The Stability of a Regionally Fixed Exchange Rate System:
Can Euro be Sustained by Austere Fiscal Discipline?

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Abstract

This article considers under what conditions a regionally fixed exchange rate system without a huge economy is sustainable. The euro area is a typical example. In general, the euro area tends to be regarded as a currency area. However, the political power of the European Central Bank (ECB) is not strong enough to directly control the fiscal-monetary policy of each affiliate country. That is, the unification of central banks within the area is not complete, and euro is not a currency area in the sense of Mundell (1961). It should be regarded as a regional fixed exchange rate system. Based on Otaki (2012-a), we construct an open economy Keynesian model under a fixed exchange rate system with a dynamic neoclassical microeconomic foundation.

We obtained the following results. First, whenever a government's tax-levying ability is limited, austere fiscal policies are required to sustain the system. Second, the low tax-levying ability has a negative effect on the economic welfare of that country because such fragility limits its discretionary monetary policy.

Keywords: Dynamic Microeconomic Theory of Fixed Exchange Rate System, Euro as a Regional Fixed Exchange Rate System without Exceptionally Economic Power, Consequences of Austere Fiscal and Monetary Policies

JEL Classifications: F32, F33, F34, E24

1. Introduction

In this article, we consider whether a regional fixed exchange rate regime is a sustainable system. This is not a trivial issue. The Bretton-Woods system, characterized by a world-wide fixed exchange rate, rested on the overwhelming industrial and financial power of the U.S. Otaki (2012-b). Various sovereign risks that each country faces are implicitly covered by the key-currency country (i.e., the U.S.).

However, euro includes no such exceptional country and the fixed exchange regime is limited to a certain number of countries in the region. Therefore, we may regard euro as a regional fixed exchange rate system characterized by a nominal exchange rate that is fixed to unity with exchange rate adjustment prohibited.

Although euro seems to be a unified currency area, there is no such powerful entity in reality. According to Mundell (1961), a currency area is identified with the unification of the all central banks in the area. However, the power of the European Central Bank (ECB) is rather restricted, and each affiliate country retains substantial discretionary power over fiscal and monetary policy ··· a situation that triggered the current Euro crisis. Thus, the question of how viable euro is as a regional fixed exchange rate system rather than a unified currency area is a potential topic for analysis.

With the adoption of a regional fixed exchange rate system, imbalances in the fiscal and current account become crucial problems in two senses. First, every country without a strong tax-levying ability that seeks a full-employment equilibrium tends to lose her fiscal discipline and fall into unilateral default. Such current account deficits are threat to her solvency, and she experiences much difficulty in sustaining the fixed exchange rate system.

Second, the viability of a regional fixed exchange rate system as a whole faces a threat when more countries are forced into a such one-sided debt default. That is, as the problem of current account imbalances spread, every affiliate country (including creditor countries) faces serious conflicts of interest. Such conflicts raise questions about the viability of the system as a whole, specifically because current account adjustments by a change in the nominal exchange rate are per se infeasible.

Accordingly, some austere policies are inevitable for one-sided debtor countries. However, the problem is how to harmonize such policies with the domestic equilibrium. We face the problem of how to sustain a high-employment equilibrium in each debtor country under austere policies.

Applying Otaki (2007, 2009) to this problem, we note that austere fiscal and current account policies are compatible with a high-employment equilibrium within every domestic economy. The reason is that a sufficiently higher tax levies with the

implementation of austere policies, restores the maneuverability required for a discretionary monetary policy. If austere policies lead to sufficiently high tax revenue to compensate for the fiscal and current account deficits, the central bank in a one-sided debtor country can increase the money supply, leading to a higher employment level than in a liberal policy regime. Austere policies requiring a balanced budget increases s economic welfare in every one-sided debtor country with a time lag between the imposition of fiscal discipline and implementation of   a discretionary monetary policy,.

This article is organized as follows. In Section 2, we construct a microeconomic and monetary model that describes a regionally fixed exchange rate system in which the adjustment by the nominal exchange rate is prohibited. We deal with the normative implications of austere policies required of one-sided debtor countries in Section 3. Section 4 contains some brief concluding remarks.

2. The Model

2.1 Structure of the Model

We use the two-period overlapping generations model with money developed by Lucas(1972) and Otaki (2007). A small country joins a regional fixed exchange rate regime in which the nominal exchange rate is fixed at unity. The country is small enough not to affect the aggregate demand and supply of the alliance as a whole. There are differentiated goods $[0,1]$ in this region. The country specializes in producing the spectrum of goods $[0,\alpha]$. The only production resource required is labor, the productivity of which is assumed at unity.

Without a constraint on her fiscal discipline, this small country is tempted to use an unlimited amount of the common currency to acquire other countries' goods. Therefore, the regional fixed exchange rate alliance must impose fiscal discipline of each allied country in advance.

Such an alliance can be described by the following two-stage game. In the first stage, each affiliate country determines the volume of tax collected to maintaining the alliance. In the second stage, each country supplies the common currency to the domestic economy to maximize her economic welfare under the fiscal constraint incurred by the first-stage game.

The order of the game is crucial. A commitment to levying proper tax is paramount importance. The discussion will be clear if we consider the converse case.   Currency supply is determined first, followed by tax collection. In such a structure, a kind of the *hold-up problem* is invoked. Incentivized by unlimited currency supply, all affiliates increase consumption, and go bankrupt. Since all candidates weave this tragic

consequence into the decision on whether to participate in the system, such an alliance is never constituted. Even if it is realized, once the fiscal discipline of each affiliate is softened, the alliance will immediately dissolve. Therefore, austere policies for one-sided debtor countries are desirable for the maintenance a regional fixed exchange rate system without any exchange rate realignment.

2.2 The Mathematical Model

2.2.1 Optimization of Individuals

All individuals have the same lifetime utility function as

$$U(c_{1t}, c_{2t+1}) \equiv [c_{1t}]^c [c_{2t+1}]^{1-c} - \chi_t \beta, c_{it} \equiv \left[\int_0^1 [c_{it}(z)]^{1-\eta^{-1}} dz \right]^{\frac{1}{1-\eta^{-1}}},$$

$$0 < c < 1, \eta > 1,$$

where c_{it} denotes the aggregate consumption of individuals in the i-th stage of life during period t. $c_{it}(z)$ is the consumption of good z of the same individual. χ_t is a definition function the value set to unity when he is employed and zero other wise. β is the disutility of labor.

The aggregate demand function for good z is

$$c_t(z) \equiv \left[\frac{p_t(z)}{P_t} \right]^{-\eta} \frac{Y_t}{P_t}, P_t \equiv \left[\int_0^1 [p_t(z)]^{1-\eta} dz \right]^{\frac{1}{1-\eta}}, (1)$$

where Y_t is the nominal effective demand during period t. Aggregating these functions over z, we obtain the lifetime budget constraint as

$$Y_t = \sum_{i,t} \int_0^1 p_t(z) c_{it}(z) dz = P_t c_{it} + P_{t+1} c_{it+1}.$$

Maximizing the lifetime utility function U with respect to (c_{it}, c_{it+1}), we obtain the following aggregate consumption function of the young generation as

$$c_t = c y_t, \quad (2)$$

where $y_t \equiv \frac{Y_t}{P_t}$ is the real disposable income in terms of the current goods.

Since the lifetime indirect utility derived from consumption h is expressed as

$$h = \frac{A Y_t}{P_t^c P_{t+1}^{1-c}}, A \equiv c^c [1-c]^{1-c},$$

the nominal reservation wage W_t^R becomes

$$W_t^R = A^{-1} \beta P_t^c P_{t+1}^{1-c}. \quad (3)$$

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2.2.2　Optimization of firms

A firm maximizes its profit　$\Pi_t(z)$ on $p_t(z)$. We assume that the labor market equilibrium is interior and some individuals are unemployed; hence the nominal equilibrium wage is equal to the nominal reservation wage　W_t^R.

That is,

$$\max_{p_t(z)} [p_t(z) - W_t^R] c_{it}(z).$$

Taking Equations (1) and (3) into consideration, we get the optimal pricing rule:

$$p_t(z) = \frac{A^{-1} \beta P_t^c P_{t+1}^{1-c}}{1 - \eta^{-1}}. \qquad (4)$$

We must note that Equation (4) represents that the nominal money supply does not affect the price level since the nominal stock of money does not appear in the equation. It also implies that money is non-neutral in our model.

Aggregating Equation (4) over z, we obtain the equilibrium inflation rate　ρ as

$$\rho = [A\beta^{-1}[1 - \eta^{-1}]]^{\frac{1}{1-c}}. \qquad (5)$$

Thus, all countries within the alliance experience the same equilibrium inflation rate.

2.2.3　Government Role

The government has two roles. First, it collects taxes and exports them in exchange for the privilege of issuing the common currency. Second, it actually issues the currency to the domestic economy under the predetermined fiscal constraint in the first stage. The seigniorage obtained is assumed to be issued to individuals via wasteful government expenditure.　Such activities are described by the following equations.

$$T = E, E = M, \qquad (6)$$

where　E　and　M denote the real export and import, respectively.[1] The second equality expresses the fiscal discipline from the regional fixed rate alliance. That is, to maintain the alliance, the inflow and outflow of the common currency should be equalized.

2.2.4　Market Equilibrium

There are two kinds of market: the aggregated goods market and labor market. The labor market is in an interior equilibrium (imperfect-employment equilibrium) when the nominal equilibrium wage is equal to the nominal reservation wage as

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[1] For simplicity, we consider that private sector exports without corresponding taxation. However, it is not difficult to introduce taxation, and our assumption does not lose the essence of the theory with this additional factor.

aforementioned. Using Equation (6), the equilibrium conditions for the aggregate goods market can be written as

$$y = c[y-T] + m + T - [1-\alpha]\big[c[y-T]+m\big] \Rightarrow y = T + \frac{\alpha m}{1-c\alpha}, (7)$$

$$B \equiv T - [1-\alpha]\big[c[y-T]+m\big] = T - \frac{1-\alpha}{1-c\alpha}m = 0, (8)$$

where B is the real current account surplus and m the real money supply.

Equation (7) represents the equilibrium condition for the aggregate goods market. The first term is the total consumption of the young generation. The second term corresponds to the sum of the old generation's total consumption and government expenditure financed by seigniorage. The third term is the export (equivalently collected tax). The final term is the aggregate import. It consists of the young generation's import $[1-\alpha]c[y-T]$ and the old generation's import $[1-\alpha]m$.

Equation (8) depicts the fiscal discipline imposed. To avoid a current account imbalance, the policy variables (T,m) are constrained by the equation.

By these equations, the real GDP y and the tax levied T or the real money supply m is determined. These two equations describe the regional fixed exchange rate system excluding the possibility of the nominal exchange rate realignment as a whole.

2.3 Comparative Statics for Austere Policies

Eliminating m from Equation (7) by using Equation (8), we obtain

$$y - T = \frac{\alpha T}{1-\alpha}. \qquad (9)$$

Equation (9) has an important policy implication. Strengthening the austere policy (i.e., increasing tax) raises the disposable income $y-T$, although it seems counterintuitive.

Such a consequence comes from the fact that the austere policy allows abundant liquidity supply for the domestic economy. As indicated in Equation (8), under the constraint of a current account equilibrium, the government's superior tax-collection ability ensures a sufficient real money supply m. Since the old generation's propensity of expenditure as regarads domestic goods is α and the corresponding multiplier is $\frac{\alpha}{1-\alpha}$ and the tax/export does not increase the real disposable income $y-T$ (note that a balanced-budget multiplier is unity), only an increase in money supply can upturn the domestic economy. An austere policy is required for this purpose.

3. Welfare Implications of Austere Policies

From the indirect lifetime utility function h, the social economic welfare h^* can be written

$$h^* = \frac{\pi - T}{\rho^{1-c}},$$

where π is the real profit in terms of current goods. By Equations (1) and (4), we obtain

$$h^* = \frac{\eta^{-1} y - T}{\rho^{1-c}} \qquad (10)$$

By Equations (9) and (10), as long as goods are sufficiently differentiated and η takes a lower value, social economic welfare is an increasing function of T. Thus, as the real currency supply, which is regulated by the austere policy, becomes abundant, the economy can attain higher efficiency.

4. Concluding Remarks

We have discussed the general properties of a regional fixed exchange alliance without nominal exchange rate realignment. The results obtained are as follows.

First, austere policies for a one-sided debtor country such as the requirement of balanced current account can upturn the economy with time lag between the additional tax imposition and easing of the monetary policy can be neglect. In other words, austere policies can restore the strength of the alliance and allow for the establishment of a discretionary monetary policy for the one-sided debtor country, at least in the long run.

However, we must note that the order of the *game* is crucial. Committing fiscal discipline should have the first priority. Whenever an easy monetary policy prevails, a hold-up problem is invoked and the alliance never becomes sustainable.

Second, austere policies improve economic welfare and upturn the business of the economy. The reason is that monetary expansion becomes feasible with the establishment of fiscal discipline. This expansion upturns the economy via the multiplier process. This increases the social surplus (earnings), and improves social welfare.

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