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Economic Integration and Fiscal Policy Transmission: Implications for Europe in 1992 and Beyond

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Increased financial integration within the European Community has implications for the conduct of fiscal policy by member nations. This paper shows that with greater integration, a fiscal policy shift within a given country will tend to have a diminished local impact and a correspondingly greater external impact on other member countries. This suggests that some convergence of fiscal policies may be necessary within the region as integration proceeds.

Recent plans by the member countries within the European Community (EC) to create a single integrated market by 1992 have raised questions concerning the appropriate conduct of fiscal policy in interdependent, open economies. There is little disagreement that this increased integration will necessitate greater coordination of monetary policies if the European countries are to move closer to their longer-run goal of a full monetary union, possibly with a common currency. However, the possible need to establish a community-wide fiscal policy stance either through fiscal policy "harmonization" or coordination has only recently received much attention. A report sponsored by the EC and issued in April 1989 suggested that although the level and composition of government spending as well as many revenue measures should remain the preserve of member states even in the final stage of economic union, closer coordination of national budgetary policies may be necessary.¹

An important concern underlying these policy recommendations is the presumption that the EC's moves to liberalize capital flows will magnify the domestic and international transmission of economic disturbances, particularly divergent fiscal policies. In the absence of controls, some believe fiscal policy shifts and other disturbances could lead to greater macroeconomic instability. Large divergences in budgetary positions and marked differences in external balance among EC members have reinforced this concern.

This paper addresses the question whether liberalization of capital controls in the EC will make greater harmonization or coordination of fiscal policies more desirable. We analyze how the effects of policy changes and disturbances are likely to change in response to greater interest rate linkage associated with increasing financial integration within the EC. In particular, we investigate the merits of the view that a higher degree of capital mobility is likely to cause divergent fiscal policies to have greatly magnified—and potentially destabilizing—real effects on the EC economies.

Our analytical framework highlights the role of intertemporal budget constraints and private sector behavior in the context of a two-period, two-country framework. In this framework, private and public sector spending decisions are not independent events with a one-time outcome,

but are multiperiod decisions linked across time through borrowing and lending. Moreover, our framework considers the effects of government policies in a general equilibrium setting with rational, forward-looking households. This allows us to focus on the interactions between financial liberalization and fiscal policy in the two countries in a well-defined way that is not possible in a small open economy setting.

The framework is designed to analyze the effects of financial liberalization and fiscal policy on real consumption, saving, trade balances, and real interest rates in the two countries. In concentrating on the real side of the economy, however, we abstract from some other important issues. In particular, we do not attempt to assess the effects of financial liberalization on the operation of a monetary union and the maintenance of fixed nominal exchange rates. A number of other recent papers have addressed these issues (for example, Lane and Rojas-Suarez, 1989).

A major conclusion of our analysis is that greater financial liberalization creates an environment in which fiscal disturbances originating at home tend to have smaller

consequences for the domestic economy and larger consequences for the foreign economy. In particular, a home fiscal expansion places less upward pressure on domestic interest rates and more upward pressure on foreign interest rates as financial integration grows. Correspondingly, domestic consumption is "crowded out" less, and foreign consumption declines more. From this perspective, the call for greater fiscal policy harmonization or coordination may be viewed as an effort by individual EC nations to limit the increased exposure to disturbances emanating from other European economies that accompanies greater financial integration.

This paper is organized as follows. Section I presents an overview of the major financial liberalization measures and the process of financial integration that have taken place over the past several years among the EC member countries. It also presents some summary historical statistics covering the fiscal stances and debt positions of the EC nations. In Section II we formally analyze the economic effects of increased financial integration. Section III concludes the paper with a number of policy implications.

I. Financial Integration and Fiscal Policy in the EC

Removing barriers to capital movements is a central part of the EC plan for financial integration, as it lays the foundation for the integration of financial markets and provision of financial services.² As mentioned above, however, many are concerned that divergent fiscal stances among the member states of the EC could have adverse consequences in a deregulated financial environment. This section provides a brief overview of financial integration in the EC and presents summary statistics demonstrating the existing divergences in fiscal positions.

Financial Integration

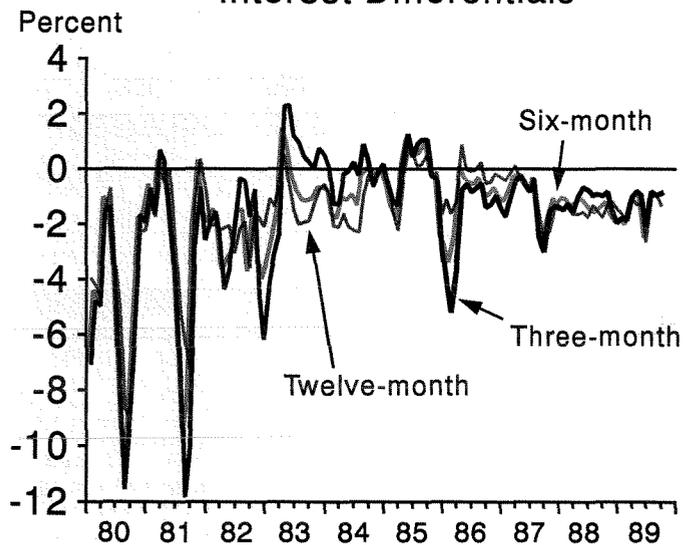
European countries traditionally have imposed a wide variety of restrictions and taxes on international financial transactions, most with the intent of limiting net capital outflows.³ In some cases these controls have taken the form of limits on the extent domestic residents can invest abroad either through the imposition of quantitative quotas, as in France after 1981 and the United Kingdom until 1979, or prohibitive taxes, as in Italy. Likewise, dual exchange rate systems, as in Belgium and Luxembourg, often work to limit capital outflows when particular international financial transactions are restricted to being conducted at a less advantageous exchange rate than other transactions. In other cases, capital controls have taken the form of restrictions on foreigners' borrowing in domestic capital

markets. This has been practiced by France, Italy, and Denmark.

The effect of such restrictions has been to discourage active arbitrage between domestic and international financial markets and to reduce the linkage between interest rates at home and abroad. Giavazzi and Giovannini (1986) show that capital controls limited arbitrage between domestic and offshore market interest rates in France and Italy between 1979 and 1985. This effect is particularly pronounced for Italy, but also has been apparent in France during periods of turbulence in the European Monetary System. Frankel and MacArthur (1988) use data on covered interest differentials for domestic securities over the period from 1982 to 1987, and find that France and most of the small European countries effectively limited capital market arbitrage, thereby maintaining domestic interest rates at lower levels than otherwise would have been the case.⁴ Giavazzi and Pagano (1985) and Barone, *et. al.* (1989) present evidence that Italian capital controls effectively limited capital outflows during the early 1980s.

The chart reproduces evidence presented by Barone, *et. al.* (1989) showing that domestic Italian rates (Treasury Bill rates) have been lower than offshore Lira rates (Euro-lira deposit rates). Effective restrictions on capital outflows, particularly in the early 1980s, presumably limited arbitrage possibilities and the ability of domestic residents

Italian Domestic-Offshore Interest Differentials*



* Italian Treasury bill rates minus interest rates on lira deposits in the Euro-market. Interest rate levels are monthly averages of daily rates.

to take advantage of higher Euromarket rates. Barone, *et. al.* suggest that the narrowing of the domestic-offshore interest differential in recent years and its reduced volatility provide evidence of the progress already achieved in liberalizing international capital movements in Italy.⁵

In fact, the gradual relaxation of restrictions on international capital flows in most EC nations has been a general phenomenon since the early 1960s. Although there were several notable setbacks in the 1970s, as a number of countries reimposed controls in the face of balance of payments problems, momentum was regained in the early 1980s. Moreover, in 1986 the European Community agreed in principle to remove capital controls directly related to trade and investment, and in 1988 to remove all remaining controls.

At present, the United Kingdom, Germany, the Netherlands, and Denmark have fully eliminated capital controls. Belgium, Luxembourg, France, and Italy still have a few remaining barriers, but are scheduled for complete liberalization by July 1990.⁶ (The dual rate system of Belgium-Luxembourg is scheduled to be eliminated by the end of 1992.) The few restrictions that do remain for these nations include French and Italian restrictions on accounts held abroad by residents and the Italian restrictions associated with the foreign exchange monopoly of the central bank. In Italy, residents still have an obligation to surrender all foreign exchange earnings and are not allowed to hold foreign deposits. Banks, likewise, are restricted in their holdings of foreign exchange and net open positions. These remaining restrictions continue to limit capital outflows.⁷

Divergent Fiscal Positions

It is clear that the EC member states have pursued widely varied budgetary policies over the past decade with no recent moves toward convergence. Table 1 presents some summary fiscal statistics on general government financial balances and debt for the EC nations. The table shows wide variation in budgetary positions in 1987: the general government financial balance of Denmark was in surplus, while Germany, France, and the United Kingdom displayed small deficit positions of two percent of Gross Domestic Product (GDP) or less. The remaining six EC nations posted significantly larger financial deficits. Moreover, although the financial position of these countries has changed in the past decade, the magnitude of the divergences in government financial positions has remained approximately constant: similar cross-country variation in government financial balances was in evidence a decade ago.

The outstanding public debt positions of the EC nations reflect the diversity of their budgetary positions. Net public debt positions in 1987, for example, ranged from a low of 22.6 percent of GDP for Germany to a high of 121.8 percent for Belgium. Moreover, the figures in Table 1 also show that the diversity in debt positions among the EC nations at present is roughly the same as that prevailing at the beginning of the decade. No moves toward fiscal convergence are apparent in the data.

Table 1
General Government
Fiscal Indicators
in the European Community
(Percent of GDP)

European Community Members	Fiscal Balance		Gross Public Debt		Net Public Debt	
	1978	1987	1980	1987	1980	1987
Germany	-2.4	-1.8	32.5	43.6	14.3	22.6
France	-2.1	-2.0	37.3	43.9	14.3	25.8
U.K.	-4.4	-1.5	54.6	50.0	47.5	43.4
Italy	-10.3	-10.5	58.5	92.7	53.6	90.6
Belgium	-6.0	-7.2	79.9	132.5	69.3	121.8
Netherlands	-3.1	-6.1	45.9	76.9	24.9	52.1
Denmark	-0.3	2.0	33.5	57.2	7.3	25.3
Greece	-1.7	-11.1	27.7	63.3	NA	NA
Spain	-1.8	-3.6	18.5	48.1	7.8	31.0
Ireland	-8.7	-9.9	78.0	137.2	NA	NA

Source: OECD *Economic Outlook*, June 1989, Tables R-15, 33 and 34.

The calls for greater convergence and coordination of fiscal policy are in part based on the strong economic linkages that already exist within the EC, particularly among the nations participating in the European Monetary System, and on the expectation that deregulation of capital controls will strengthen these ties.

Simulations of a number of large econometric models illustrate these strong linkages, not least on the fiscal side. Representative results from these exercises, presented in Table 2, show the effects of independent fiscal expansions in each of the largest EC countries. The experiment shown is the effect of a sustained rise in real government expenditure equal to one percent of GNP on the level of domestic and foreign real GNP. One year following a one percent fiscal expansion in Germany, French real GNP is estimated to rise by .44 percent, Italian GNP by .45 percent, and U.K. GNP by .07 percent. The multipliers for France and Italy are smaller by a fraction corresponding to the size of their economies, but nonetheless are significant. Clearly, the degree of linkage among EC nations—even with the existing degree of international capital mobility—is sufficiently large as to transmit fiscal shocks from one EC nation to another.

Nonetheless, it is not entirely clear from a theoretical perspective that this will present a particular problem for these economies after the complete removal of capital controls within the EC. In particular, it is not obvious that the disruptive effects of fiscal divergences (“shocks”) need increase as the degree of capital mobility increases. We address this issue below within the context of a simple theoretical framework.

In the following analysis, we refer to EC nations that are in the process of removing the existing controls and restrictions on capital outflows as “Italy.” Those that already have removed restrictions on international capital movements, but are likely to be affected by the liberalization process in other EC nations, are referred to as “Ger-

II. Analytical Framework

This section develops a simple model to explore the effects of increased financial integration on the countries within an economic union. In particular, we analyze the way greater financial integration influences the impact of changes in fiscal policy on real macroeconomic variables such as real interest rates, consumption levels, and the trade balance.

The model highlights the role of intertemporal budget constraints and private sector behavior. This intertemporal perspective is crucial in analyzing the general equilibrium effects of particular policies in a framework with rational, forward-looking households.¹⁰

Table 2

European Community Real Linkages: Effects of Sustained Increase in Real Government Expenditure Equal to 1% of Real GNP

Fiscal Expansion in:	Change in Real GNP (Percent)			
	Germany	France	U.K.	Italy
Germany	1.10	.44	.07	.45
France	.20	1.54	.03	.26
U.K.	.13	.18	1.17	.15
Italy	.23	.41	.05	1.92

Source: Economic Research Institute, Economic Planning Agency, Japan

Note: The numbers represent the percentage increase in real GNP (for the country listed in the column headings) one year after the beginning of a sustained fiscal stimulus (by the country listed in each row).

many.” The starting point for our analysis is that both the “Italian” private and government sectors are net borrowers abroad.⁸ In addition, it is assumed that controls on capital outflows effectively limit the extent to which “Italian” private residents purchase foreign assets, while encouraging them to borrow more abroad. This implies that private net foreign lending (borrowing) is less (more) than in the absence of controls. Since one of the motivations for the introduction of capital outflow controls presumably is the desire to finance government debt domestically at relatively favorable rates,⁹ the level of foreign government debt financing may be interpreted as being less than would otherwise be the case in the absence of controls.

We capture these effects within a real, two-period, two-country framework. The two-period assumption allows us to capture the flavor of intertemporal decision making and relationships within the simplest possible setting. The general results we obtain are invariant to a multiperiod setting. The two-country framework allows us to focus on the direct and indirect interactions between two economies in a well-defined way that is not possible with a small open economy model. In this analysis we focus on the “real” aspects of integration and abstract from monetary issues.

The Model

Consider a world of two countries, each of which has a household sector and government. The home country will be referred to as Italy, and the foreign country as Germany. In each period t ($t=1,2$), the home country produces a given quantity of output Y_t of a single good; the foreign country produces Y_t^* of the same good. Out of these quantities, residents in each country pay T_t and T_t^* lump-sum units of taxes to their respective governments. They also invest in local government bonds and borrow (or lend) abroad. What is left over is consumed.

Specifically, the home (Italian) households' first and second period budget constraints are:

$$C_1 = Y_1 - T_1 - B + F^P \quad (1)$$

$$C_2 = Y_2 - T_2 + (1+r_b)B - (1+r_f)F^P \quad (2)$$

where C_t denotes consumption in period t , B denotes lending by home country households to the home country (Italian) government, and F^P denotes borrowing from foreign (German) households in period 1. It is assumed that the associated interest rates on these activities are r_b and r_f , respectively. Equation (1) defines home country consumption in the first period as output plus foreign borrowing net of taxes and domestic lending. Consumption in the second period is given by output, net of taxes, plus the return earned on first-period lending, net of foreign debt repayment. The two-period horizon of the model implies that all borrowing undertaken in period 1 is repaid in period 2, and no new debts are incurred. For simplicity we have assumed that there is no real investment and that output is exogenous.

Households in the foreign country, Germany, are assumed to lend both to their own government and to the Italian government, while also lending to Italian households. The period budget constraints for the German households are:

$$C_1^* = Y_1^* - T_1^* - B^* - F^P - F^G \quad (3)$$

$$C_2^* = Y_2^* - T_2^* + (1+r_b^*)B^* + (1+r_f^*)(F^P + F^G) \quad (4)$$

where foreign variables are denoted by asterisks and defined analogously to the home variables. For example, B^* denotes lending by foreign (German) households to the foreign country (German) government, and r_b^* denotes the associated interest rate. F^P represents net borrowing by Italian households from German households, as defined above (negative levels of F^P denote net foreign lending by Italian households); F^G denotes borrowing by the Italian government from German households; and the associated

interest rate from the perspective of German households, r_f^* , is assumed identical for these two cross-border financial activities. Note that in this two-country setup foreign borrowing by the Italian private sector from German households, F^P , represents lending by the German private sector, $-F^P$.

With perfect capital markets and no tax differentials, international capital arbitrage implies that the relevant interest rates faced by residents in the home and foreign countries will be equalized; that is, $r_b = r_f = r_f^* = r_b^*$. International capital controls, however, drive a wedge between these rates from the point of view of Italian households. In particular, we assume that

$$(1+r_f) = (1+r_f^*)/(1+u), \quad 0 < u < 1, \quad (5)$$

where u reflects the reduction in the return to Italian residents on lending abroad that arises from controls on capital *outflows*. These controls *reduce* the interest rate received by Italians on foreign lending below that paid by the German borrowers; that is, $r_f < r_f^*$. The reduction in the return to home households may be interpreted as arising from a combination of deadweight losses and taxes associated with the controls.¹¹ Such controls correspondingly imply that the interest rate *paid* by Italian residents on foreign borrowing will be below that received by German lenders.

We assume that controls affect only *international* capital flows, and that arbitrage continues to operate in domestic markets. Thus, interest rates within each country are equalized; $r_b = r_f$ and $r_b^* = r_f^*$, implying $r_b = r_f < r_f^* = r_b^*$. To simplify the notation in our subsequent analysis, we define $r = r_b = r_f$ and $r^* = r_f^* = r_b^*$.

The intertemporal consolidated present-value budget constraint for the household sector in each country may be obtained by dividing (2) and (4) by $1+r$ and $1+r^*$, respectively, and adding the resultant equations to (1) and (3), respectively:

$$C_1 + RC_2 = Y_1 + RY_2 - (T_1 + RT_2) \quad (6)$$

$$C_1^* + R^*C_2^* = Y_1^* + R^*Y_2^* - (T_1^* + R^*T_2^*) \quad (7)$$

where $R = 1/(1+r)$ and $R^* = 1/(1+r^*)$ are the period 1 present value factors. The intertemporal budget constraints in each country limit consumption by the difference between the discounted present value of output and taxes. Note that this specification implies that as long as the discounted sums of taxes, $T_1 + RT_2$ and $T_1^* + R^*T_2^*$, remain unchanged, the timing of taxes does not influence private sector behavior.¹²

While government spending and taxes are given from

the point of view of households, they are linked together through the requirement that the government be solvent. The government budget constraint requires that in each period government outlays be financed by taxes or by domestic foreign debt issue and that in the last period all debt be repaid without issuing new liabilities. Thus for the domestic country government,

$$G_1 = T_1 + B + F^g \quad (8)$$

$$G_2 = T_2 - (1+r)B - (1+r^*)F^g \quad (9)$$

where F^g denotes (Italian) government foreign borrowing in period 1. (Negative levels of F^g denote foreign public lending.) The Italian government borrows domestically at the domestic interest rate r . When borrowing abroad, however, it is assumed that it does not face the capital controls imposed on the private sector, and the relevant interest rate for domestic government borrowing abroad is the foreign interest rate r^* . Moreover, to simplify the analysis, it is assumed that the government is unable to extract by taxes any of the interest differential $r^* - r$ associated with the domestic household sector's foreign borrowing and lending.

The domestic government's present-value budget constraint may be obtained analogously to that for the private sector. Dividing (9) by $1+r$ and adding the result to (8) gives:

$$G_1 + RG_2 = T_1 + RT_2 - uF^g \quad (10)$$

where use has been made of the result that (5) implies $R/R^* - 1 = u$. Although government spending, taxing, and financing decisions are all assumed exogenous, equation (10) makes clear that they are not independent of one another since the government's lifetime budget constraint must be satisfied. In the presence of controls on private sector capital outflows ($u > 0$), (10) implies that the present value of government revenue (discounted at the private home discount rate r) is reduced the greater is the extent of public foreign borrowing F^g . Intuitively, the existence of controls on capital outflows bottles up domestic funds and pushes down the home interest rate to a level below the foreign interest rate. Government borrowing (lending) abroad then implies a loss (gain) in revenue relative to borrowing (lending) domestically.

In the case of the foreign government, it is assumed that it borrows only from its local residents. Thus the single-period and present-value budget constraints abroad can be written as:

$$G_1^* = T_1^* + B^* \quad (11)$$

$$G_2^* = T_2^* - (1+r^*)B^* \quad (12)$$

$$G_1^* + R^*G_2^* = T_1^* + R^*T_2^* \quad (13)$$

Fully-informed, rational agents "see through" the government budget constraints, and recognize that the levels of government spending generate (implied) tax liabilities. Hence they incorporate the implications of the government budget constraints into their own budget constraints. The resulting consolidated budget constraint for the home country is obtained by substituting (10) into (6) and noting that (5) implies $R = R^*(1+u)$:

$$C_1 + RC_2 = Y_1 + RY_2 - (G_1 + RG_2) - uF^g \equiv W \quad (14)$$

The righthand side of (14) may be interpreted as a measure of household wealth W , defined as the difference between the present value of output and taxes, discounted by the domestic interest rate, plus a term associated with the (exogenous) foreign financing actions of the home government.¹³ The corresponding constraint for the foreign country is obtained analogously by substituting (13) into (7):

$$C_1^* + R^*C_2^* = Y_1^* + R^*Y_2^* - (G_1^* + R^*G_2^*) \equiv W^* \quad (15)$$

Several observations may be drawn from (14) and (15) concerning the effects of government policies on household wealth. First, observe from (14) that the home government's foreign financing actions, F^g , affect home household wealth because capital outflow controls reduce the foreign interest rate faced by households (r) below that faced by the government (r^*). This implies that borrowing abroad by the home government reduces its discounted revenue, increases its need for domestic financing of given public spending levels, and thereby lowers private sector wealth. Foreign lending by the Italian government has the reverse effect. This may be interpreted as an example in which capital controls break down the Ricardian equivalence between lump-sum taxes and foreign financing.¹⁴ We shall see below that through this wealth effect government financing will influence household behavior and the real economic equilibrium of the home and foreign countries.¹⁵

Second, observe that given the pattern of government spending, Ricardian equivalence still holds between lump-sum taxes and domestically-issued public debt, neither of which enters into (14). Thus households do not perceive *domestic* public debt as affecting private wealth.¹⁶ This implies that there is a distinction between government expenditures financed by taxes or domestically-issued public debt, on the one hand, and government expenditures financed by reduced (increased) foreign public lending (borrowing), on the other. Thus a switch from domestically-financed government expenditures to foreign-financed government expenditures will have real effects as long as capital controls exist.¹⁷ Observe from (15) that in the foreign country where there are no such controls, only the present value of government expenditures matters.

Optimal Household Behavior and Equilibrium

The households in each country are assumed to maximize lifetime utility subject to the intertemporal budget constraints above, where lifetime utility is defined as:¹⁸

$$V = \ln C_1 + D \ln C_2 \quad (16)$$

$$V^* = \ln C_1^* + D^* \ln C_2^* \quad (17)$$

where $D = 1/(1+d)$, $D^* = 1/(1+d^*)$ denote subjective discount factors, and d , d^* denote the corresponding subjective rates of time preference.¹⁹ The solution to this problem implies that the households in the two countries will choose intertemporal patterns of consumption which satisfy:

$$C_1/C_2 = (R^*/D)(1+u) \quad (18)$$

$$C_1^*/C_2^* = R^*/D^* \quad (19)$$

Thus the lower is the interest rate relative to the rate of social time preference (that is, the higher is R^*/D or R^*/D^*), the less is the incentive to lend, and the greater is the level of first period consumption relative to that in the second period. Note that capital controls, by restricting outflows and foreign lending by Italian households, also work to increase current relative consumption for the home country.

Optimization also requires that the economy-wide intertemporal budget constraints (14) and (15) be satisfied. Use of (18) and (19) along with these equations allows us to obtain

$$C_1 = \frac{W}{1+D}; C_2 = \left[\frac{D}{R^*(1+u)} \right] \left[\frac{W}{1+D} \right] \quad (20)$$

$$C_1^* = \frac{W^*}{1+D^*}; C_2^* = \left[\frac{D^*}{R^*} \right] \left[\frac{W^*}{1+D^*} \right] \quad (21)$$

The wealth coefficients represent the marginal (and average) propensities to consume out of wealth in each period. Observe that these propensities are all less than 1.

In equilibrium, the world supply of the single good is equal to the demand in each period. Thus, in period 1,

$$Y_1 + Y_1^* = \frac{W}{1+D} + \frac{W^*}{1+D^*} + G_1 + G_1^* \quad (22)$$

where W and W^* are given by the righthand sides of (14) and (15), respectively. An analogous condition defines equilibrium in period 2. It can be shown, however, that this condition is redundant.

By substituting the definitions of W and W^* into (22), we obtain an equation that relates the equilibrium foreign

interest rate factor, R^* , to the government spending levels, G_t and G_t^* ; home country foreign financing, F^g ; output levels, Y_t and Y_t^* ; the degree of home country capital controls, u ; and the subjective time preference factors, D and D^* :

$$R^* = \frac{(Y_1 - G_1)D(1+D^*) + (Y_1^* - G_1^*)D^*(1+D) + uF^g(1+D^*)}{(Y_2 - G_2)(1+D^*)(1+u) + (Y_2^* - G_2^*)(1+D)} \quad (23)$$

The home interest rate factor follows immediately from (5) which implies $R = R^*(1+u)$.

We will discuss the determinants of interest rates below. Before doing so, we note that the home country's trade balance surplus in period 1, TB_1 , is given by the difference between its output and absorption, $TB_1 = Y_1 - G_1 - C_1$.²⁰ Substituting with (14), (5), (20), and (23) yields the following expression:

$$TB_1 = \frac{(Y_2^* - G_2^*)[(Y_1 - G_1)D + uF^g] - (1+u)(Y_1^* - G_1^*)D^*(Y_2 - G_2)}{(Y_2 - G_2)(1+D^*)(1+u) + (Y_2^* - G_2^*)(1+D)} \quad (24)$$

Observe that in the special case of balanced growth and fiscal spending across countries and time (that is, $Y_1 - G_1 = Y_2 - G_2 = Y_1^* - G_1^* = Y_2^* - G_2^* = Y - G$) and no capital controls ($u = 0$), equation (24) reduces to $TB_1 = (D - D^*)(Y - G)/(2 + D + D^*)$ which is negative if $D < D^*$; that is, if $d > d^*$.²¹ Thus the home country runs a trade deficit in the first period if it has a higher rate of time preference and is more "impatient" than the foreign country.

Effects of Reduced Capital Controls

We are now able to investigate how financial liberalization may change the impact of fiscal policy on key macroeconomic variables, particularly interest rates, consumption levels, and the trade balance. We will consider three ways in which fiscal policy might change: (a) a domestically-financed increase in government expenditures; that is, $dG_1 > 0$, $dF^g = 0$; (b) a change from domestic to international financing of a given level of government expenditure; that is, $dG_1 = 0$, $dF^g = -(dT_1 + dB) > 0$; and (c) an internationally-financed increase in government expenditures; that is, $dG_1 = dF^g > 0$, $dT_1 + dB = 0$. The results of these exercises are summarized in Table 3. Inspection of (23) and (24) indicates that the effects of exogenous domestic supply shocks ($dY_1 > 0$) are symmetrical to case (a). The analysis of the effects of foreign and future fiscal policy changes is similar, but is not presented.

a. Domestically-financed government expenditures

The multiplier effects of temporary fiscal policy changes on the equilibrium foreign interest rate $1 + r^* = 1/R^*$ may

be determined from (23). An increase in first-period government spending financed out of either taxes or domestically-issued bonds ($dG_1 = dT_1 + dB$, $dF^g = 0$) leads to a fall in R^* and a rise in r^* .²² Intuitively, the increase in fiscal spending leads to an excess demand in the first-period goods market. To eliminate this excess demand, the relative price of first-period goods in terms of future goods, that is, the interest rate, must rise. Given u , the level of r rises as well.²³

Observe from (20) and (21) that the resulting increase in r^* and corresponding decline in R^* imply substitution away from current consumption and towards future consumption in *both* countries. Thus an increase in first-period home government spending crowds out not only current domestic consumption, but also current foreign consumption. Part of the rise in domestic government spending is "financed" through the crowding out of foreign consumption. In an interdependent world, increased fiscal spending in one country is financed by higher

interest rates and the crowding out of private spending in both countries. From (24), it may be discerned that even though home consumption is crowded out, on balance, the home country's trade balance worsens in response to the fiscal stimulus.

A decline in controls on capital outflows in the domestic country *diminishes* the effect of fiscal policy on the home country's interest rate r and *magnifies* the effect on the foreign interest rate r^* . Intuitively, diminished capital controls allow Italian residents greater access to the higher interest rates available abroad. This lessens the bottling up of domestic funds and allows domestic policies to have a smaller effect locally and a larger effect abroad. This implies that current domestic consumption will be crowded out less and foreign consumption more in response to domestic fiscal stimulus as capital controls are lowered. Note also that because the home country's current level of consumption falls less, the fiscal expansion leads to a greater decline in the trade balance.

b. Shift from domestic to international public financing

Next, we consider the effect of a switch in the financing of given levels of current fiscal spending from domestic to foreign sources ($dG_1 = 0$, $dF^g = -(dT_1 + dB) > 0$); that is, an increase (decrease) in public borrowing (lending) abroad. Because the government faces a higher interest rate abroad than do domestic residents, such a shift in financing will have an effect on real behavior.

In particular, it may be shown that increased public foreign borrowing leads to a decline in r^* and r . The reason is that the increase in borrowing creates a negative domestic wealth effect since the private sector perceives that the government will need to raise taxes to offset the greater cost associated with borrowing at the relatively higher foreign interest rate. (See equation (14).) The fall in wealth, in turn, implies households will reduce their current consumption, borrow less and/or lend more abroad, thereby pushing down interest rates in both countries. Hence increased government foreign borrowing crowds out private foreign borrowing.

With declining interest rates, both countries will increase first period consumption relative to second period consumption. However, because domestic households experience a wealth loss directly proportional to the extent of government foreign financing, the absolute level of consumption falls in the home country, and its trade balance improves correspondingly.

Increased integration diminishes the loss in wealth, the channel through which government foreign financing actions affect private behavior. Correspondingly, the declines

Table 3

Fiscal Policy Multipliers and Effects of Increasing Financial Liberalization on:¹

	r^*	r	C_1^*/C_2^*	C_1/C_2	C_1^*	C_1	TB_1
a. Domestically-Financed Government Expenditure Increase	+	+	-	-	-	-	-
Effect of Increased Liberalization	+	-	+	-	+	-	+
b. Shift from Domestic to International Public Financing	-	-	+	+	+	-	+
Effect of Increased Liberalization	-	-	-	-	-	-	-
c. Internationally-Financed Government Expenditure Increase	+ ²	+ ²	-	-	-	-	-
Effect of Increased Liberalization	+	-	+	-	+	-	+ ²

Notes: ¹The first line of each case gives the sign of the fiscal policy multiplier. The second line gives the effect of a decline in u on the absolute value of the corresponding multiplier. These signs assume, where necessary, $Y_1 - G_1 = Y_2 - G_2 = Y_1^* - G_1^* = Y_2^* - G_2^* = Y - G$, $F^g > 0$, and $(Y - G)R^* - F^g > 0$.

²Assumes $D > u$.

in r^* and r and the effects on both domestic and foreign macro aggregates are reduced. In the absence of capital controls, Ricardian equivalence between foreign and domestic financing holds, and there is no effect at all.²⁴

c. Internationally-financed government expenditures

An internationally-financed increase in government expenditures, that is, $dG_1 = dF^g > 0$, $dT_1 + dB = 0$, represents the combination of the previous two cases. The rise in government expenditures causes r^* and r to rise. The increases in interest rates are dampened, however, by the adverse wealth effects of public foreign financing. The net effects of the fiscal stimulus are qualitatively the same as with domestically-financed government expenditures when the wealth effects associated with the decline (rise) in foreign lending (borrowing) are not too large.²⁵ Thus, with the existence of capital controls ($u > 0$) the domestic and foreign interest rate are both *less* sensitive to internationally-financed temporary changes in home country government spending. That is, an internationally-financed increase in home country government spending leads to

smaller rises in r^* and r than for a domestically-financed increase. The reason is that, as noted above, when government spending is financed by more foreign public borrowing, home households perceive a fall in wealth. The resulting decline in consumption lessens the pressure on interest rates.

Thus the larger the share of home country government spending that is financed internationally, the *less* is the effect on foreign activity. This dampening of the transmission effect to foreign economies associated with the method of financing fiscal spending is dependent on the presence of capital controls. As integration increases, then, the transmission of changes in home country fiscal policy increases.²⁶

The analysis indicates that reduced restrictions on capital flows increase the transmission of disturbances, such as fiscal policy shifts, across national borders. Domestic disturbances have smaller effects domestically, and larger effects on foreign economies. Conversely, foreign shocks have larger impacts on the domestic economy.

III. Conclusions

A major finding of our analysis is that, with greater financial integration, a given domestic fiscal expansion (or adverse supply shock) will place less upward pressure on domestic interest rates and more upward pressure on foreign interest rates. Correspondingly, current domestic consumption will be crowded out by less and foreign consumption by more in response to domestic fiscal stimulus as capital controls are lowered. The reason here is that the closer linkage of the foreign and the domestic financial markets in effect "spreads" more of the effect of fiscal stimulus internationally.

Our analysis thus sheds light on the theoretical circumstances under which divergent fiscal policies may have larger disruptive effects as international capital mobility increases. Up to this point, the rise in the degree of capital

mobility in Europe over the past decade seemingly has not contributed to real instability associated with divergences in fiscal policy.²⁷ However, it is possible that further liberalization measures combined with a different pattern of fiscal disturbances within the EC could generate greater instability than has been observed so far. In particular, eliminating controls on capital movements will further increase the degree of linkage among the EC economies. Fiscal actions in one EC nation will be felt by its neighbors more than before. A given fiscal stimulus or contraction will have larger international repercussions in this new environment, and recent proposals to limit the magnitude of budgetary divergences may be viewed as an attempt to limit these transmission effects.

NOTES

1. The so-called Delors report, released in April 1989, outlines the specific steps required to achieve the "final stage" of economic and monetary union in Europe. With respect to macroeconomic policy coordination, the final stage of economic and monetary union envisioned involves permanently fixed exchange rates and possibly, though not necessarily, a single EC currency. It also recommends the setting of a Community-wide fiscal policy position and close coordination of national budgetary policies. Specifically, the report recommends "binding rules" be adopted: (i) to impose effective upper limits on budget deficits of individual member countries, (ii) to strictly limit monetary finance of budget deficits, and (iii) to limit external borrowing in non-EC member country currencies.
2. Key (1989) provides an excellent summary of the institutional features of the international liberalization of capital movements in Europe and the changes planned. Our descriptive material in this section draws on his article.
3. See Giavazzi and Giovannini (1986) for the role of capital controls in the workings of the European Monetary System.
4. Frankel and MacArthur (1988) find a bias against capital outflows in Italy until 1983, a neutral effect in 1984, and a bias effectively working to limit capital inflows in 1985 (i.e., Italian covered interest differentials were significantly positive). The latter may be attributable to the temporary constraint on capital inflows during this time: banks in Italy were not allowed to increase their net debtor foreign position from the second half of 1984 to December 1985. Barone, *et. al.* (1989) provide a useful description of the capital controls in effect in Italy during the 1980s.
5. Although a new foreign exchange law in Italy enacted in October 1988 liberalized the controls on capital flows, restrictions still remain. (See Barone, *et. al.*, 1989.) For example, Italian residents still are not allowed to hold funds in bank accounts abroad, and non-bank residents are not permitted to extend credit lines to non-residents or purchase money market instruments abroad with a maturity of less than six months. These residual controls should be eliminated by the middle of 1990 with the implementation of the EC Directive on the liberalization of short-term capital flows.
6. For Spain, Ireland, Portugal, and Greece the deadline for removal of restrictions on capital movements is 1992, with a possible extension for Portugal and Greece.
7. Several "safeguard" measures have been adopted in tandem with the process of liberalization of capital movements. These include a loan facility for member countries with balance-of-payments difficulties and a clause allowing the reimposition of capital controls in the event of exchange crises. These measures have been put into place not so much because of a concern that surges in capital outflows would follow as a consequence of lifting the few remaining restrictions, but primarily because it

is believed that exogenous shocks—one of which may be divergent fiscal positions—will lead to balance-of-payments and exchange crises in a fully deregulated environment.

8. According to national sources, in 1987 the Italian private and Italian public sectors (excluding the monetary authorities) had net foreign liability positions of \$37.6 billion and \$35.9 billion, respectively.

9. Another motivation is the desire to maintain domestic monetary control simultaneously with fixed exchange rates. Large government debt issues may place pressure for monetization on the central bank, which in turn may be forced to impose capital controls to maintain the exchange rate objective.

10. A number of papers have examined international aspects of fiscal policies in models in which agents' intertemporal objectives and constraints are explicitly modelled. See Frenkel and Razin (1985, 1987), Djajic (1985), and Greenwood and Kimbrough (1985), among others.

11. In the case of controls on capital inflows, the analogous condition to (5) would be $(1+r_f^*)(1+u_b) = 1 + r_f$, where u_b reflects the added cost to Italian residents from borrowing abroad.

12. Also, the intertemporal budget constraint implies $TB_1 + RTB_2 = 0$, that is, the discounted sum of trade balance surpluses must equal the sum of the inherited initial debt, which is zero in this model. Thus a trade deficit in the first period must be followed by a surplus in the second.

13. Note that the definition of home country household wealth in (14) discounts future output and government expenditures at the domestic interest rate. Use of the relation $R = R^*(1+u)$ allows equation (14) to be rewritten as $C_1 + RC_2 = Y_1 + R^*Y_2 - (G_1 + R^*G_2) + u[R^*(Y_2 - G_2) - F^g] = W$. This representation of the consolidated home country budget constraint separates household wealth into a component that discounts future output and government expenditures at the foreign interest rate—what may be interpreted as the "true" or shadow interest rate for home households—and a component associated with the direct effects of capital controls on household wealth.

14. Greenwood and Kimbrough (1985) obtain a similar nonequivalence result, although in their model capital controls take the form of quantitative restrictions on capital flows.

15. One possible extension of the model is to assume that capital controls take the form of an explicit tax on capital outflows and that the government can extract at least a fraction of the interest differential $r^* - r$ associated with household foreign lending, F^p . It can be shown that if the home government fully extracts this differential without any deadweight losses and if rational households fully internalize the effect of the controls on their wealth, F^g will not matter.

16. A number of papers have modelled the circumstances under which the nonequivalence between taxa-

tion and domestic bonds breaks down in an international setting. For example, Frenkel and Razin (1987, Chapter 11) develop a two-country version of Blanchard's (1985) uncertain-lifetime setup in which the relevant household discount rate is below that of the infinitely-lived government. Obstfeld (1989) analyzes the long-term dynamics of fiscal policy in a model with economic growth. In his paper, nonequivalence between domestic debt and taxation arises because new households are assumed to be unconnected with existing households. Since current debt holders do not value the consumption of unborn taxpayers, a fraction of public debt is perceived as net wealth by existing households.

17. Greenwood and Kimbrough (1985) make a similar point.

18. We do not directly analyze government optimization decisions; hence we ignore the problem of the time inconsistency of government policies.

19. The results would not be affected by including government spending levels in these utility functions as long as preferences for the privately- and publicly-provided goods were separable.

20. This relation is consistent with the summing of equations (1) and (8), which implies $Y_1 - C_1 - G_1 = -(F^p + F^g) = TB_1$, that is, national saving equals the capital account deficit, which, in turn, equals the current account surplus.

21. With capital controls, (24) reduces to $TB_1 = [(D - D^*)(Y - G) - u((Y - G)D^* - F^g)]/[2 + D + D^* + u(1 + D^*)]$. In this case the condition for $TB_1 < 0$ is $(Y - G)[D - D^*(1 + u)] + uF^g < 0$.

22. An increase in current foreign fiscal expenditures such that $dG_1^* = dT_1^* + dB^*$ has the same effect on r^* . An increase in second period fiscal spending in either country has the opposite effect.

23. In our benchmark model, output levels in the two periods are assumed fixed and given by endowments. Extending the model to allow real investment provides a richer "supply side" to the model by causing output growth to become endogenous. This would focus attention on production opportunities of each economy, as government policies influence private investment decisions and hence the future capital stock and output potential. This supply mechanism generally dampens the

effects of such exogenous changes as stimulatory fiscal policy on interest rates. In addition, it implies that the net impact of fiscal stimulus on aggregate income and consumption could be positive, as suggested by typical Keynesian models.

24. In this analysis the level of government financing (F^g) is treated as an exogenous variable. In addition, it has been assumed that the domestic government is unable to extract any of the interest differential between domestic and foreign interest rates through taxes. Relaxing this assumption could create an incentive for the government to exploit the corresponding arbitrage opportunity by borrowing less abroad, where interest rates are higher, and more at home. Such an analysis would necessitate extending the model by specifying a government objective function and determining optimal government behavior.

25. A sufficient condition is $D > u$.

26. Our basic model focuses on the intertemporal terms of trade—the real interest rate—as a central component in the transmission mechanism of fiscal policy. Introducing non-tradable goods focuses attention on the intratemporal terms of trade, that is the real exchange rate, defined as the inverse of the relative price of non-tradable goods to tradable goods. In this case the effects of government spending depend on the commodity composition and time pattern of the spending. See Chapter 9 of Frenkel and Razin (1987) for a detailed exposition of the effects of fiscal policy in a two-country, two-period model with tradable and non-tradable goods.

27. Tanzi and Ter-Minassian (1987) discuss in detail the extent to which monetary and fiscal policies in the EC members of the European Monetary System (EMS) have tended to converge. Tanzi and Ter-Minassian argue that the discipline associated with nearly fixing exchange rates (despite the fact that there have been eight EMS realignments since its inception resulting in a 27 percent cumulative appreciation of the DM against other EMS currencies) has been partly responsible for a convergence in monetary policies and hence inflation rates. The convergence of monetary policies has not been matched by a convergence of fiscal policies, however.

REFERENCES

- Barone, E., G. Majnoni, and G. Marchese. "International Interest Rate Linkages and Monetary Implications in Italy," in *International Interest Rate Linkages and Monetary Policy*. Basle: Bank for International Settlements, March 1989.
- Blanchard, Olivier. "Debt, Deficits, and Finite Horizons," *Journal of Political Economy*, 93, 1985. 223-247.
- Committee for the Study of Economic and Monetary Union. "Report on Economic and Monetary Union in the European Community." April 12, 1989.
- Djajic, Slobodan. "Effects of Budgetary Policies in Open Economies: The Role of Intertemporal Consumption Substitution," *Journal of International Money and Finance*, 6, 1987. 373-83.
- Frankel, Jeffrey and A. MacArthur. "Political vs. Currency Premia in International Real Interest Differentials: A Study of Forward Rates for 24 Countries," *European Economic Review*, 32, 1988. 1083-1121.
- Frenkel Jacob A. and Assaf Razin. "Fiscal Expenditures and International Economic Interdependence," in Willem Buiter and Richard Marston, eds., *International Economic Policy Coordination*. Cambridge: Cambridge University Press, 1985.
- _____. *Fiscal Policies and The World Economy*. Cambridge: MIT Press, 1987.
- Giavazzi, Francesco and Alberto Giovannini. "The EMS and the Dollar," *Economic Policy*, No. 2, April 1986.
- Giavazzi, F. and M. Pagano. "Capital Controls and the European Monetary System," in F. Giavazzi, ed., *Capital Controls and Exchange Legislation*. Milan: Euro-mobiliare Occasional Papers, No. 1, June 1985.
- Greenwood, Jeremy and Kent P. Kimbrough. "Capital Controls and Fiscal Policy in the World Economy," *Canadian Journal of Economics*, November 1985. 743-65.
- Key, Sydney J. "Financial Integration in the European Community." Board of Governors of the Federal Reserve System, *International Finance Discussion Papers* No. 349, April 1989.
- Lane, Timothy and L. Rojas-Suarez. "Credibility, Capital Controls, and the EMS," *International Monetary Fund Working Papers* No. 89-9, January 26, 1989.
- Obstfeld, Maurice. "Fiscal Deficits and Relative Prices in a Growing World Economy," *Journal of Monetary Economics*, 23, 1989. 461-484.
- Tanzi, Vito and Teresa Ter-Minassian. "The European Monetary System and Fiscal Policies," in S. Cnossen, ed., *Tax Coordination in the European Community*. Netherlands: Kluwer Press, 1987.