«ΣΠΟΥΔΑΙ», Τόμος 58, Τεύχος 1ο-2ο, (2008) / «SPOUDAI», Vol. 58, No 1-2, (2008), University of Piraeus pp. 115-147

INTERDEPENDENCE BETWEEN U.S. AND EU GOODS, MONEY, AND FOREIGN MARKETS AND SPILLOVER EFFECTS

By

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«πάντα εύσχημόνως καὶ κατά τάξιν γινέσθω»
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Abstract*

The paper examines the interdependence in three different markets (goods, money, and foreign sectors) between the U.S. and the EU. A theoretical open economy macroeconomic model is used for the analysis and tested with data from the two entities. The results show that there is a tremendous economic interdependence between the U.S. and the EU, but the social and political influences from the U.S. overshadow the economic ones. Both entities face serious problems, like deficits and unemployment and at the same time loss of competitiveness and heterogeneity in their own countries. The current trend of inconsiderate integration and internationalization will hurt the citizens in Europe, first, and in America soon. JEL Classifications: C13, C22, C53, F41, F42.

Keywords: Estimation, Time-Series Models, Forecasting and Other Model Applications, Open Economy Macroeconomics, International Policy Coordination

1. Introduction

The objective of this analysis is to determine how changes in foreign income, consumption, exports, TOT, government spending, saving, and other macro-variables affect domestic equilibrium. In an (culturally, politically, socially, and economically) interdependent world, as it is the U.S. and the EU societies and economies, disturbances affecting income in one country can have significant

* A version of this paper has been presented at the International Symposium on Economic Theory, Policy and Applications of the Athens Institute for Education in Athens, Greece, August 21-23, 2006 and we would like to thank the participants for their comments. Also, we would like to acknowledge the help provided by our research assistants Keith Brady and Arati Gandhi. Financial support (travel expenses) from Henry George Research Funds (Robert Schalkenbach Foundation) is gratefully acknowledged, too. The usual disclaimer applies.

effects on other countries (EU). An economy can be subject to major dislocations associated with economic events abroad.[1] For instance, by reducing EU demand for U.S. goods, hence reduction in U.S. exports, due to a recession and unemployment abroad, can spillover or be transmitted into recession and unemployment in the U.S. economy, as Rivera-Batiz and Rivera-Batiz (1985), Dornbusch (1980), and Kallianiotis (1998) say, too.

Spillover effects point to the global nature of income determination in an interdependence world and especially today with the internationalization of our economies. Suppose a monetary or fiscal expansion results in a U.S. boom. As income grows, U.S. imports will swell because some of the additional spending falls into purchases of foreign goods and services. Since higher domestic imports correspond to an increase in European exports to the U.S., the U.S. income expansion generates an export-led production and income expansion abroad (based on the income elasticities of demand for imports and supply of exports). In other words, the U.S. boom is transmitted to Europe as Americans spend more on European goods.

On the other hand, an induced expansion of European income can be expected to increase European spending on U.S. goods (income effect), feeding back into the U.S. economy in the form of increased exports to Europe and therefore increased U.S. production and income. The process involves a repercussion effect of the initial U.S. autonomous spending expansion on the U.S. economy. This repercussion effect is positive in the sense that it serves to further expand U.S. income. In interdependent economies, foreign income and employment can be affected by domestic disturbances.

Policy-makers of a country must concentrate in the national economy (the social welfare of their citizens) by taking into consideration the exogenous events, like changes in oil prices, world interest rates, imported inflation, imported unemployment, payment crises, debts obligation, foreign unfair competition, etc. In a domestic decision-making process, the international repercussions of national decisions should not be neglected.[2] Co-ordination policies are necessary among all economies and countries must match domestic and foreign instruments and objectives through co-operation for the benefits of their nations and citizens.

The literature in this area is vast and we try to give some of its recent selections. Berk and Bikker (1995) introduce new leading indicators to forecast the business cycle in manufacturing for 15 industrialized countries and are examining the degree to which this interdependence is affected by growing economic integration, as in the EC. Jones (1995) develops a framework for the analysis of issues and problems rooted in an international setting. Kenen (1995) in a

collection of articles on different open economy macroeconomic topics gives an excellent understanding of interdependence and on unresolved issues in international macroeconomics. Ventura (1997) presents the postwar international growth experience. Sutherland (1999) examines the fundamental contradiction between free trade and national sovereignty with the increasing interdependence among nations. Peretto (1999) studies the joint determination of the interdependence of market structure and growth in our oligopolistic economies.

Further, Dibooglu (2000) investigates the relationship between international monetary regimes and incidence and transmission of macroeconomic shocks within the context of an open-economy macro model. Kallianiotis (2001) uses a Kalman Filtering (dynamic) method to test the interdependence of the country-members of the EU and measures the degree of integration in goods, money, and capital markets. Corsetti and Pesenti (2001) develop a baseline model of monetary and fiscal transmission in interdependent economies. Streeten (2001) argues that today's world is in many ways fragmented and without coordination. Rhoads (2002) gives the opinions of two economists (Rogoff's and Stiglitz's) for the global economy. Andersen and Beier (2003) document substantial persistence in the adjustment process to nominal shocks in existing open-economy models. Pesaran, Schuerman, and Weiner (2004) build a compact global model capable of generating forecasts for a core set of macroeconomic factors (variables) across a number of countries.

Recently, Onishi (2005) has developed a global modeling system as a scientific policy simulation tool of providing global information to the human society and finding out possibilities of policy coordination among countries in order to achieve sustainable development of the global economy. Bezmen and Selover (2005) investigate business cycle synchronization and transmission patterns of economic interdependence in Latin American countries. Ehrmann and Fratzscher (2005) found a strongly increased interdependence of money markets around EMU and that spillover effects from the U.S. to the euro area remain strong. Baele (2005) investigates integration and its effect on equity market interdependence and spillover effects from the aggregate EU and U.S. Pavia, Cabrer, and Vila (2006) analyze how trade transmits economic events from one economy to another. Field (2006) presents the virtues of interdependence and the difficulties that integrated economies cause to politicians to understand the global growing complexity.

This current theoretical, descriptive, and empirical analysis presents a two-country (the U.S.A. and the EU), multi-equation static open economy macroeconomic model.[3] It studies the alternative point-in-time or monetary equilibrium values for a set of seven endogenous variables for each country associated with alternative possible settings for the four exogenous ones at

the particular point in time under consideration. The distinguishing feature of the static analysis is that it is capable of determining alternative values of the endogenous variables, taking as given only the values of the exogenous variables at that point in time, which may include values of endogenous and exogenous variables that were determined in the past and are thus given or predetermined at the present moment.[Sargent (1979, pp. 1-5)]. The model is in static equilibrium at a particular moment, if the endogenous variables assume values, which assure that the structural equations are all satisfied. Here, the analysis is done to determine only the degree of interdependence between the two "countries". [Pindyck and Rubinfeld (1981, pp. 319-352)].

We try to be very careful with the assumptions, which are used, here. The most of the models today are using heroic assumptions, so their results are unrealistic and untrue. Individuals gather and process, as many as they can, from the available information, but this information is not complete and, of course, is not correct. Thus, people cannot have rational expectations, due to inferior information (misinformation). Also, the formation of our expectations is wrong not only due to incomplete information, but because our reasoning is incorrect.[4] The human reason can be correct only when we will reach perfection (complete knowledge); until that time, it would be much better, if we will not use at all our "rational expectations" to affect the world (the lives of our fellow citizens, for whom we are responsible as social scientists) and forecast its future.

A two-country,[5] six-equation static model (for the goods, money markets, and the foreign sectors) is used, here, to provide a representation of the real economic sector between USA and EU.[6] Variables can interact with each other across equations and through time so the model can describe and explain the behavior of these economies. The variables determined by the model (endogenous) are: Y, E, P, X, S, C, and I; while the variables given from outside (exogenous) are: G, T, M, i and lag values of the endogenous variables for each country. We assume that future expectations are not known and that people have not perfect foresight. Also, we assume imperfect capital mobility with dirty floating exchange rates,[7] gradual adjustment of prices, and sluggish output response to fiscal and monetary shocks.

The paper is divided in five sections. The first one gives the introduction and the review of the literature. Section II lays out the theoretical model of interdependence between the two entities. Section III deals with the data, their testing for stationarity, and gives the empirical results of the macroeconomic model. Next section states some social and policy implications of this huge interdependence. The last section gives a few concluding remarks from the current analysis and the daily observations.

2. An Open Economy Macroeconomic Interdependence Model

The model is taking into consideration the works by Bryant, Henderson, Holtham, Hooper, and Symansky (1988), Dornbusch (1980), Rivera-Batiz and Rivera-Batiz (1985), Sargent (1979), Kallianiotis (1991, 1996a, 1996b, 1998, and 2004), Kallianiotis and Boutchev (1996), and Kallianiotis and Petsas (2006). The general two-country model is as follows

(α) The Goods Market equilibrium:

$$Y = C(Y - T, i - \pi, \frac{EP^*}{P}) + I[C, X, G, (i - \pi) - (i^* - \pi^*), S, \frac{EP^*}{P}]$$

$$+ G + X(Y^*, i - i^*, E, \frac{EP^*}{P}) - X^*(Y, i - i^*, E, \frac{EP^*}{P}) \tag{1}$$

$$C_{Y-T} > 0, C_{i-\pi} < 0, C_{\frac{EP^*}{P}} < 0, I_C > 0, I_X > 0, I_G > 0,$$

$$I_{(i-\pi)-(i^*-\pi^*)} < 0, I_S > 0, I_{\frac{EP^*}{P}} > 0, X_{Y^*} > 0, X_{i-i^*} < 0,$$

$$X_E > 0, X_{\frac{EP^*}{P}} > 0, X^*_Y > 0, X^*_{i-i^*} > 0, X^*_E < 0, X^*_{\frac{EP^*}{P}} < 0$$

and for the foreign country,

$$Y^* = C^*(Y^* - T^*, i^* - \pi^*, \frac{EP^*}{P}) + I^*[C^*, X^*, G^*, (i - \pi) - (i^* - \pi^*), S^*, \frac{EP^*}{P}]$$

$$+ G^* + X^*(Y, i - i^*, E, \frac{EP^*}{P}) - X(Y^*, i - i^*, E, \frac{EP^*}{P})$$

$$C^*_{Y^*-T^*} > 0, C^*_{i^*-\pi^*} < 0, C^*_{\frac{EP^*}{P}} < 0, I^*_{C^*} > 0, I^*_{X^*} > 0, I^*_{G^*} > 0, \tag{2}$$

$$I_{(i-\pi)-(i^*-\pi^*)} > 0, I^*_{S^*} > 0, I^*_{\frac{EP^*}{P}} < 0, X^*_Y > 0, X^*_{i-i^*} > 0,$$

$$X^*_E < 0, X^*_{\frac{EP^*}{P}} < 0, X_{Y^*} > 0, X_{i\text{-}i^*} < 0, X_E > 0, X_{\frac{EP^*}{P}} > 0$$

where, Y = real income (output), C = private consumption, T = taxes, i = nominal short-term rate of interest, π = inflation rate, E = exchange rate ($/FC), P = the price level, $EP^*/P = P_M/P_X$ = TOT = the terms of trade (the real exchange rate), I = private investment, X = exports, G = government spending, S = saving, and an asterisk (*) denotes the foreign country.

Equation (1) can be solved for i and the IS locus is determined:

$$i = IS(Y, T, \pi, E, \frac{EP^*}{P}, C, I, S, G, X, X^*, i^*, \pi^*, Y^*) \tag{3}$$

The solution of eq. (2) for i^* gives the foreign IS^*:

$$i^* = IS^*(Y^*, T^*, \pi^*, E, \frac{EP^*}{P}, C^*, I^*, S^*, G^*, X^*, X, i, \pi, Y) \tag{4}$$

(β) The Money Market equilibrium:

$$\frac{M}{P} = L(Y, i, E)$$

$$L_y > 0, L_i < 0, L_E < 0 \tag{5}$$

and

$$\frac{M^*}{P^*} = L^*(Y^*, i^*, E)$$

$$L^*_{y^*} > 0, L^*_{i^*} < 0, L^*_E > 0 \tag{6}$$

where, M= the money supply.

Eq.(5) can be solved for i and the LM curve is provided:

$$i = LM(Y, M, P, E) \tag{7}$$

For the foreign country the LM* locus is:

$$i^* = LM^*(Y^*, M^*, P^*, E) \tag{8}$$

(γ) The Balance of Payments equilibrium:

$$BP = T(Y^*, Y, i - i^*, E, \frac{EP^*}{P}) + K(i - i^*, E) \tag{9}$$

$$T_{Y^*} > 0, T_Y < 0, T_{i-i^*} < 0, T_E > 0, T_{\frac{EP^*}{P}} > 0, K_{i-i^*} > 0, K_E > 0$$

and for the foreign country,

$$BP^* = T^*(Y, Y^*, i - i^*, E, \frac{EP^*}{P}) + K^*(i - i^*, E) \tag{10}$$

$$T^*_Y > 0, T^*_{Y^*} < 0, T^*_{i-i^*} > 0, T^*_E < 0, T^*_{\frac{EP^*}{P}} < 0, K^*_{i-i^*} < 0, K^*_E < 0$$

where, BP= balance of payments, T= current (trade) account, and K= capital account.

From eq. (9), solving for i, we can determine the BP locus:

$$i = BP(Y, Y^*, i^*, E, \frac{EP^*}{P}) \tag{11}$$

From eq. (10), we can determine the BP* locus.

$$i^* = BP^*(Y^*, Y, i, E, \frac{EP^*}{P}) \tag{12}$$

In order to solve the system, we utilize Hicks' (1937) IS-LM curve apparatus and a BP curve.[8] This simply entails adopting the strategy of collapsing the equations of the model into a system of three equations, for the IS, LM, and BP functions and three others for the foreign country (EU). The ultimate objective will be to estimate the coefficients of the variables of these six equations and to find the size of the effects (interdependence, repercussion, and spillover) between each of the two countries (United States with European Union).

3. Some Stationarity Testing and Preliminary Empirical Results

(i) Data

The data are monthly from 1999:01 to 2005:12 and are coming from economagic.com, imfstatistics.org, and Eurostat. They comprise the variables, income or GDP (Y), consumption (C), investment (I), government spending(G), Saving (S), taxes (T), money supply (M^s), a variety of interest rates (S-T and L-T), exports (X) and imports (M), prices (CPI), wages and salaries (w), unemployment rate (u), and a few others. In the first analysis, we look at some empirical evidence of interdependence between the U.S. and the EU. Such evidence can be provided by correlations, causality, and regression analysis of the econometric models presented in the theory. Consider now a U.S. expansion. We already noted that the income in the U.S. will rise. But we also see spillover effects of the U.S. expansion. In the EU, income will rise, too. This is evidence of international interdependence through induced changes in imports.

(ii) Test of Stationarity and Cointegration of the Variables

The unit root issue is important in the context of the standard regression model. The assumptions of the classical model necessitate that dependent and independent variables must be stationary and the error terms must have: $E(\varepsilon_t)=0,\quad E(\varepsilon_t^2)=\sigma^2$ and $E(\varepsilon_t,\varepsilon_{t-1})=0$. In the presence of nonstationary variables, there might be a spurious regression.[9] In this case, the regression equation must be estimated in first differences. If the nonstationary variables are integrated of the same order and the residual is stationary, the two series are cointegrated. We test the variables in our regressions for stationarity by using a Dickey-Fuller (1979) and a Phillips-Perron (1988) test[10] and for cointegration by using Johansen (1991, 1995) methodology.

The finding that most of the macro-variables contain a unit root (Table 1) has spurred the development of the theory of non-stationary time series analysis. Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. If such a stationary linear combination exits, the non-stationary time series are said to be cointegrated. This stationary linear combination is called the cointegrating equation and may be interpreted as a long-run equilibrium relationship among the variables.

Consider the logarithmic linear equation of the Money Market equilibrium, eq. (5), which can be written as,

$$m_t - p_t = \alpha_0 + \alpha_1 y_t + \alpha_2 i_t + \alpha_3 e_t + \varepsilon_t$$
$$\alpha_1 > 0, \alpha_2 < 0, \alpha_3 < 0 \qquad (5')$$

where, m_t–p_t= the real quantity of money balances, y_t= the real income, i_t= the interest rate (opportunity cost of holding money), e_t= the exchange rate ($/euro), ε_t= the stationary disturbance term, and α_t= parameters to be estimated. All the variables, except the interest rate, are expressed in natural logarithms ($m_t \equiv \ln M_t$).

For the theory to make any sense at all, any deviation in the demand for money must necessarily be temporary in nature. If ε_t has a stochastic trend, the errors in the model will be cumulative so that deviations from money market equilibrium will not be eliminated. Hence, a key assumption of the theory is that the $\{\varepsilon_t\}$ sequence is stationary. The problem confronting, here, is that m_t, p_t, y_t, and e_t are nonstationary [$I(1)$] variables, except i_t, which is stationary [$I(0)$]. As such, these nonstationary variables can meander without any tendency to return to a long-run level. However, the theory expressed in eq. (5) insists that there exists a linear combination of these nonstationary variables that is stationary.

Solving eq. (5') for the error term, we can rewrite it as,

$$\varepsilon_t = m_t - p_t - \alpha_0 - \alpha_1 y_t - \alpha_2 i_t - \alpha_3 e_t \qquad (5'')$$

Since, $\{\varepsilon_t\}$ must be stationary, it follows that the linear combination of integrated variables given by the right-hand side of eq. (5") must also be stationary. Thus, the theory necessitates that the time paths of the four nonstationary variables $\{m_t\}$, $\{p_t\}$, $\{y_t\}$ and $\{e_t\}$ be linked.[11] The goods market equilibrium, the money market equilibrium, and the balance of payments function, here, are examples of stationary combinations of mostly nonstationary variables. Of course, within any equilibrium framework, the deviations from equilibrium must be temporary. The purpose of these cointegration tests is to determine whether our group of nonstationary series are cointegrated or not. The results of the cointegration test outputs for our multi-variables models by using a Johansen and Juselius (1990) method are presented in Table 2.

(iii) Empirical Results

We started analyzing the U.S. and EU data by looking and comparing their mean values, their natural logarithms, their growth, and their standard deviations. The growth of GDP is higher in the U.S., the exchange rate between dollar and euro is very risky ($\sigma_{\dot{e}} = 31.23\%$), the price level (inflation) is higher in the U.S. (which makes the EU data suspicious); the growth of exports and imports is higher in the EU, but their standard deviations are very high, too. The growth of wages is higher in the U.S.; the unemployment rate is much

higher in EU ($\overline{u}_{EU} = 8.6\%, \quad \overline{u}_{US} = 5.0\%$); the saving rate is very small in the U.S.; consumption is growing more in the U.S. and investment more in the EU; the growth of government spending is higher in the U.S., due to the military expenditures; money is growing more in the U.S.; the interest rates are almost the same in both entities.

Next, we looked at the correlation coefficients (ρ_{X,X^*}) between the U.S. and the EU macro-variables. The (ρ_{X,X^*}) is higher than +0.50 between Y^* and Y, Y^* and P, Y^* and M, Y^* and w, Y^* and u, Y^* and C, Y^* and M2, between P^* and Y, P^* and P, P^* and M, P^* and w, P^* and u, P^* and C, P^* and G, P^* and M2. Interest rates have a negative correlation with most of the variables. These reveal a high interdependence between the two economies, the U.S. and the EU one (i.e., $\rho_{Y,Y^*} = 0.98$). At the same time, we test the causality between the variables in the two economies. The U.S. Y causes Y^*, E, P^*, X^*, M^*, C^*, I^*, G^*, and $M2^*$. The exchange rate E causes I^* ; X and M cause X^*, M^*, and I^*. Unemployment u causes E, u^*, I^*, i_{OND}. U.S. consumption C causes Y^*, E, P^*, X^*, M^*, I^*, and $M2^*$. The policy variables (G, T, M2, and i instruments) cause Y^*, E, P^*, X^*, M^*, u^*, G^*, $M2^*$, i_{OND}, and i_{3MDL}.[12]

Then, the first table reported, here, is Table 1, which presents an Augmented Dickey-Fuller and Phillips-Perron unit root test for the variables of our model. The only stationary series are: w, u, i_{FF}, and i_p for the U.S. and m^*, x^*, and m^{*s} for the EU. The rest of the variables contain a unit root, they are integrated of order one [I(1)]. Tables 2's (from 2a to 2k) give the results of the cointegration tests of eqs. (1), (2), (5), (6), (9), and (10). Trace tests and maximum eigenvalue ones indicate that our equations are cointegrating (stationary).

Finally, Tables 3 and 3a show the least squares estimations of the goods market equilibrium in the U.S. and EU. The coefficients of y and y^* are highly significant and reveal the interdependence between the two economies. Table 4 discloses the significant effects not only of the domestic variables on money supply, but of the exchange rate, too. Table 5 presents the regressions of the subaccounts of the Balance of Payments. Income elasticity in the U.S. demand for imports is very high (2.367) and the corresponding one for EU is smaller (1.445). The price elasticities for the U.S. are statistically no different than zero; in EU they are statistically significant, but less than one (0.301+0.196=0.497<1). Then, Marshall-Lerner conditions do not hold. The advertising and the huge line of credits that consumers have received from profit maximizing financial institutions have made their demand for imports completely inelastic. In this case, trade policies (through devaluation of the currency) cannot improve the trade deficits.

4. Social and Policy Implications

We assume imperfect capital mobility, here, which means that a rise in domestic interest rates above the European rates generates capital inflows, but not in such massive amounts as it is required with the low return on the European rates.[13] In the context of imperfect capital mobility,[14] the government can attain the goals of internal balance (full employment) and external balance (balanced payments) through the use of a fiscal and monetary policy mix. Our concern is the determination of output (employment), interest rates, and the level of the exchange rate in these two economies (U.S. and EU) operating under flexible exchange rates. We are particularly interested in the problem of EU suffering from unemployment and of the U.S. from high interest rates and current account deficits. Their national, business, and households debts are very high in both entities, which might have negative effects on the futures of both economies.

In a world of managed (dirty) floating exchange rates, the Central Banks intervene from time to time in foreign exchange markets, which will affect the international reserve holdings of central banks (Fed and ECB). Many times, they do not allow the exchange rate to adjust to guarantee external payments balance. Then, the economy's international transactions carried out and recorded by the current account (CA) and capital account (KA) are not balanced to zero, but an official reserve settlements account (OS) requires to make the Balance of Payments (BP) zero.

$$BP=CA+KA+OS=0 \tag{13}$$

Since Spring 2003, it has been a surge of capital outflows from the U.S. to the Euro-zone as many investors from the Middle-East and Arab nations (due to the fear that the U.S. might freeze their funds) sought to sell dollars to purchase more safe European assets. These increased capital outflows has contributed to the current account deficit of the U.S. This excess supply of dollars, associated with the capital outflows, has depreciated the dollar in foreign exchange markets. The current process tends to shift demand toward domestic goods and away from European ones, thus improving the current account balance (if Marshall-Lerner conditions holds).[15]

The central banks' holdings of international reserves are influenced by the international transactions of domestic and foreign residents. At a given level of the exchange rate (E), and in the absence of any disturbances affecting autonomous spending, eq. (1) provides us with the combinations of domestic (i) and foreign (i^*) interest rates and income (Y and Y^*) that clear the goods market. A domestic currency depreciation (increase in the E) raises the relative price of foreign goods in terms of domestic (TOT increases), switching demand away

from foreign and toward domestic goods and improving the trade balance. This raises output at any given level of the interest rate, shifting the IS curve to the right (I'S').

The asset market equilibrium is represented by the money market, eq. (5). The money supply, here, is also affected by the exchange rate (the balance of payments conditions of the country). The nominal money supply is endogenously determined by the economy (central bank is targeting interest rate, i_{FF}). With a fixed interest rate, eq. (5) states the combinations of money, price, income, and exchange rate that clear the money market.

Investors in U.S. and EU can borrow or lend at i and i*.[16] Arbitrage between domestic and European capital markets causes interest rate parity (IRP) to hold. Balance of payments equilibrium, eq. (9), occurs along the BP curve.[17] When the domestic interest rate increases above the European level ($i_t > i_t^* + f_t - s_t$), there will be a huge inflow of foreign funds into the U.S. economy, generating a massive capital account surplus and consequently a current account deficit and a domestic currency appreciation. This dollar appreciation would cause the interest rate (i) to fall, IRP will be created and balance of payments equilibrium will be restored. Balance of payments are obtained when the economy lies along the BP curve.

The equilibrium of the economy occurs when there will be a simultaneous equilibrium in the goods and money markets at the interest rate i_0 [$i_0 = i^* + (f - s) + FFRP$]. According to Figure 1, the equilibrium of the U.S. economy occurs at point E, which shows the intersection of the IS and LM curves along the BP curve and an equilibrium level of output equal to Y_0. The money market equilibrium condition, eq. (5) becomes,

$$\frac{M_t}{P_t} = L(Y_t, i_t^*, f_t - s_t, FFRP_t, e_t) \tag{14}$$

where, $-s_t$ and e_t cancelled because are equal to zero. Then, the above real money equation becomes,

$$\frac{M_t}{P_t} = L(Y_t, i_t^*, f_t, FFRP_t) \tag{15}$$

Equation (15) determines the equilibrium level of income in the domestic economy by solving it for Y_t, which is becoming,

$$Y_0 = F(\frac{M}{P}, i^*, f, FFRP) \tag{16}$$

Equation (16) shows that the equilibrium level of income, Y_0, can be determined by $M_0, P_0, i_0^*, f_0,$ and $FFRP_0$. Then, the forward rate (f_0) drives the spot rate (e_0), too.

An expansion of government spending (G) raises aggregate demand for domestic goods and shifts the IS curve upward to I'S' (point E"). This results in upward pressure on domestic interest rates, generating incipient capital inflows as investors shift their portfolios toward the relatively more attractive domestic assets. The government will supply more securities to finance this new budget deficit. This will appreciate the U.S. dollar and will induce a switch of aggregate demand out of domestic goods and into imports, deteriorating the current account and shifting a little to the left the I'S' curve. But, this increase in aggregate demand will increase income (from Y_0 to Y_F). The high income raises money demand and interest rate rises. This increase in income has no lasting effect. Of course, the central bank (Fed) has an interest rate target and will expand the money supply to keep the interest rate on target. This will shift the LM curve to the right (L'M'). As a result of the downward pressure on domestic interest rates, the economy would face massive capital outflows as investors switch toward the relatively more attractive European assets. The result is a depreciation of the U.S. dollar. This depreciation in turn, shifts aggregate demand toward domestic goods and production reaches Y_F (E"). Then, this expansionary fiscal and tight monetary policy have increased interest rate, deteriorated the budget deficit, increased output (unemployment has declined), depreciate the currency, and improved a little the current account.[18]

Within the context of imperfect capital mobility, the government can attain the goals of internal balance (full employment) and external balance (balanced payments) through the use of monetary and fiscal policies. But, these public policies have been lost for the EMU country members; they have become exclusive policies of the ECB and of the European Commission. The countries in Euro-zone have lost their exchange rate policies (devaluation of their currencies) and the free trade agreements with the rest of the world do not allow them to use any protective trade policies (tariffs, quotas, qualitative restrictions, etc.). Also, from 2003 to 2006, we had an unexpected appreciation of the euro, which has affected EU exports negatively, but prices in Euro-area have not decline, they have increased absurdly, which show that free market does not work, there, so the euro was not a very good and thoughtful choice.

If the equilibrium of the economy lies along the BP=0 curve, there would be external balance. To the right of BP=0 a balance of payments deficit prevails and to the left, the economy is in surplus. The vertical line at output Y_F shows the level of domestic output associated with full employment (U.S. is very close

to this point of production at E', but EMU is far away to the left of it). If the equilibrium of the economy lies to the left of this line, it faces unemployment. The desired point in terms of the government's and central bank's goals is point E", where both internal and external balances are obtained. An appropriate combination of fiscal and monetary policies is necessary to attain internal and external balance. Trade balance equilibrium requires an expenditure-switching policy from foreign to domestic goods and an optimal interest rate[19] to affect positively the capital account balance and the domestic economy.

The economy is in short run equilibrium when the quantity demanded of domestic goods equals the quantity supplied of domestic goods. There is a simultaneous short run equilibrium in the goods, money, and labor[20] markets. But a broad array of situations can destabilize an economy, leading it to either, balance of payments difficulties, national debts, recessions and high unemployment (as it is in the EU for the last years), accelerated price increases (inflation) or to all of them combined. An external shock in the form of increased raw material and energy prices (as it happened before, where the price of oil rose in one year from $11.38 to $29.88 per barrel; during summer 2006, its price surpassed $75.00 per barrel)[21] would raise the costs of imported inputs, inducing the AS curve to shift to the left, causing domestic prices to rise and output to fall. Internal events in the economy may also contribute to destabilization, i.e., an increase in wages, which will shift the economy's AS leftward, increasing domestic prices, deteriorating the economy's international competitiveness, worsening its trade balance and reducing its national product because multinational firms are moving to lower cost countries.[22] Increased government spending could have a permanent positive effect on output if the economy is below full employment, but at the same time, it will be inflationary if not combined with measures such as tax cuts, that shift aggregate supply.[23]

The long run equilibrium of an economy occurs at that point where there is full employment and balanced payments. Today, almost both entities are in disequilibrium because they face unemployment and deficits in their balance of payments accounts. The free-market economy is acting procyclically and without government's and central bank's interventions, the economies will be for a very long time in long-run disequilibria. Macroeconomic adjustment programs are intended to speed up the adjustment of an economy toward long-run equilibrium. Policies must be enacted in situations, in which the economy is not characterized by full employment and price stability, but is instead suffering initially from high unemployment, chronic inflation, trade account deficit, and national debt. A wide range of disturbances can destabilize an economy, lead-

ing it to stagnation, unemployment, inflation, deficits or to all these problems combined.[24]

In situations where countries share unemployment and recession, or are under worldwide inflationary pressures, monetary policy with floating rates may engender in international policy conflicts. On the other hand, when business cycles in different countries are out of phase, such policies may in effect have negative repercussion effects abroad. The United States was in a recessionary situation (as it was in 2001) while Europe is suffering from underemployment and rampant inflation (due to the introduction of euro). In this context, U.S. expansionary monetary policy had potentially stimulated the economy by inducing a U.S. dollar nominal and real depreciation. The impact of the policy abroad, on the other hand, might be deflationary (but it did not happened), resulting in lower inflation and output (high unemployment). Given the stage of the business cycle abroad, however, such effects were not very beneficent. It can thus be concluded that international policy conflicts[25] would erupt from the use of monetary policy under floating exchange rates, interest differentials, price differentials, and speculation from the private sector.

5. Concluding Remarks

In a world of unemployment and recession, no one can observe countries (especially large economies inside the Euro-area) undertaking competitive money supply expansions intended to raise domestic output by exporting the unemployment abroad because they have lost their most important public policy, the monetary one. Similarly, in a world of inflationary pressures, countries tightening their money supplies might be able to reduce their inflation rate by transmitting it to other countries. This policy loss would cause serious economic and social crises in EU. A domestic (EU) monetary contraction would lower domestic prices but, at the same time, would tend to appreciate domestic currency, implying foreign currency depreciation. Even though such depreciation might be associated with a short run improvement in net exports and output abroad it might also raise foreign prices, which is not a welcome event in economies close to full employment, whose main worry is inflation. In today's EMU economies, the problem is not so much inflation, but high unemployment and the loss of their public policies (fiscal, due to Maastricht criteria and monetary, due to ECB and euro).

A coordinated expansion by the EU countries would be able to impinge on domestic output and employment. If the EU countries pursue expansionary aggregate demand policies (increased G) this will tend to raise each expanding country's interest rate, inducing the world interest rate to rise. Under perfect

capital mobility, a rise in the world interest rate above its American counterpart would generate massive capital flight out of the U.S.A. (euro has become a competitive international reserve currency, thanks to the Middle East crises), a sharp depreciation of the U.S. dollar and output expansion in the U.S. It is consequently, quite possible to have international transmission of disturbances under fluctuating exchange rates, as Dornbusch and Krugman (1976) mentioned. A foreign income disturbance associated with changes in world interest rates will generally be transmitted domestically. A coordinated fiscal expansion in Europe might thus aid in pulling the U.S. economy out of recession, and vice versa.[26]

Under imperfect capital mobility, both monetary and fiscal policies will influence domestic output, with the effectiveness of fiscal policy oppositely related to the degree of capital mobility in the economy. Flexible exchange rates insulate the economy from isolated foreign autonomous spending disturbances but not from a general coordinated disturbance by a group of foreign countries like the EU. A coordinated fiscal policy initiative by a group of major countries abroad affects world interest rates and is transmitted worldwide. Within this context, expansionary fiscal policy simultaneously engaged in by major countries will stimulate income growth in the world economy.

What we have discussed here illustrates the inherent difficulties of attaining multiple objectives in an open economy and especially if these economies are members of the same economic and monetary union. Contractionary monetary and fiscal policies oriented toward a rapid improvement in the balance of payments will generate a sharp recession and increased unemployment. Alternatively, if a devaluation is used to attain balanced payments and to raise output, prices will rapidly increase, fueling inflation. Finally, if contractionary demand policies are attached to devaluation as a package, price stability and balanced payments can in principle be attained, but unemployment will not be completely eliminated. The main reason for these conflicts of objectives lies in that, with an unchanged aggregate supply curve, the range of possible equilibria of the economy will lie along the curve, implying a short-run trade off between output and price increases. This suggests that policies oriented toward increasing aggregate supply (shifting the AS curve to the right) may have an important role in macroeconomic adjustment programs. This type of approach was popularized in early 1980s by so-called "supply side economics", whose emphasis was on the use of tax cuts, labor market incentive policies, and other policies intended to manipulate aggregate supply.[27]

The character of political, economic and monetary unions is deeply influenced and depend on the density of associational life in the union, the level of

social trust, the education, the language, the history, the culture, the tradition, the religion, and a variety of other socio-cultural factors that lead countries and individuals into closer social relations within the union. Now, on matters of policy; the future of the common agricultural policy (CAP) with the creeping reductions on farmers' subsidies,[28] the Union's external trade relations (especially with the unrivalled China), co-operation on defense with the U.S., the absurd enlargement, etc.; the voices of the small nations must be heard. Further ambitions for European integration need to be balanced by an understanding of the gains and loses that countries has had from the European projects. Security and safety is also a serious issue and especially for Greece, which is surrounding by enemies. Trade with the U.S. and the rest of the world is another major problem together with inward investment and the high unemployment[29] and promoting healthy competition rather than oligopolies and monopolies, as at present. People must encourage to save instead of over-consuming and wasting their resources. Domestic small businesses and industries need to be protected for the benefits of the country. The first thing that is missing, are the unique historical circumstances of the years between 1945 and 1989, which cannot be reproduced. The world is moving towards a new era; the century of delusion, of rebellion, of corruption, of powerful, of slavery, of ignorance, and of destruction. The disruptive effect of the decline of the Soviet Union has been at least as great in the East as in the West, due to the loss of balance between them. A cooperation with all the EU members and participation of all the European citizens might help the dissolution of this antinational artificial structure, the EMU. Also, cooperation between the U.S. and the EU, on equal footing, can improve both entities, which have common philosophy, to face the Asian "invasion".

Finally, the heterogeneity inside the EU is unique and the differences with the U.S. are hunge, but due to interdependence and spillover effects between the two entities, fair and just cooperation is necessary. Institutions' building is taking place in the absence of a strong legitimating myth or ideology or belief structures, etc. in the EU. The process is an ad hoc one, leading to greater future problems. We hope to be some powerful sources of resistance to those oppressive institutions and their policies if they will act against individuals, as we saw lately from Poland, Spain, France, and the Netherlands. EU is an extremely diverse mosaic of nations, if someone studies the given diversity of historical experience, political, religious, and cultural cleavages across the entire Europe. The European polity is extremely fragmented, reflecting diverse member state interests and an institutional structure based on a complex distribution of power across the European Council, Commission, Court, Parliament,

and the new Constitution on the one side and NATO (U.S.) on the other side of the Atlantic; consequently, they could lead to conflicts and confrontations even with the United States, as it happened during the 2003 with the Iraqi invasion. Economic interdependence and spillover effects between the U.S. and EU have been supported by the data, but are not sufficient to create social equilibria. The late trends of integration and its expansion to Asia and the internationalization, on the other side, will hurt competitiveness, growth, social welfare, and the independence of the nations.

Notes

1. The political, social, and cultural events are even stronger than the economic one. The U.S. exercises a tremendous influence on the EU in all its socio-economic structure. See, Kallianiotis (2006b).

2. During 2003, the U.S. has reduced drastically its interest rates and devaluated the U.S. dollar and at the same period the EU economies were suffering from tremendous trade deficits, unemployment, and low foreign investment. Fed increased the federal funds rate (i_{FF}) to 4.5% on January 31, 2006 and the ECB increased it overnight rate to 4.25% on March 2, 2006. (*The Wall Street Journal*, February 1, 2006 and TV News *ERT*, March 2, 2006). On May 10, 2006, Fed raised this rate to 5.00% and a month later, the ECB and the Asian Central Banks followed. Today, they are, i_{FF}=4.75% and i_{ONR}=4.00% correspondingly. (*The Wall Street Journal*, October 29, 2007, p. C8).

3. Kallianiotis (2004c) presents a multi-country, multi-equation model.

4. Rationalism is a poor theory, because it depends on simplistic assumptions and on our inferior reason, rather than on accumulated practical knowledge, empiricism, and above all the absolute knowledge. The reason must not be considered as the prime source of knowledge, if we want to see any improvement in our irrational society. Our logic and reasoning are not ours; they are imposed on us by "others". Actually, our behavior is not "rational" at all today because we know only "information" (I) and not "πληροφορίες"; $I \subset \Pi$. This information that individuals have available in forming their expectations, based on governments' behavior, uncertain international events, corruption, the underground economy, national disasters, speculations, integration in Europe and globalization, and also the lack of objective knowledge (controlled "news" and propaganda) distort their decisions and actions and the entire world suffers. See, Kallianiotis (2007).

5. Also, it can be used for the U.S. with respect each EU country-member or between the EU nations.

6. The model can very well be applied between the USA and NAFTA countries, too.

7. Lately, due to the Iraqi war, the high interest rate in EU, and the use of euro as international reserve; euro has attracted many speculators and it continues to be overvalued. It reached 1.3646$/euro on December 30, 2004 and it became still worse 1.4401 $/euro on October 29, 2007. (*Bloomberg.com*).

8. The BP curve is the balance of payments equilibrium line; along this line the BP = 0.

9. See, Granger and Newbold (1974). A spurious regression has a high R^2 and t-statistics that

appear to be significant, but the results are without any economic meaning. It is a bad regression that its output "looks good". Enders (1995, p. 216).

10. See, Kallianiotis (2002, pp. 52-53).

11. This example illustrates the crucial insight that has dominated much of the Macroeconometric literature lately: "Equilibrium theories involving nonstationary variables require the existence of a combination of the variables that is stationary." Enders (1995, p. 357).

12. The above results are not reported here, due to space limitations, but are available from the authors upon request.

13. The reason might be the high risk perceived by Arabs (Muslims) to invest in the U.S., due to the Middle East crises and the pro-Israeli American policy.

14. This can be seen from the different interest rates at these countries, even when their inflation rates are similar. The prime rates on Monday, October 14, 1996 were: i_{US}= 8.25%, i_G= 3.11%, i_{UK}= 5.75%, (See, *The Wall Street Journal*, October 15, 1996); on Wednesday, January 26, 2000, they were: i_{US}=8.50%, i_G=3.00%, i_{UK}=5.75%, (See, *The Wall Street Journal*, January, 27, 2000); on February 10, 2004 they were: $i_{U.S.}$=4.00%, i_{ECB}=2.00%, i_{UK}=4.00%, (See, *The Wall Street Journal*, February 11, 2004); on March 17, 2006, they were: $i_{U.S.}$=7.50%, i_{ECB}=2.50%, i_{UK}=4.50%, (See, *The Wall Street_Journal*, March 20, 2006, p. B2); and on November 26, 2007, they were: $i_{U.S.}$=7.75%, i_{ECB}=4.00%, i_{UK}=5.75%, i_C=6.25%, i_{SW}=3.86%, and i_J=1.875%. (*The Wall Street Journal*, October 29, 2007, p. C8).

15. The CA deficit has decreased very little in the U.S. ($190.8 billion in the second quarter of 2007, which is 7% of the GDP) because the Marshall-Lerner conditions do not hold (see, Table 5). (Source: U.S. Bureau of Economic Analysis, 10/29/2007).

16. Where, $i_t - i_t^* = f_t - s_t$ and $i_t = i_t^* + (f_t - s_t)$ if IRP holds. But for the U.S. currently, it seems that there is a freezing fund risk premium (FFRP), which makes the equation: $i_t = i_t^* + (f_t - s_t) + FFRP$.

17. Domestic and foreign assets are not perfect substitutes, due to differences in liquidity, taxes, default risk, political risk, exchange rate risk, etc. For this reason, risk-averse investors diversify their asset holdings internationally. See, Kallianiotis (2006a).

18. Between 2003:01 and 2007:02, we had in the U.S.: i_{FF}=1.00% =>4.75%, Y=$10,126 billion => $11,520 billion, u=5.8% => 4.7%, E=1.0622 $/euro => 1.4401 $/euro. (*economagic.com*, 10/29/2007). The economy seems that it is today in point E' (region I). But, the continuous weakening dollar shows a lack of confidence among foreign investors in the U.S. economy.

19. See, Kallianiotis (2002, p. 55).

20. The labor market is in short run equilibrium in the sense that the quantity of workers employed is determined by the demand for labor, at the given rigid nominal wage rate.

21. See, Bloomberg.com, June 8, 2006. On May 3, 2006, the price of oil reached $74.53 per barrel and in July became worse, due to Israeli invasion in Lebanon. From December 1998 ($11.28) to October 2007 ($92.28), its price has risen by 718.09%. See, Economagic.com.

22. For the 2004, the hourly labor costs for the textile industry were: in France $19.82, in Italy $18.63, in U.S. $15.78, in Slovakia $3.27, in Turkey $3.05, in Bulgaria $1.14, in Egypt $0.88, and in Mainland China $0.49. (*The Wall Street Journal*, September 27, 2005, pp. A1 and A10).

23. Unfortunately, EU country-members cannot use fiscal policy (reduction in taxes) to

stimulate their economies, because of the strict Maastricht convergence criteria, but they have increased government spending unevenly and excessively, which has raised interest rates (crowding out) with their huge debts.

24. The term stagflation, a combination of recession (stagnation) and inflation, has been coined to characterize the general features of the industrial world following the oil shocks of the 1970s.

25. The World Economic Forum and the Reinventing Bretton Woods Committee in co-operation with selected finance ministries and central banks of the G-20 countries, were organizing a year-long series of public-private roundtables on the future of the international monetary system. (weforum.org, 3/20/2006).

26. Note that the channel of transmission of the foreign AD disturbance originates in changes of the world interest rate and involves exchange rate changes as a key link.

27. See, Canto, Joines, and Laffer (1983).

28. There are rumors circulating in Greece, that EU will ask Greek farmers to cut their olive trees, to take off their vines, and control the sizes of their livestock.

29. Priorities in employment policy would be to lower taxes on the working poor, students must pay a little for their education at universities, some of them must go to vocational schools and every student must work part-time. Also, students who vandalize the universities must pay for the cost of their repairing. No high minimum wage, no foreign (illegal) workers and other initiatives calculated to put people out of work. Of course, we must keep people in their villages otherwise we will destroy our countries and cultures and will increase the social problems in the big cities.

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Appendix

TABLE 1

Augmented Dickey-Fuller and Phillips-Perron Unit Root Tests

Variables in Levels [y_t]	ADF	I(d)	PP	I(d)	Variables in 1st differences [$\Delta(y_t)$]	ADF	I(d)	PP	I(d)
y	-0.440	I(1)	-1.149	I(1)	Δ (y)	-7.001***	I(1)	-34.031***	I(1)
y/p	-1.425	I(1)	-2.233	I(1)	Δ (y/p)	-7.558***	I(1)	-33.980***	I(1)
e	-1.038	I(1)	-0.914	I(1)	Δ (e)	-6.379***	I(1)	-6.212***	I(1)
p	0.306	I(1)	0.171	I(1)	Δ (p)	-2.899**	I(1)	-19.448***	I(1)
m	-0.884	I(1)	-0.896	I(1)	Δ(m)	-10.262***	I(1)	-25.984***	I(1)
x	-1.090	I(1)	-1.202	I(1)	Δ(x)	-6.713***	I(1)	-25.520***	I(1)
w	-1.222	I(1)	-4.322***	I(0)	Δ(w)	-3.420***	I(1)	-24.099***	I(1)
u	-3.390***	I(0)	-2.850**	I(0)	Δ(u)	-8.486***	I(1)	-24.130***	I(1)
s	-0.364	I(1)	-1.207	I(1)	Δ(s)	-21.186***	I(1)	-39.753***	I(1)
c	-0.111	I(1)	-0.348	I(1)	Δ(c)	-4.886***	I(1)	-35.271***	I(1)
i	-0.561	I(1)	-0.605	I(1)	Δ(i)	-21.305***	I(1)	-34.352***	I(1)
i_{FF}	-2.797*	I(0)	-2.615*	I(0)	Δ(i_{FF})	-16.234***	I(1)	-15.731***	I(1)
i_{RF}	-2.454	I(1)	-2.412	I(1)	Δ(i_{RF})	-6.719***	I(1)	-17.252***	I(1)
i_p	-2.676*	I(0)	-2.448	I(1)	Δ(i_p)	-8.356***	I(1)	-12.390***	I(1)
i_{20GB}	-1.520	I(1)	-1.619	I(1)	Δ(i_{20GB})	-18.265***	I(1)	-18.212***	I(1)
i_{30GB}	-1.562	I(1)	-1.656	I(1)	Δ(i_{30GB})	-18.004***	I(1)	-17.774***	I(1)
g	-1.163	I(1)	-1.858	I(1)	Δ(g)	-5.385***	I(1)	-32.238***	I(1)
t	-0.783	I(1)	-1.629	I(1)	Δ(t)	-8.402***	I(1)	-29.498***	I(1)
m^s	-2.120	I(1)	-2.254	I(1)	Δ(m^s)	-4.090***	I(1)	-24.088***	I(1)
y^*	-0.182	I(1)	-0.623	I(1)	Δ(y^*)	-4.775***	I(1)	-19.809***	I(1)
p^*	0.558	I(1)	1.316	I(1)	Δ(p^*)	-7.136***	I(1)	-9.753***	I(1)
m^*	-4.504***	I(0)	-2.851*	I(0)	Δ(m^*)	-2.357	I(2)	-32.348***	I(1)
x^*	-3.846***	I(0)	-3.965***	I(0)	Δ(x^*)	-2.812*	I(1)	-28.849***	I(1)
u^*	-2.126	I(1)	-2.542	I(1)	Δ(u^*)	-3.715***	I(1)	-7.463***	I(1)
c^*	-0.619	I(1)	-1.121	I(1)	Δ(c^*)	-3.545***	I(1)	-18.740***	I(1)
i^*	-0.102	I(1)	0.261	I(1)	Δ(i^*)	-3.046***	I(1)	-14.205***	I(1)
i^*_{OND}	-1.696	I(1)	-1.770	I(1)	Δ(i^*_{OND})	-7.363***	I(1)	-12.239***	I(1)
i^*_{RF}	-1.237	I(1)	-1.352	I(1)	Δ(i^*_{RF})	-5.816***	I(1)	-5.721***	I(1)
i^*_{10GB}	-0.505	I(1)	-0.939	I(1)	Δ(i^*_{10GB})	-8.149***	I(1)	-8.398***	I(1)

g^*	0.512	I(1)	-1.298	I(1)	$\Delta(g^*)$	-3.480***	I(1)	-17.512*** I(1)
m^{*s}	1.619	I(1)	2.687*	I(0)	$\Delta(m^{*s})$	-2.187	I(2)	-19.156*** I(1)

Note: Y=income, E=exchange rate, P=price level, X=exports, M=imports, w=wages and salaries, u=unemployment rate, S=saving, C=consumption, I=investment, G=government spending, T=taxes, M2=money supply, i_{FF}=federal funds rate, i_{TB}=Treasury Bill rate, i_{GB}=government bonds rate, $\overline{x}$=the mean value of the ln X, σ_x=the standard deviation of the ln X, i_{OND}=overnight deposit rate, i_{3MDL}=3-month deposit rate (LIBOR), an (*) denotes the foreign country (Euro-zone). * (**) and (***) significant at the 10, 5, and 1 percent level, ADF=Augmented Dickey-Fuller Test Statistic, PP=Phillips-Perron Test Statistic, I(d)=series contains d unit roots and is of integrated order d, y=ln Y, an asterisk denotes an EU variable.

Source: http://www.economagic.com, http://www.imfstatistics.org, and Eurostat, Year Book, various issues.

TABLE 2A

Cointegration Tests of the Multi-variables Models

Eq. (1); Variables: $y, i_{RF} - \pi, e + p^* - p, c, x, g, i^*_{RF} - \pi^*, s, i_{RF} - i^*_{RF}, y^*$

(Maximum lag in VAR=2)

			Trace Test		Maximum Eigenvalue Test	
Null	Alternative	Eigenvalue	Statistics	Critical Values 95%	Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.7259	399.001***	239.235	97.073***	64.505
$r \leq 1$	$r > 1$	0.6631	301.928***	197.371	81.596***	58.434
$r \leq 2$	$r > 2$	0.5752	220.332***	159.530	64.216***	52.363
$r \leq 3$	$r > 3$	0.4554	156.116***	125.615	45.571*	46.231
$r \leq 4$	$r > 4$	0.4186	110.544***	95.754	40.669**	40.078
$r \leq 5$	$r > 5$	0.3337	69.876**	69.819	30.448	33.877
$r \leq 6$	$r > 6$	0.2083	39.428	47.856	17.520	27.584
$r \leq 7$	$r > 7$	0.1559	21.908	29.797	12.715	21.132
$r \leq 8$	$r > 8$	0.1148	9.194	15.495	9.145	14.265
$r \leq 9$	$r > 9$	0.0006	0.048	3.841	0.048	3.841

Note: See Table 1; Trace test indicates 6 cointegrating equations at the 5% level. Maximum eigenvalue test indicates 4 cointegrating equations at the 5% level and 1 cointegrating at the 10% level.

Source: See Table 1.

TABLE 2B

Cointegration Tests of the Multi-variables Models

Eq. (2); Variables: $y^*, i^*_{RF} - \pi^*, c^*, x^*, g^*, y$

(Maximum lag in VAR=2)

			Trace Test		Maximum Eigenvalue Test	
Null	Alternative	Eigenvalue	Statistics	Critical Values 95%	Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.5785	195.369***	95.754	74.300***	40.078
$r \leq 1$	$r > 1$	0.4009	121.068***	69.819	44.054***	33.878
$r \leq 2$	$r > 2$	0.3972	77.015***	47.856	43.535***	27.584
$r \leq 3$	$r > 3$	0.2364	33.479**	29.797	23.195**	21.132
$r \leq 4$	$r > 4$	0.1049	10.284	15.495	9.531	14.265
$r \leq 5$	$r > 5$	0.0087	0.752	3.841	0.752	3.841

Note: See Table 1; Trace test indicates 4 cointegrating equations at the 5% level. Maximum eigenvalue test indicates 4 cointegrating equations at the 5% level.

Source: See Table 1.

TABLE 2C

Cointegration Tests of the Multi-variables Models

Eq. (5); Variables: $m^s - p, y, i_F, e$

(Maximum lag in VAR=2)

			Trace Test		Maximum Eigenvalue Test	
Null	Alternative	Eigenvalue	Statistics	Critical Values 95%	Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.2856	50.503**	47.856	26.229*	27.584
$r \leq 1$	$r > 1$	0.1727	24.274	29.797	14.785	21.132
$r \leq 2$	$r > 2$	0.0944	9.489	15.495	7.738	14.265
$r \leq 3$	$r > 3$	0.0222	1.751	3.841	1.751	3.841

Note: See, Table 1; Trace test indicates 1 cointegrating equation at the 5% level. Maximum eigenvalue test indicates no cointegration at the 5% level, but 1 cointegrating equation at the 10% level.

Source: See, Table1.

TABLE 2D

Cointegration Tests of the Multi-variables Models

Eq. (5); Variables: $m^{*s} - p^*, y^*, i^*_{OND}, e$

(Maximum lag in VAR=2)

			Trace Test		Maximum Eigenvalue Test	
Null	Alternative	Eigenvalue	Statistics	Critical Values 95%	Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.3406	60.876***	47.856	30.814**	27.584
$r \leq 1$	$r > 1$	0.2099	30.063**	29.797	17.432	21.132
$r \leq 2$	$r > 2$	0.1538	12.631	15.495	12.361	14.265
$r \leq 3$	$r > 3$	0.0036	0.270	3.841	0.270	3.841

Note: See, Table 1; Trace test indicates 2 cointegrating equation at the 5% level. Maximum eigenvalue test indicates 1 cointegrating equation at the 5% level.

Source: See, Table 1.

TABLE 2E

Cointegration Tests of the Multi-variables Models

Eq. (9); Variables: $x - m, y, y^*, i_{RF} - i^*_{RF}, e + p^* - p, e$

(Maximum lag in VAR=2)

			Trace Test		Maximum Eigenvalue Test	
Null	Alternative	Eigenvalue	Statistics	Critical Values 95%	Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.6405	177.606***	95.754	79.797***	40.078
$r \leq 1$	$r > 1$	0.3753	97.809***	69.819	36.694**	33.878
$r \leq 2$	$r > 2$	0.3000	61.115***	47.856	27.823**	27.584
$r \leq 3$	$r > 3$	0.1885	33.293**	29.797	16.293	21.132
$r \leq 4$	$r > 4$	0.1640	16.999**	15.495	13.970*	14.265
$r \leq 5$	$r > 5$	0.0381	3.029*	3.841	3.029*	3.841

Note: See, Table 1; Trace test indicates 5 cointegrating equations at the 5% level and 1 cointegrating equation at the 10% level. Maximum eigenvalue test indicates 3 cointegrating equations at the 5% level and 2 cointegrating at the 10% level.

Source: See, Table 1.

TABLE 2F

Cointegration Tests of the Multi-variables Models

Eq. (9); Variables: $x, y^*, e + p^* - p$

(Maximum lag in VAR=2)

			Trace Test		Maximum Eigenvalue Test	
Null	Alternative	Eigenvalue	Statistics	Critical Values 95%	Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.2741	43.895***	29.797	24.986**	21.132
$r \leq 1$	$r > 1$	0.1992	18.909**	15.495	17.322**	14.265
$r \leq 2$	$r > 2$	0.0201	1.587	3.841	1.587	3.841

Note: See, Table 1; Trace test indicates 2 cointegrating equation at the 5% level. Maximum eigenvalue test indicates 2 cointegrating equations at the 5% level.

Source: See, Table 1.

TABLE 2G

Cointegration Tests of the Multi-variables Models

Eq. (9); Variables: $m, y, e + p^* - p$

(Maximum lag in VAR=2)

			Trace Test		Maximum Eigenvalue Test	
Null	Alternative	Eigenvalue	Statistics	Critical Values 95%	Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.3450	43.226***	29.797	33.007***	21.132
$r \leq 1$	$r > 1$	0.1018	10.219	15.495	8.375	14.265
$r \leq 2$	$r > 2$	0.0234	1.844	3.841	1.844	3.841

Note: See, Table 1; Trace test indicates 1 cointegrating equation at the 5% level. Maximum eigenvalue test indicates 1 cointegrating equation at the 5% level.

Source: See, Table 1.

TABLE 2H

Cointegration Tests of the Multi-variables Models

Eq. (10); Variables: $x^*, y, e + p^* - p$

(Maximum lag in VAR=2)

			Trace Test		Maximum Eigenvalue Test	
Null	Alternative	Eigenvalue	Statistics	Critical Values 95%	Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.4161	77.213***	29.797	41.962***	21.132
$r \leq 1$	$r > 1$	0.3481	35.251***	15.495	33.373***	14.265
$r \leq 2$	$r > 2$	0.0238	1.878	3.841	1.878	3.841

Note: See, Table 1; Trace test indicates 2 cointegrating equations at the 5% level. Maximum eigenvalue test indicates 2 cointegrating equations at the 5% level.

Source: See, Table 1.

TABLE 2K

Cointegration Tests of the Multi-variables Models

Eq. (10); Variables: $m^*, y, e + p^* - p$

(Maximum lag in VAR=2)

			Trace Test		Maximum Eigenvalue Test	
Null	Alternative	Eigenvalue	Statistics	Critical Values 95%	Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.3204	48.004***	29.797	30.123***	21.132
$r \leq 1$	$r > 1$	0.1993	17.881**	15.495	17.334**	14.265
$r \leq 2$	$r > 2$	0.0070	0.547	3.841	0.547	3.841

Note: See, Table 1; Trace test indicates 2 cointegrating equations at the 5% level. Maximum eigenvalue test indicates 2 cointegrating equations at the 5% level.

Source: See, table 1.

TABLE 3

Least Squares Estimations of the Model: Eq. (1) Goods Market Equilibrium

Variables	*y*	*y*	*y*	*y*	*y*
α_0	1.567***	55.932	1.369***	2.195***	1.304***
	(0.253)	(80485)	(0.481)	(0.409)	(0.337)
$i_{RF} - \pi$	0.001	0.001	-	-	-
	(0.001)	(0.001)			
$e + p^* - p$	0.025***	-0.007	-	-	-
	(0.009)	(0.011)			
c	0.343***	-0.063	-	-	0.301***
	(0.096)	(0.061)			(0.050)
x	0.124***	0.110***	0.103***	0.128***	0.124***
	(0.012)	(0.015)	(0.014)	(0.016)	(0.015)
g	0.102	0.061	0.087	0.209***	0.163***
	(0.063)	(0.058)	(0.054)	(0.050)	(0.045)
$i^*_{RF} - \pi^*$	0.001	0.001	0.001	-	-
	(0.001)	(0.001)	(0.001)		
s	0.001	0.001	0.001*	-0.001	-
	(0.001)	(0.001)	(0.001)	(0.001)	
$i_{RF} - i^*_{RF}$	-0.001	-0.004	-0.003	-	-
	(0.004)	(0.003)	(0.002)		
y^*	0.424***	0.898***	0.890***	0.643***	0.445***
	(0.149)	(0.119)	(0.097)	(0.066)	(0.069)
AR(1)	-	0.999***	0.980***	0.992***	0.978***
		(0.018)	(0.028)	(0.006)	(0.015)
R^2	0.998	0.999	0.999	0.999	0.999
SER	0.004	0.002	0.002	0.003	0.003
D-W	0.726	1.879	1.917	2.128	2.170
F	3730.21	8945.87	20634.66	137204.4	166033.3
N	78	77	88	173	173

Note: See, Table 1.
Source: See, Table 1.

TABLE 3A

Least Squares Estimations of the Model: Eq. (2) Goods Market Equilibrium

Variables	y^*	y^*	y^*
α_0	0.666***	0.602***	0.669***
	(0.100)	(0.154)	(0.078)
$i^*_{RF} - \pi$	0.001	0.001	-
	(0.001)	(0.001)	
x^*	-0.001	0.001	-
	(0.004)	(0.001)	
c^*	0.561***	0.577***	0.576***
	(0.053)	(0.082)	(0.054)
g^*	0.217***	0.191***	0.196***
	(0.041)	(0.050)	(0.039)
y	0.179***	0.190***	0.181***
	(0.022)	(0.044)	(0.031)
AR(1)	-	0.876***	0.914***
		(0.052)	(0.031)
R^2	0.998	0.999	0.999
SER	0.003	0.002	0.002
D-W	0.232	1.899	1.928
F	10545.95	39012.38	275021.8
N	89	88	173

Note: See, Table 1.
Source: See, Table 1.

TABLE 4

Least Squares Estimations of the Model: Eqs. (5) and (6) Money Market Equilibrium

Variables	$m^s - p$	$m^s - p$	$m^s - p$		$m^{*s} - p^*$	$m^{*s} - p^*$
α_0	-1.947***	-1.643***	2.543***	α_0^*	-3.198***	-3.266***
	(0.142)	(0.289)	(0.380)		(0.127)	(0.227)
y	0.585***	0.552***	0.111***	y^*	0.942***	0.951***
	(0.015)	(0.031)	(0.029)		(0.017)	(0.030)
i_{FF}	-0.018***	-0.019***	-0.001**	i^*_{OND}	-0.009***	-0.010***
	(0.001)	(0.001)	(0.001)		(0.002)	(0.003)
e	-0.028***	-0.012	-	e	0.060***	0.051**
	(0.009)	(0.018)			(0.016)	(0.024)
AR(1)	-	0.559***	0.996***		-	0.479***
		(0.099)	(0.001)			(0.103)
R^2	0.989	0.992	0.999		0.988	0.991
SSR	0.008	0.007	0.007		0.009	0.007
D-W	0.955	2.020	1.681		0.988	1.833
F	2402.96	2381.75	391988.4		1976.21	1943.50
N	81	80	560		77	76

Note: See, Table 1.
Source: See, Table 1.

TABLE 5

Least Squares Estimations of the Model: Eqs. (9) and (10) The Balance of Payments

Variables	$x-m$	$x-m$	$x-m$	x	m	x^*	m^*
α_0	4.593***	4.116***	4.278***	-8.007**	-15.983***	-7.311***	-6.451***
	(0.357)	(0.759)	(0.715)	(3.469)	(2.905)	(1.327)	(1.198)
y	0.344	0.284	0.296	-	2.367***	1.257***	-
	(0.215)	(0.259)	(0.244)		(0.302)	(0.140)	
y^*	-1.095***	-0.916***	-0.976***	1.847***	-	-	1.445***
	(0.255)	(0.339)	(0.317)	(0.454)			(0.157)
$i_{RF}-i^*_{RF}$	0.025*	-0.006	-	-	-	-	-
	(0.015)	(0.009)					
$e+p^*-p$	-0.253	0.324	-0.003	0.010	-0.011	-0.301***	-0.196**
	(0.487)	(0.356)	(0.037)	(0.097)	(0.089)	(0.095)	(0.086)
e	0.232	-0.330	-	-	-	-	-
	(502.502)	(0.358)					
AR(1)	-	0.840***	0.833***	0.977***	0.982***	-	-
		(0.066)	(0.065)	(0.023)	(0.021)		
R^2	0.901	0.967	0.967	0.969	0.984	0.540	0.554
SSE	0.016	0.009	0.009	0.020	0.019	0.088	0.086
D-W	0.421	1.842	1.857	1.989	2.024	1.987	1.719
F	136.49	359.01	543.52	803.39	1577.76	45.72	48.40
N	81	80	80	80	80	81	81

Note: See, Table 1.
Source: See, Table 1.