rate[8]. Also as to country-specific shock, ω is an important factor. The deficit increases if ω is positive because fiscal expenditure decreases unemployment to improve the loss function. The deficit decreases if ω is negative because fiscal contraction decreases unemployment to improve the loss function.

On the other hand, the actual unemployment rate deviates from the equilibrium unemployment rate (structural unemployment rate) by that of common shock and / or country-specific shock, which are accommodated. Absorption of common shock by both policies depends on the sign and value of ω. If ω is positive, the shock is not absorbed perfectly to increase the influence. Also, absorption of country-specific shock by both policies depends on the sign and value of ω. If ω is negative, the shock is not absorbed perfectly, to increase the influence.

Next, the effect of the Stability Pact on inflation and unemployment

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[8]   This process is not described explicitly in our model. However, we test the coefficient in the previous section.

is considered as follows. In this paper, increase of φ represents the fiscal restraint, or the Stability Pact. If φ increases, the expected inflation declines under the condition that the inertia of unemployment is relatively strong, or $1 - \beta > 0$. If φ increases, the deviation of actual inflation by common shock (μ) becomes smaller under the condition that the inertia of the unemployment rate is relatively strong. Also, the deviation of actual inflation by country-specific shock (υ) becomes larger if φ increases. Because the Stability Pact imposes a restraint on fiscal policy as the shock absorber of the shock, unemployment worsens. Therefore, the ECB reacts to this unemployment situation through monetary policy if the ECB targets unemployment.

If φ increases in the same way, variation of the deficit by the positive common shock (μ) is ambiguous. The fiscal policy is so more restrained that the policy cannot absorb the shock, while contracted monetary policy is executed for the shock. This results in decrease of relative loss for the deficit in the object function, to increase the deficit. The restraint also induces the decrease of deficit.

Variation of the government deficit and inflation by country-specific shock (υ) becomes smaller by the increase of φ, because fiscal restraint imposes a discretionary response to υ, while the monetary policy is executed for the shock, to increase the deficit partially for the same reason mentioned above.

The effect of the Stability Pact on the unemployment rate is ambiguous. The increase of the penalty of the Stability Pact induces the lower amount of fiscal policy for both shocks. If the amount causes high unemployment, monetary policy is applied for partial compensation of the shocks. If the amount causes lower unemployment, monetary policy with a low inflation target is supported by the Stability Pact.

Restrictive demand management such as the Stability Pact is an important factor in stabilizing the macroeconomy. It is often motivated to bring down inflation, limit budget deficits, and support a fixed exchange rate, such as the ERM and the common currency policy, such as the EMU. The Stability Pact was introduced to sustain a common monetary policy in the EMU through restrictive demand management. If the country has a positive effect of the government deficit on the unemployment rate, the Stability Pact is consistent with

the employment situation.

4. Macroeconomic effects of the labor market reform in the EMU

Labor market institutions and other factors determine the high unemployment problems in Western Europe. It should be possible to reduce the high employment in Western Europe through labor market reform.

The difference in unemployment performance between the United States and Western Europe is further caused by the functioning of the labor market. Some researches focus on this problem. For example, some 40-50% of the unemployed in Western Europe have been unemployed for more than one year, while only about 10% in the United States have been unemployed for more than one year[9]. The outward outflow from the unemployment pool is smaller in Western Europe than in the United States. The reasons for this are as follows[10];

1) Labor market institutions
2) Government regulations
3) Various welfare-state arrangements

These result in high equilibrium unemployment, which is affected by exogenous factors, for example, labor market institutions and government regulation.

There is another problem regarding unemployment in Western Europe. Persistent unemployment in Western Europe is affected by endogenous variables, as explained below.

1) Rigid real and relative wages and labor turnover costs
2) Difficulty of job search, discouraged workers due to various benefit systems
3) Social norms

The extent to which labor market reform to reduce equilibrium

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[9] See OECD (1994).
[10] These are cited from Lindbeck (1996).

unemployment and the persistence of unemployment are undertaken concerns the political economy. Bean (1998) argues that reform is not acceptable until the escape route of depreciating the currency is definitely closed. Although monetary policy and labor market reforms are not a substitute, the incentive for reform will be stronger. Calmfors (1998) and Siebert and Sutherland (1997) have developed analysis based on the Barro-Gordon model under discretionary monetary policy. Labor reforms will be promoted because monetary policy is no longer the measure of stabilization for country-specific shocks. Indeed, there is another measure, fiscal policy stabilizing the shocks. However, the effect of fiscal policy is limited by the Stability Pact , as mentioned above. Policymakers will consider labor market reform as a stabilization measure for specific shocks.

If a member state in the EMU faces country-specific or EMU-wide common shocks, the government has an incentive to reform the labor market, for example, by reducing unemployment benefits, or barriers for the unemployed to enter the labor market.

This section expands the model in the previous section to investigate the effect of labor reform on inflation and unemployment. Equilibrium unemployment is assumed to depend negatively on the amount of reform, so that

$$u^* = \tilde{u} - \phi r, \tag{9}$$

where $\tilde{u}$ denotes the equilibrium unemployment rate in the absence of reform, r the amount of labor reform. Furthermore, $u^* > \tilde{u}$ is assumed. The labor market reforms include a reduction of the wage rigidities, an increase in flexibility in the labor market, furthermore, a reduction of unemployment benefits and deregulation of labor markets. As a result of the labor market reform, the unemployment rate is assumed to decrease because greater flexibility in the labor market induces new employees to enter the labor market more easily.

The government determines the amount of labor reform by minimization of the following loss function before wage setters form the expectation for inflation.

$$L^g = \frac{1}{2}\left\{\pi^2 + \theta_u\left(u - \overline{u}\right)^2 + \theta_g d^2 + cr^2\right\},$$ (10)

where the first, second and third terms is the same as in the previous loss function of the government, Equation (3). The fourth term represents the cost of labor market reform. In general, labor market reform is costly because there is political conflict between the government and employees who have vested interests. For example, the introduction of market flexibility by the government infringes the vested interest of employees who have entered the labor market. Therefore, they object to this policy politically. The coefficient c represents this situation.

First, the government determines the amounts of labor market reforms. Second, wage setters form the expectation of inflation. Third, a country-specific shock and/or a common shock are recognized by the authorities. Next, the government determines the fiscal policy to stabilize common and specific shocks, and the ECB determines the monetary policy to stabilize the common shock simultaneously.

Minimization of (10) subject to (1), (4) and (9) by the government, and minimization of (2) subject to (1) and (9) by the ECB yield the following equilibrium amount of labor reform,

$$r = \lambda_1\left(\widetilde{u} - \overline{u}\right) + \lambda_2\mu + \lambda_3\upsilon,$$ (11)

where the coefficients are denoted as follows;

$$\lambda_1 \equiv \frac{J_1^2\left(J_2 + \phi\alpha_g J_4^2\right) + \alpha_u K_1^2}{\phi\left(J_1^2\left(J_2 + \phi\alpha_g J_4^2\right) + \alpha_u K_1^2\right) + c}, \quad \lambda_2 \equiv \frac{J_1\left(J_2 + \alpha_g J_4^2\right) + \alpha_u K_1 K_2}{\phi\left(J_1^2\left(J_2 + \phi\alpha_g J_4^2\right) + \alpha_u K_1^2\right) + c},$$

$$\lambda_3 \equiv \frac{-J_1\left(J_3 + \alpha_g J_4 J_5\right) + \alpha_u K_1 K_3}{\phi\left(J_1^2\left(J_2 + \phi\alpha_g J_4^2\right) + \alpha_u K_1^2\right) + c}.$$

$$K_1 \equiv 1 - \beta G + \omega(1-\varphi)J_1, \; K_2 \equiv J_1 + \omega(1-\varphi)J_4, \; K_3 \equiv 1 - \frac{\theta_u \beta^2 E}{\Delta} - \omega(1-\varphi)J_5.$$

The amount of reform is chosen so that the sum of the gain from lower unemployment (the first term in (11)), of the gain from reduction of the variation in unemployment by the common shock (the second term) and by the country-specific shock (the third term) are maximized. The more the amount of labor reform increase, the more the unemployment rate declines. Because the labor reforms are supposed to improve structural unemployment in the EMU, the actual unemployment rates decline.

The inflation rate and the unemployment rate are also decided as follows;

$$\pi = J_1 J_2 (\phi\lambda_1 - 1)(\tilde{u} - \bar{u}) + J_2(J_1\phi\lambda_2 - 1)\mu + (J_1 J_2\phi\lambda_3 + J_3)\upsilon, \qquad (12)$$

$$u = J_1 J_4 (\phi\lambda_1 - 1)(\tilde{u} - \bar{u}) + J_4(J_1\phi\lambda_2 - 1)\mu + (J_1 J_4\phi\lambda_3 + J_5)\upsilon, \qquad (13)$$

When the coefficient of Equation (12) is compared with that of (6) as to common shock μ, the absolute value of the coefficient of Equation (12) is lower than that of (6). This means labor market reforms contribute to lower inflation by common shock if the sign of D is negative, that is, J_2 is negative. The negative D means that the effect of fiscal policy on the unemployment rate is smaller. If D _is positive, that is, the effect of fiscal policy is larger, the influence of the shock on inflation is negative. The labor reforms increase the inflation. Therefore, the reforms contribute to minimizing the variance of inflation caused by a common shock. In the same way, the absolute value of the coefficient of the country-specific shock in (12) is lower than that of (6). This means labor market reforms contribute to minimizing the variance of inflation caused by country-specific shock.

The absolute value of the coefficient of Equation (13) is lower than that of (7). This means that labor market reforms contribute to lower government deficit caused by common shock. The reforms contribute

to minimizing the variance of deficit caused by a common shock. Also, the absolute value of the coefficient of the country-specific shock in (12) is lower than that of (6). This that means labor market reforms contribute to minimizing the variance of deficit caused by country-specific shock.

The above-mentioned findings suggest that the labor reforms are effective measures for sustaining inflation and government deficit in member's states. Decline of structural (or equilibrium) unemployment caused by the labor reforms lightens the burden imposed on the monetary and fiscal policy, to improve unemployment, inflation and the government deficit.

5. Conclusion

This paper examines the monetary policy of the ECB and fiscal constraint under the EMU. If the countries participating in the EMU do not constitute an optimal currency area, macroeconomic performance in the EMU would be seriously affected by symmetric and asymmetric shocks. Also, the European countries have serious unemployment problems induced by labor market institutions and unemployment benefits, etc. Therefore, the authorities pursue economic stabilization EMU wide and in each country through economic policies. The monetary policy of the ECB is implemented through minimizing the loss function including just symmetric shock. The fiscal policy of the government is implemented through minimizing the loss function including both asymmetric and symmetric shocks. This paper investigates the effect of the policy on inflation and the unemployment rate, which depends on surprise inflation and fiscal policy. Both monetary policy and fiscal policy can absorb shocks to stabilize the economy.

In fact, fiscal restraint or the Stability Pact is introduced in the EMU, which is effective against inflation and fiscal deficits. However, the stabilization effects of the fiscal policy are decreased, which results in the fiscal policy absorbing little shocks. If rigid constraint is practiced, economies in the EMU might become unstable.

In order to support fiscal restraint, labor market reforms are effective against the shocks. This paper also suggests that labor

reform is needed on the decline of the structural unemployment problems, to decrease inflation and government deficits. The reforms are difficult to achieve in Europe because political pressures and conflicts can occur in any country. However, labor market problems are key factors in achieving successful monetary union.

Appendix 1

We obtain the signs of the effects of the changes of preferences to each coefficient in S0ection 3 as follows.

$$\frac{\partial J_1}{\partial \theta_u} = \alpha_g \beta^2 \left\{ 2 + 2\alpha_g + \alpha_u \omega^2 \left(1 - \varphi^2\right) \right\} > 0, \quad \frac{\partial J_2}{\partial \theta_u} = -\alpha_g \beta \left\{ \alpha_g + \alpha_u \omega^2 \left(1 - \varphi^2\right) \right\} < 0,$$

$$\frac{\partial J_3}{\partial \theta_u} = \alpha_u \beta \omega \left(1 - \varphi\right)^2 \left\{ \alpha_g + \alpha_u \omega^2 \left(1 - \varphi^2\right) \right\}, \quad \frac{\partial J_4}{\partial \theta_u} = \alpha_u \beta \omega \left(1 - \varphi\right) \left\{ \alpha_g + \alpha_u \omega^2 \left(1 - \varphi^2\right) \right\},$$

$$\frac{\partial J_5}{\partial \theta_u} = \alpha_u \beta \omega \left(1 - \varphi\right) \left\{ \left(1 - \beta\right)\alpha_g + \alpha_u \omega^2 \left(1 - \varphi^2\right) \right\}, \quad \frac{\partial J_1}{\partial \alpha_u} = \omega^2 \left(1 - \varphi\right)^2 \left(1 - \theta_u \beta\right),$$

$$\frac{\partial J_2}{\partial \alpha_u} = \beta \alpha_g \theta_u \omega^2 \left(1 - \varphi\right)^2 > 0, \quad \frac{\partial J_3}{\partial \alpha_u} = \omega^2 \left(1 - \varphi\right)^2 \theta_u \beta \alpha_g \left(1 + \theta_u \beta^2\right) > 0,$$

$$\frac{\partial J_4}{\partial \alpha_u} = \alpha_g \omega \left(1 - \varphi\right) \left\{ \theta_u \beta \left(1 - \beta\right) - 1 \right\} \left(1 + \theta_u \beta^2\right), \quad \frac{\partial J_5}{\partial \alpha_u} = \alpha_g \omega \left(1 - \varphi\right) \left(1 + \theta_u \beta\right) \left(1 + \theta_u \beta^2\right),$$

$$\frac{\partial J_1}{\partial \alpha_g} = -\left(1 + \theta_u \beta^2\right) \left\{ \left(1 + 2\theta_u \beta^2\right) \alpha_g + \alpha_u \omega^2 \left(1 - \varphi\right)^2 \right\} < 0,$$

$$\frac{\partial J_2}{\partial \alpha_g} = -\theta_u \beta \alpha_u \omega^2 \left(1 - \varphi\right)^2 < 0, \quad \frac{\partial J_3}{\partial \alpha_g} = -E\theta_u \beta \left(1 + \theta_u \beta^2\right) < 0,$$

$$\frac{\partial J_4}{\partial \alpha_g} = -\omega \left(1 - \varphi\right) F \left(1 + \theta_u \beta^2\right), \quad \frac{\partial J_5}{\partial \alpha_g} = -\omega \alpha_u \left(1 - \varphi\right) \left(1 + \theta_u \beta^2\right) \left(1 + \theta_u \beta\right).$$

$$\frac{\partial J_1}{\partial \varphi} = 2\alpha_u \omega^2 \theta_u \beta^2 \alpha_g \left(1-\varphi\right) > 0 , \quad \frac{\partial J_2}{\partial \varphi} = -D2\alpha_u \omega^2 \left(1-\varphi\right) > 0 ,$$

$$\frac{\partial J_3}{\partial \varphi} = -2\alpha_u \omega^2 \theta_u \beta \alpha_g \left(1-\varphi\right)\left(E+\Delta\right) < 0 , \quad \frac{\partial J_4}{\partial \varphi} = \omega F\left\{\alpha_u \omega^2 \left(1-\varphi\right)^2 - \left(1+\theta_u \beta^2\right)\alpha_g\right\},$$

$$\frac{\partial J_5}{\partial \varphi} = \alpha_u \omega\left(1+\theta_u \beta\right)\left\{\alpha_u \omega^2 \left(1-\varphi\right)^2 - \left(1+\theta_u \beta^2\right)\alpha_g\right\}.$$

Appendix 2 Estimation results of the effects of the deficits on unemployment rates and inflation

Table A1 Estimation results of unemployment rates in the EMU

Variable	Germany Coefficient	t-Statistic	France Coefficient	t-Statistic	Italy Coefficient	t-Statistic	Belgium Coefficient	t-Statistic
C	-2.420946	-1.235775	3.258992	2.253525	9.503448	2.315325	2.195224	0.999541
(unemployment rates)$_{-1}$	1.249118	5.179922	0.609015	3.999552	0.27833	0.871992	0.829763	5.277246
(inflation rates)$_{-1}$	-0.016528	-0.091953	-0.150684	-0.778861	0.008153	0.043179	0.029486	0.174506
(fiscal surplus)$_{-1}$	-0.340052	-2.589606	-0.413654	-2.492838	0.128168	1.177217	0.023467	0.219266
Adjusted R-squared	0.748683		0.736763		0.011736		0.671089	
Durbin-Watson stat	1.891112		2.113744		1.768278		0.573053	

Variable	Ireland Coefficient	t-Statistic	Netherlands Coefficient	t-Statistic	Portugal Coefficient	t-Statistic	Spain Coefficient	t-Statistic
C	7.797214	1.695849	2.522712	1.543117	0.179698	0.136855	7.372915	1.723079
(unemployment rates)$_{-1}$	0.50136	1.855054	0.779902	4.340819	0.836589	5.291396	0.641621	3.274984
(inflation rates)$_{-1}$	0.029741	0.077857	-0.279804	-0.558526	-0.037952	-0.299572	-0.309269	-0.538784
(fiscal surplus)$_{-1}$	-0.197805	-1.615299	0.306673	0.915196	-0.187028	-1.338199	0.000411	0.001032
Adjusted R-squared	0.380268		0.771694		0.707756		0.433728	
Durbin-Watson stat	2.704555		1.582063		1.238815		0.806553	

Variable	United Kingdom Coefficient	t-Statistic	Finland Coefficient	t-Statistic
C	5.305909	1.758371	6.196893	1.4842
(unemployment rates)$_{-1}$	0.237489	0.584246	0.4771	1.346434
(inflation rates)$_{-1}$	-0.401258	-1.334697	-1.421629	-2.052021
(fiscal surplus)$_{-1}$	-0.163808	-0.424372	-1.024362	-1.135349
Adjusted R-squared	0.209959		0.862343	
Durbin-Watson stat	1.092995		0.521882	

Notes) 1. Unemployment rates are from Eurostat, OECD Main Economic Indicators, inflation rates from IMF IFS, and structural fiscal balances from OECD Economic Outlook.
2. The estimation period is from 1983 to 1998, excluding the United Kingdom from 1988 to 1998.

We estimated the effects of the government deficits on unemployment rates in countries in EU using a simple structural model. Fiscal policy shifts the aggregate demand curve to decrease unemployment rates, but the policy increases the rates of interest to decrease the aggregate demand. We measure the change of stance of the fiscal policy as budget surplus, which is equal to the change of government debts. The estimation period is from the 1983 to 1997 for the ten countries (Germany, France, Italy, Belgium, Ireland, Netherlands, Portugal, Spain, United Kingdom, and Finland) in the EMU.

Allowing for some inertia in both relationships with one period lag[11], we obtain the reduced form for unemployment rates as shown in Table 1. In all countries, the coefficients of inertia of lagged unemployment are significant, which shows the strong inertia effect in EU countries. It is caused by the characteristics of labor markets in Western Europe, i.e. the wage rigidity, unemployment benefits, etc.

The effects of inflation on unemployment are negative excluding the case of Belgium, Italy and Ireland. In particular, the coefficient of Italy is significantly positive. The case of a negative coefficient means that declines of inflation cause an decrease of unemployment. The case of a positive coefficient means declines of inflation cause a decrease of unemployment. The former is consistent with the standard Phillips curves.

The coefficient on the fiscal surplus shows the impacts of the budget on the unemployment in each country. The effects of fiscal stance in each country are various. The signs of unemployment in Italy, Belgium, Netherlands and Spain are positive, but no country has a significant coefficient The signs of Germany, France, Ireland, Portugal, and the United Kingdom, Finland are negative. In particular, the coefficients of Germany and France are significant due to the probability of 10% .

From these results, both positive and negative signs of fiscal surplus to unemployment rate are possible although the coefficients might be insignificant. The signs are not determined ad hoc. Below,

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[11] Determination of lag is based on Akaike criteria. Some countries are not suitable for the two period lag, but we applied two period lag to all countries finally.

we analyze the theoretical examination of monetary policy and fiscal policy in order to obtain more general insights into the policy effects, supposing the unemployment function with these results of the effects of fiscal surplus on unemployment rates.

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