Table 8.12 **Fiscal Multipliers from Two World Macro Models (percentage increase in real GDP in the first two years)**

	United States		Japan		Germany	
Effect on real GDP						
FRB MCM[a]	1.5	0.9	0.2	0.2	0.2	0.5
EPA WEM[b]	2.02	2.01	0.17	0.56	0.17	0.59
Effect on prices						
FRB MCM	−0.0	0.3	0.0	0.1	0.0	0.2
EPA WEM	0.57	1.38	0.11	0.36	0.04	0.20

Source: See note 55.

Note: The table shows the percentage increase in real GDP and in consumer prices owing to a sustained increase in United States real government spending equal to 1% of GDP for the first two years.

[a]Federal Reserve Board multicountry model.

[b]Japanese Economic Planning Agency world economic model.

8.3 Summary

The standard macroeconomic paradigm remains the IS-LM model augmented with a Phillips curve.[52] In this paper we have shown how the model must, for the case of the United States economy, be amended to take account of international effects and interactions. What conclusions emerge?

The only key structural equation that goes unamended is the money demand equation. Even here foreign variables are often proposed, though not persuasively.[53] In the goods and assets markets, foreign prices, foreign activity, and foreign asset yields appear as important determinants of domestic activity, prices, and interest rates. The quantitative magnitude and the stability of these relations remains a topic of research, but their existence and their importance to an understanding of the United States macroeconomy are beyond question.

International interactions exert an important effect on the way monetary and fiscal policies operate. The exchange rate system determines the extent to which asynchronized policies are possible and the channels through which they exert their effects on the economy. The Mundell/Fleming model of twenty years ago introduced these ideas, and they remain valid today. For the United States economy, policy limitations became apparent in the late 1960s when capital outflows on a large scale signaled that even a large country could not set the tone for the world economy. But under flexible exchange rates these interdependence effects have become much more dramatic. They immediately affect the

52. See Board of Governors of the Federal Reserve 1983, Amano, Sadahiro, and Sasaki 1981, and Yoshitomi 1984. For further references see, too, Larsen et al. 1983.

53. See, for example, McKinnon 1982.

key trade-off—the Phillips curve. Theory suggests and empirical evidence supports the notion that under flexible rates the Phillips curve is much steeper. A tight money policy leads to appreciation and thus allows rapid disinflation. The traditional idea, appropriate to fixed rates, is that crowding out takes place chiefly via higher interest rates' depressing interest-sensitive components of spending, particularly housing. Under flexible rates the crowding out takes place also at another margin, reduced net exports owing to appreciation.

Thinking on fiscal policy, too, must be modified. Fiscal expansion via its impact on interest rates induces currency appreciation, at least in the short run. Therefore fiscal expansion is less inflationary than the closed-economy Phillips curve suggests, but it also involves more crowding out. This is because net exports decline under the impact of appreciation.

Several unsettled areas of research require attention. One is to determine the importance of relative asset supplies for risk premiums and hence for long-run interest differentials, equilibrium real exchange rates, or both. The literature as yet gives no guidance to these issues. To make the point concretely, we do not have in domestic macroeconomics any empirical evidence that the maturity of the debt affects the term structure of interest rates. Long-term and short-term debt, for macroeconomics, are much the same. Is this also true when we ask if it makes a difference whether our United States deficits are financed in deutsche mark or United States dollar bonds? If the answer is affirmative, an entire popular range of ideas about the budget and exchange rates becomes irrelevant.

The second issue on which we know very little, indeed even less, is the open economy role of the stock market. If asset markets are important via their impact on exchange rates and hence on aggregate demand and prices, then surely the stock market must take a particularly important place because it is forward looking and because of its size relative to other asset markets.

The third issue, closely linked to the previous point, concerns the open economy linkages to investment. What is the impact of real exchange rates on investment spending, and how important are long swings in real exchange rates in affecting investment and hence productivity growth and employment? This question connects, of course, with the crowding-out issue raised above. The current view expressed in policy discussions is that there is less crowding out under flexible than under fixed exchange rates. But perhaps, taking into account the open economy channels, we get as much crowding out of investment, but with real appreciation rather than increased real interest rates as the channels and with manufacturing rather than housing as the affected sector. Such effects, if they do exist, would have significant longer-run implications for the performance of the economy.

Appendix

In this appendix we set out and briefly analyze a simple model that includes the three chief links between the domestic and international economies: the demand for goods, corresponding to Keynesian multiplier analysis; asset market linkages, emphasis on which at one time led to the claim that exchange rates are determined in the assets markets; and the supply side, which has received emphasis in the recent disinflation. The model guides our discussions in the text of the effects of exchange rate changes and foreign shocks.

The Model

The Assets Markets

There are four assets: domestic money, domestic bonds, foreign bonds, and capital. Domestic money is held entirely by domestic residents. Domestic bonds and capital may be held by foreigners as well; foreign bonds may be held by domestic residents.

Equilibrium conditions in the markets for domestic assets are:

$$\text{(A1)} \quad \frac{M_t}{P_t} = L(Y_t, R_t^B), \qquad L_1 > 0,\ L_2 < 0.$$

$$\text{(A2)} \quad \frac{B_t}{P_t} = H(Y_t, \gamma_t^B, \Pi_t, \gamma_t^K, \gamma_t^F, V_t, V_t^*), \quad H_1 < 0,\ H_2 > 0,\ H_3 \gtrless 0,\ H_4 < 0,\ H_5 < 0,\ H_6 > 0,\ H_7 > 0.$$

$$\text{(A3)} \quad q_t K_t = J(Y_t, \gamma_t^B, \Pi_t, \gamma_t^K, V_t, V_t^*), \quad J_1 \lessgtr 0,\ J_2 < 0,\ J_3 \gtrless 0,\ J_4 > 0,\ J_5 < 0,\ J_6 > 0,\ J_7 > 0.$$

Symbols are defined in table 8.A.1. The expected real returns on domestic bonds, capital (equity), and foreign bonds are given by:

$$\text{(A4)} \quad (1 + \gamma_t^B) = (1 + R_t^B)_t \left(\frac{P_t}{P_{t+1}}\right).$$

$$\text{(A5)} \quad (1 + \gamma_t^K) = \frac{F_K(K_t, Y_t) + {}_tq_{t+1}}{q_t}.$$

$$\text{(A6)} \quad (1 + \gamma_t^F) = (1 + R_t^F)_t \left(\frac{e_t P_t}{e_{t+1} P_{t+1}}\right).$$

The presubscript t indicates the expectation formed on the basis of information available at time t. In writing (A2) and (A3) as functions

Table 8.A.1 Symbols

M_t	Money stock
P_t	Price level
Y_t	Real output
R_t^B	Nominal return on domestic bonds
B_t	Stock of domestic bonds
Y_t^B	Expected real return on domestic bonds
Π_t	Expected inflation rate
γ_t^K	Expected real return on domestic equity
V_t	Wealth of domestic residents
V_t^*	Foreign wealth
q_t	Relative price of an equity claim on capital
e_t	Exchange rate
B_t^{d*}	Holdings of foreign bonds by domestic residents
B_t^d, K_t^d	Holdings of corresponding assets by domestic residents
P_t^*	Foreign price level
Y_t^d	Disposable income
G_t	Government expenditure
Y_t^*	Foreign output
P_t^m	Domestic price of material inputs
W_t	Nominal wage
δ	Rate of depreciation of capital
T_t	Real taxes minus transfers, exclusive of interest payments on government debt

not only of expected real returns but also of Π_t, the expected inflation rate, we use the first-order approximation:

$$(A4') \qquad (1 + R_t^B) = (1 + \gamma_t^B) \frac{1}{t\left(\frac{P_t}{P_{t+1}}\right)}$$

$$\approx (1 + \gamma_t^B) \frac{{}_tP_{t+1}}{P_t}$$

$$= (1 + \gamma_t^B)(1 + \Pi_t).$$

A similar approximation applies for the return on foreign bonds.

Real domestic wealth, V_t, consists of holdings of the four assets by domestic residents:

$$(A7) \qquad V_t = \frac{M_t}{P_t} + \frac{B_t^d}{P_t} + q_t K_t^d + \frac{e_t B_t^{d*}}{P_t} .$$

Because foreign residents may hold both domestic bonds and domestic equity, the amounts of these assets held by domestic residents are not usually equal to the outstanding stocks.

The assumption in (A1) is that money is held for transactions purposes, at an opportunity cost equal to the return on bonds.[54] The assets are assumed to be gross substitutes. Demand functions by domestic residents have the same general forms as $LC(\ )$, $H(\ )$, and $J(\ )$ but are not dependent on foreign wealth, V_t^*. In addition, the demand by domestic residents for foreign bonds is:

$$\text{(A8)} \quad \frac{e_t B_t^{d*}}{P_t} = G(Y_t, \gamma_t^B, \Pi_t, \gamma_t^K, \gamma_t^F, V_t), \qquad \begin{array}{l} G_1 \leqslant 0,\ G_2 < 0,\ G_3 \geqslant 0, \\ G_4 < 0,\ G_5 > 0,\ G_6 > 0. \end{array}$$

The Goods Market

We start by specifying the demand for domestic output.

$$\text{(A9)} \quad Y_t = D\left(\frac{e_t P_t^*}{P_t}, Y_t^d, G_t, V_t, q_t\right) + NX\left(\frac{e_t P_t^*}{P_t}, Y_t^d, Y_t^*, V_t\,(q, q^*, P_m/P)\right), \; D_i > 0,\ i = 1,?,$$
$$NX_1 > 0,\ NX_2 < 0,\ NX_3 > 0,\ NX_4 < 0.$$

Prices are based on costs and the level of output relative to capacity:

$$\text{(A10)} \quad P_t = C(W_t, P_t^m, e_t P_t^*, Y_t/K_t), \qquad C_1 > 0,\ C_2 > 0,\ C_3 > 0,\ C_4 \geqslant 0.$$

The function (A10) permits an interpretation as a supply function with output on increasing function of the price level and a decreasing function of the wage, materials prices, and the prices of imported inputs.[55]

Wages

Wages are predetermined, based on the level of output (and thus employment) and expected price level:

$$\text{(A11)} \quad W_t = \psi\left((Y/K)_{t-1}, {}_{t-1}(Y/K)_t, \frac{{}_{t-1}P_t}{P_t}, W_{t-1}\right), \qquad \psi_1 > 0,\ \psi_2 > 0,\ \psi_3 > 0,\ \psi_4 > 0.$$

54. The return R_t^B should therefore be thought of as applying to a short-term asset; it would be desirable to include term-structure relations in an extended version of the model.

55. We have not included cost of capital measure in (A10), though the rental rate on capital and inventory holding costs do provide a supply-side channel for interest rates to affect prices.

Accumulation Equations

The wage equation provides the first explicit dynamic equation. Asset accumulation equations add further essential dynamics.

$$K_t = (1 - \delta)K_{t-1} + I(q_{t-1}, K_{t-1}). \tag{A12}$$

$$(M_{t+1} + B_{t+1} - M_t - B_t) = P_t(G_t - T_t) + (1 + R^B_{t-1})B_t. \tag{A13}$$

$$\begin{aligned}(1 + R^f_{t-1})e_t B^{*f}_t - (1 + R^b_{t-1})(B_t - B^d_t) \\ - (1 + F_K(\,))q_t(K_t - K^d_t) + P_t NX_t \\ = e_t B^{*f}_{t+1} - (B_{t+1} - B^d_{t+1}) - q_t(K_{t+1} - K^d_{t+1}).\end{aligned} \tag{A14}$$

(A12) is the capital accumulation equation, (A13) the government budget constraint, where it is implicitly assumed that all debt is one-period, and (A14) is the balance of payments constraint.

The openness of the economy is reflected in the asset market equilibrium conditions, the goods market, and the asset accumulation equations. In the assets markets, movements in foreign interest rates, or in foreign wealth, affect United States rates of return and asset prices: foreign influences appear on both the demand and supply sides in the goods market; on the supply side, external disturbances may affect both the prices of material inputs and, directly, the costs of imported inputs. Equation (A14) describes the link between the current account and net ownership of foreign assets.

We now analyze the short- and long-run equilibriums of the model, emphasizing open-economy aspects, before turning to the dynamics of adjustment.

Short-Run Equilibrium

To start we examine short-run asset market equilibrium. We wish to obtain functions:

$$\begin{aligned}R^B_t &= R\,(X_t) \\ q_t &= q(X_t) \\ e_t/P_t &= e(X_t),\end{aligned} \tag{A15}$$

where

$$X_t = \left[M_t, B_t, K_t, P_t, Y_t, \frac{{}_tP_{t+1}}{P_t}, \frac{{}_te_{t+1}}{e_t}, \frac{{}_tq_{t+1}}{q_t}, \gamma^f_t, B^d_t, K^d_t, B^{*d}_t\right].$$

Several of the variables in X_t will themselves be determined in the full equilibrium of the model. The asset holdings, B^d_t, K^d_t, B^{*d}_t are to be understood as beginning of period stocks.

The properties of the functions in (A15) are implied by the equilibrium conditions (A1)–(A3). (A1) directly implies

$$\text{(A16)} \qquad R_t^B = R\left(\frac{M_t}{P_t}, Y_t\right), \qquad R_1 < 0, R_2 > 0.$$

We are thus making the strong assumption that money market conditions alone determine the short-term interest rate. Inclusion of wealth in the demand function for money would modify this latter conclusion without affecting the signs of the derivatives indicated in (A16).

The properties of the $q(\ )$ and $e(\ )$ functions are obtained using (A2) and (A3). Suppose there is an increase in the expected real return on foreign bonds, γ^f, with other variables in X_t held fixed. (Thus both the nominal and real returns on foreign bonds increase.) Figure 8.A.1 shows asset market equilibrium loci, JJ representing capital market equilibrium and HH bond market equilibrium. The JJ curve is positively sloped because an increase in q creates an excess supply of capital that is offset by the wealth effect arising from an increase in

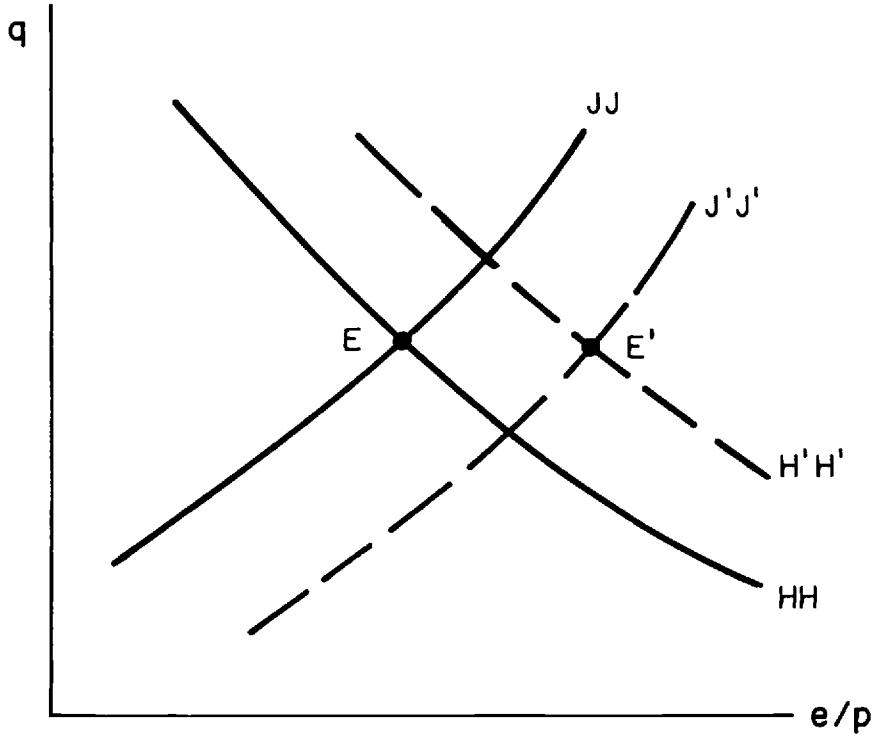

Fig. 8.A.1 Effects of an increase in the foreign interest rate.

the real exchange rate (depreciation). The HH curve slopes down because an increase in q creates excess demand for bonds through both rate of return and wealth effects, which is offset by the wealth effect of an appreciation.

An increase in the foreign interest rate creates an excess supply of both bonds and capital in the United States. The curves shift as shown in figure 8.A.1 to maintain asset market equilibrium. The real exchange rate unambiguously rises—the currency depreciates. The effects on q depend on the relative substitutability of domestic bonds and capital for foreign bonds. If the substitution is mainly between domestic and foreign bonds, then q will rise. This occurs because with the domestic interest rate given, the increase in e/P that equilibrates the bond market is large and creates excess demand in the capital market. If substitution between foreign bonds and domestic real assets is high, a rise in interest rates abroad will reduce United States stock values. An increase in the expected rate of depreciation of the dollar (i.e., a rise in ${}_te_{t+1}/e_t$) will have the same effects on the exchange rate and q as a change in the foreign interest rate.

An open market purchase, in figure 8.A.2, reduces the domestic interest rate, creating an excess demand for capital and—it can be shown—an excess supply of bonds. Equity prices rise, and the effects on the exchange rate are ambiguous. The more substitutable are bonds and capital, the more likely is it that the open market purchase causes the currency to depreciate.

The properties of the functions $q(\ )$ and $e(\ )$ in (A15), which can be derived using similar analysis, are:

(A17)
$$\frac{\partial q}{\partial M} > 0; \frac{\partial q}{\partial B} > 0; \frac{\partial q}{\partial K} < 0; \frac{\partial q}{\partial P} < 0; \frac{\partial q}{\partial Y} ?; \frac{\partial q}{\partial \frac{{}_tP_{t+1}}{P_t}},$$

$$\frac{\partial q}{\partial \frac{{}_te_{t+1}}{e_t}} \gtrless 0; \frac{\partial q}{\partial \frac{{}_tq_{t+1}}{q_t}} > 0 \quad \frac{\partial q}{\partial \gamma_t^f} \gtrless 0 \quad \frac{\partial e}{\partial M} > 0, \frac{\partial e}{\partial B} > 0, \frac{\partial e}{\partial K}$$

$$> 0, \frac{\partial e}{\partial P} < 0, \frac{\partial e}{\partial Y} ?, \frac{\partial e}{\partial \frac{{}_tP_{t+1}}{P_t}}, \frac{\partial e}{\partial \frac{{}_te_{t+1}}{e_t}} > 0; \frac{\partial e}{\partial \frac{{}_tq_{t+1}}{q_t}} > 0 \quad \frac{\partial e}{\partial \gamma_t^f} > 0.$$

Data and Definitions

1. The wage equations in table 8.5 use the following data:
   W: hourly earnings of production workers, total private nonfarm
   Wman: hourly earnings of production workers in manufacturing
   Wser: hourly earnings of production workers, services.

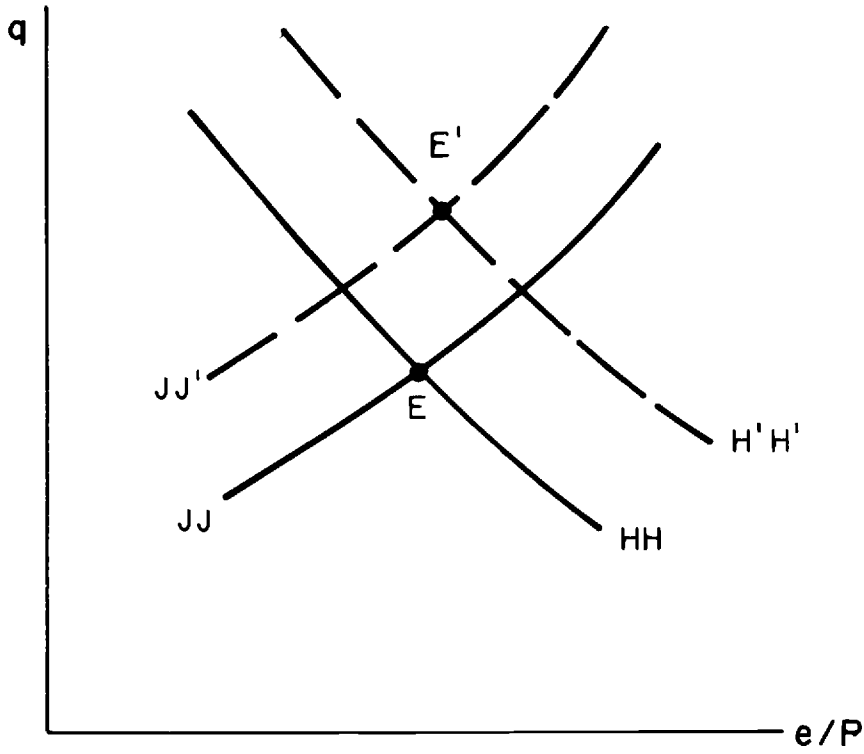

Fig. 8.A.2 Effects of an open market purchase.

Wage inflation is measured by the quarter-to-quarter change at an annual rate in each equation. The unemployment variables in the three equations are respectively the unemployment rate of wage and salary workers in manufacturing, the unemployment rate of wage and salary workers in finance and services, and the economywide unemployment rate of married men.

Expinf: expected inflation is measured by a geometrically distributed lag on the four-quarter inflation rate of the consumption expenditure deflator with a .15 decay factor so that expinf = $.151\log(P(-1)/P(-5)) + .85*\text{expinf}(-1)$.

Delex denotes the twelve-quarter change in the real exchange rate. The real exchange rate variable is the relative value added deflator in manufacturing reported in the International Monetary Fund *International Financial Statistics*. With R the real exchange rate, Delex = $100*\log(R/R(-12))$.

2. The inflation equation in table 8.4 shows as independent variable the quarter-to-quarter change, at an annual rate, of the fixed-weight

GNP deflator. The unemployment rate is that of married men. Real exchange depreciation is defined as above. The wage inflation variable is the four-quarter change in hourly compensation in the private nonfarm economy, Winf = 100*log(Wage/Wage(−4)). The dummy variable in the regression assumes a value of 0 for 1965–72 and 1 for 1973:1 to 1983:2.

3. The inflation equation for manufacturing uses as wage inflation the quarter-to-quarter change, at annual rates, of hourly compensation in manufacturing. The unemployment rate is that of wage and salary workers in manufacturing. The real depreciation variable is defined as above.

Comment

Stanley W. Black

The paper by Dornbusch and Fischer should perhaps be retitled "Linkages of the United States Economy to the Rest of the World," since that is its principal topic and theme. As such, it is a highly useful component of a domestically oriented volume such as this one.

The paper falls into two parts, of which the first examines whether the major linkages have changed in the postwar period or more recent floating exchange rate periods, as compared with prewar experience, using descriptive statistics. The second part, together with the appendix, provides an analytical model of the linkages and some estimates of price/wage linkages in the period 1962–83.

To my taste this organization of data first, theory second leaves something to be desired. To a novice in international economics, it might appear a bit like some of my ten-year-old daughter's cake-making operations: first we get out the ingredients, then we look for a recipe to combine them! Of course Dornbusch and Fischer are expert chefs, so they know which ingredients are called for. But the unwary reader might find it useful to peruse part 2 before reading part 1.

The paper begins with a perhaps surprising fact: business cycles in four major countries were more closely in phase during the gold standard era than in either the interwar or the postwar period. This result depends on comparing Morgenstern's measures of harmonization of "classical" business cycles in the prewar periods with Klein and Moore's measure of postwar "growth cycles," a comparison that involves the use of slightly different concepts.

Dornbusch and Fischer next turn to discussion of trade linkages, showing in table 8.1 that *on average* the United States economy has

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always been relatively closed, though it reached an autarchic extreme in the 1930s. Use of the *net* service balance here is possibly misleading because of the growth in the share of services in total trade flows. However, as the authors stress, the United States economy is open *at the margin* in the sense that trade flows, though small, fluctuate as much as other components of GNP. Figure 8.2 suggests appropriately that changes in relative prices as reflected in the real exchange rate may have led to the increased importance of traded goods in the economy in the 1970s, as shown in table 8.1.

It is interesting that Dornbusch and Fischer's discussion of trade flows looks at trade in relation to income and relative prices but not, with the exception of their treatment of the gold standard period, in relation to monetary flows. I take this as a reflection of the fact that the monetary approach to the balance of payments is not particularly relevant to explaining the composition of the United States balance of payments, especially since reserve flows have usually been an unimportant component of changes in the money supply.

The digression on the Smoot-Hawley tariff argues that a tariff that is not subject to retaliation should be expansionary on both Keynesian and monetarist grounds. This argument would be more convincing if the authors could assure us that retaliation did not occur. This point is particularly worrisome in the light of current agitation to pass legislation requiring a minimum domestic content for automobiles sold in the United States.

Moving on to the discussion of asset market linkages, we note an apparent paradox in the findings: (*a*) the correlation between United States and United Kingdom monthly treasury bill rates is higher in the floating rate period 1974–83 than during the gold standard period 1876–1914; (*b*) the standard deviation of interest rate *differentials* was lower during the gold standard period than during the floating rate period. The paradox is probably due to the inflation premium in interest rates during 1974–83, which exaggerates the correlation coefficient. It might well disappear if *real* interest rates were compared rather than nominal rates.

Part 2 of the paper begins with a model of aggregate supply and demand, spelled out more explicitly in the appendix and familiar from the authors' textbook and many other places cited in a footnote. While I have no serious problems with this rather Keynesian model, Anna Schwartz and others may find things to argue with. I take it the main purpose is to describe the linkages, which is certainly accomplished.

Tables 8.7 to 8.9 offer estimates of price and wage linkages, covering 1962–83, which includes periods of both pegged and flexible exchange rates. Several questions may be raised about these estimates. Is it

proper to enter the exchange rate as a predetermined variable when the exchange rate is floating? Did wage and price controls affect the relationship? Was it unchanged over such a long period? Table 8.10 estimates that a 10% depreciation of the dollar would eventually lead to a 2% rise in prices, significantly above the usual estimate of 1.5%. One should note that the larger effect of the exchange rate on the personal consumption deflator than on the GNP deflator is due to the exclusion of imports from domestic value added (i.e., GNP).

Part 2's discussion of asset markets seems disjointed, presenting the case of perfect substitutability in the text and the case of imperfect substitutability in the appendix. As the authors note, the empirical literature has in a sense rejected both cases, since random walk models forecast about as well as any standard structural model. Since the text maintains the assumption of perfect substitutability down to the section on fiscal policy, it would be helpful to the reader to understand that this implies risk-neutral investors.

The discussion of monetary and fiscal policy notes the role of movements in the real exchange rate as a key element in the transmission process in an open economy model. The familiar Dornbusch result that the nominal exchange rate overshoots its equilibrium value in a world of high asset substitutability is explained in the context of tight money leading to a temporarily overvalued exchange rate. The benefits to inflation control can be described as a steeper Phillips curve, but it should be noted that the gain to inflation control is only temporary, because the overvaluation is necessary.

Introduction of imperfect substitutability in the discussion of monetary policy would allow treatment of different monetary policy instruments such an open market operations or exchange market intervention, which cannot be distinguished in the perfect substitutes case. Recent work by Hansen and Hodrick (1980) and Loopesko (1983) rejects the perfect substitutes model when combined with the assumption of efficient markets.

The alternative approach leads to a model of a time-varying risk premium, as shown in the authors' equation (8). Among others, Dornbusch (1982b) and Black (1985) have decomposed the risk premium into factors involving a coefficient of risk aversion, the conditional variance of the exchange rate, and the relative supply of foreign currency assets. A substantial amount of current work is aimed at identifying causes of time-varying risk premiums.

This paper closes with some rather mystifying comments on the portfolio effects of fiscal policy. The authors state that fiscal expansion will lead to exchange rate depreciation if "portfolio effects are important." This presumably refers to imperfect substitutability and would

be no surprise in the Mundell/Fleming model with low capital mobility. Finally, they suggest that the effects of fiscal policy on the stock market may be of major importance.

There are several issues affecting monetary and fiscal policy that do not make it into part 2 of the paper and that ought to be considered by business cycle theorists. These include Meade's (1951) analysis of the role of internal and external balance targets on the formulation of monetary and fiscal policy and more recent discussion by Sachs (1980) and others of the influence of real versus nominal wage stickiness on the effectiveness of monetary and fiscal policy. But the authors have provided a service to readers of this volume by discussing the major linkages between open economies.

Comment

Anna J. Schwartz

Let me begin by noting an error of omission and one of commission that I find in the paper. The error of omission is the absence of a money supply function. Dornbusch and Fischer state that if monetary authorities "attempt to stabilize interest rates in the context of a foreign budget deficit, they create a monetary expansion in attempting to fight rising domestic interest rates." That is the only reference to a disturbance that may arise on the supply of money side. Again, in summing up, they refer to the ways an IS-LM model must be modified to take account of international effects and interactions. They state that the only key structural equation that goes unamended is the money demand equation. If the money demand equation is the only key equation that goes unamended, why is there no amended money supply equation in the event authorities react to foreign influences in setting the target for the instrument they use in determining the money stock growth rate? The authors may respond that it is the United States economy only that they are examining, and United States monetary authorities do not react to foreign influences. That certainly has not been true of the whole period since 1962 that the second part of the paper focuses on. In any event the subject of foreign influences on the supply of money deserves discussion.

The error of commission I find in the paper is the assessment of the role of the exchange rate. Dornbusch and Fischer state, "The exchange rate must play a part in explaining United States inflation and in assessing the impact of policy changes on the price level." The exchange rate does not "explain" inflation. It is a necessary adjustment to in-

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flation that originates in monetary actions. I shall take up this issue at a subsequent point. My comments deal with selected aspects of the paper.

Trends and Cycles

Although the first part of the paper covers trends and cycles in the external linkages, by NBER traditional standards, there is not much on cycles. The following points occur to me.

1. The measure of openness of the United States economy in table 8.1, shown in the column of tariff proceeds as a percentage of total imports of dutiable and nondutiable goods, is dubious, as the authors indicate, but not only because a tariff that excludes all imports would have no weight in an index of this type. More important, in recent years it is not the tariff but quantitative trade restraints that are the most important barriers to openness. How to express the quantitative effect of such restraints when there is no measure of the volume of trade that does *not* take place is an intractable problem.

With respect to the exchange rate regime, fixed exchange rates under the pre–World War I gold standard implied openness to foreign disturbances. It was the rejection of this condition and the consequences for domestic economic activity that led in the interwar period to the conceptions that dominated the creation of the Bretton Woods system. Fixed but adjustable exchange rates would be the new order, but international payments imbalances would not be required to affect domestic monetary policy. Although liberalization of trade would be encouraged, capital controls were acceptable. The Bretton Woods system broke down, and we now have a system with supposedly market-determined exchange rates that are periodically managed by the industrialized countries; some relaxation of capital controls among the industrialized countries, but an increasing incidence of a varied lot of protectionist measures adopted by both industrialized and developing countries; and monetary growth rates that many central banks determine by reference to foreign interest rates and exchange rate changes. Openness seems to me a concept that defies measurement.

2. Dornbusch and Fischer note that asset market linkages in the pre–World War I and interwar economies were less tight than simple accounts of the gold standard imply. I agree that the evidence does not support the instantaneous arbitrage in goods and asset markets that the doctrinaire monetary approach to the balance of payments espouses. On the other hand, I believe that debunking the linkages under the pre–World War I gold standard can be carried too far. The main reason for this belief is that the gold standard would have broken down if the countries that formally adhered to it in fact did not intend to maintain fixed exchange rates and convertibility of the domestic cur-

rency. That rules of the gold standard were flouted from time to time merely confirms that there was leeway to delay the required response. The proof is that the gold standard did not break down before World War I. So I would not agree that pre–World War I central banks "frequently sterilized gold flows." They sometimes did for periods of limited duration that did not compromise the integrity of the standard. Sterilization clearly became more generalized during the interwar period.

In this connection, the discussion in the paper of Morgenstern's findings on asset market linkages should be tempered by reference to George Borts's criticism of both Morgenstern's methodology and his data.

3. The authors argue that the effects of the Smoot-Hawley tariff of June 1930 have been substantially exaggerated. There are two views on this issue. Frank Taussig regarded the tariff as futile and the marginal increase in duties over the Fordney-McCumber tariff of 1922 as not much more damaging. The opposite view that Allan Meltzer has expressed shows that the two-year period of the slow legislative progress to enactment of the Smoot-Hawley bill enabled our trading partners to retaliate immediately on its passage. World economic welfare clearly was adversely affected. This argument and Gottfried Haberler's stress on the intensification of the world depression as a result of the imposition of the tariff and the retaliatory measures that followed seem to me valid.

Dornbusch and Fischer cite the fact that the quantity of United States imports rose smartly in 1922–23 despite the imposition of the Fordney-McCumber tariff, thanks to business expansion. Although the quantity of exports declined, that did not interrupt the expansion. The quantity both of imports and of exports declined in 1931–33 following Smoot-Hawley, but the decline in import values was much steeper than that in import quantities. The authors contend that had there been sensible macroeconomic policy after 1930, the connection that Meltzer finds between the tariff, declines in exports of agricultural goods, and bank failures in agricultural regions would not have resulted in a great depression. Moreover, even a generous allowance for a multiplier effect of the tariff-based decline in exports would account for only 3% of the 15% decline in United States real GNP between 1929 and 1931. I am in general agreement with this view, although the effects in the rest of the world probably were more severe. I do not, however, understand the statement in the paper, "In addition to the tariff, net exports were, of course, affected by the extensive competitive depreciation on the part of foreign countries." What "competitive depreciations"? Is this a reference to Britain's abandonment of gold in 1931? To the depreciation in 1936 following the United States depreciation in 1933–34? Were these "competitive"?

Open Economy Linkages

In part 2 of the paper, Dornbusch and Fischer trace open economy linkages in the goods market, between the goods market and factor prices, in asset markets, and in monetary and fiscal policies. The models presented are Keynesian. For example, the equation for the goods market equilibrium is strictly demand determined. There is no reference to the possibility that supply reacts to price changes, particularly if the changes are unexpected. The notion of transmission through a multiplier effect of foreign purchases of home goods that leads to an increase in output and employment in my view encourages the drift to protectionism. We know from the current recovery in this country that it is feasible to achieve a strong growth rate of real GNP with a balance of trade deficit. As the authors note, Darby and Stockman find very weak multiplier effects in their international model. In a Saint Louis–type equation for GNP, the evidence presented by Batten and Hafer also suggests that accounting for export activity is not statistically important for the Untied States. So emphasis on the linkages between foreign trade and aggregate demand seem to me overdrawn. International linkages are also identified in the terms for wealth and disposable income that affect the world real interest rate, but the paper admittedly does not define their impact on the aggregate demand for United States goods. A final channel mentioned is the wealth effect of "persistent international capital movements, for instance, arising from persistent public sector deficits." I shall refer to the channel in a different context later on.

The markup price equation is the basis for theorizing about the effects of a rise in import prices and materials on aggregate demand and supply: a direct route through the effects of import prices on domestic markups and on costs and thus prices, and indirect routes through the effects on wage settlements in industries involved in the international economy and the effect of demand pressures from abroad on domestic prices.

Nine quarterly regressions for 1962–83 are presented to test the theoretical impacts of the external sector on domestic inflation based on the markup equation, sets of three regressions each with the dependent variable the rate of change first of the GNP deflator, second of the personal consumption deflator, and third of wages, not otherwise identified. According to the results, exchange rate changes, the rate of change of hourly wage rates and of output per hour in manufacturing, and the rate of change of the price of oil and gas can explain about 80% of the variance of the deflators. In the regressions on the rate of change of wages, exchange rate changes, the log of unemployment for married men and expected inflation can explain about 50% of the variance of wages. The most significant variable is the expected inflation

rate. Dornbusch and Fischer conclude that exchange rate changes have relatively quick direct effects on prices and a slower-working indirect effect on wages.

I believe the results of the regressions reflect how some of a necessary adjustment was worked out. The regressions do not explain why an adjustment was necessary. A price level equation can of course be obtained by equating nominal money supply and demand and solving for the price level. By opening to view the monetary source of the price rise, such an equation will demonstrate that an adjustment is necessary.

In considering the asset market, Dornbusch and Fischer indicate that answers to the questions whether domestic and foreign bonds are perfect or imperfect substitutes, whether the stock market should be accorded a role, and whether the redistribution of wealth through the current account is important for the determination of the exchange rate and macroeconomic equilibrium help analyze the implications of sustained fiscal deficits and of long-term current account deficits. The conclusion is that under flexible rates, with perfect substitutability an increase in the money stock leads to overshooting of the exchange rate because prices are sticky, real balances increase, and output expands while the real and nominal interest rates fall. The ensuing inflation returns the real exchange rate to its long-run equilibrium value. Thus monetary and fiscal policy affect the real exchange rate as well as the real interest rate channel.

Whether overshooting would in fact occur depends on whether inflationary expectations come into play when the money stock is increased. Dornbusch and Fischer agree that overshooting is not inevitable if output expands initially to raise the nominal interest rate. I would put it differently. There may be no output effects given inflationary expectations but simply higher nominal interest rates.

The asymmetry in adjustment speeds between goods and asset markets, they argue, establishes a link between tight money and significant transitory exchange rate overvaluation. Since tight money works rapidly and strongly on the exchange rate, disinflation therefore can take place more rapidly.

I do not see the close connection between money growth rates and real exchange rates in 1982 and 1983. During the four quarters of 1982 real exchange rates rose 13%. M1 rose 8.5%. Was that tight money? In the first quarter of 1983, the real exchange rate fell 3.5% while money growth accelerated from the fourth quarter 1982 annual rate of 9.9 to the first quarter 1983 annual rate of 14.3. The deceleration of money growth in the second quarter of 1983 of one-half a percentage point was accompanied by an increase in the real exchange rate of 2.9%.

To affirm a close connection between money growth rates and the exchange rate during this period, one has to appeal to the appreciation

of the exchange rate as proof that double-digit money growth rates are not excessive. This is Martin Feldstein's dubious argument in the 1984 annual report of the Council of Economic Advisors: "The fact that the price of the dollar in foreign exchange markets remained high throughout 1983 is a clear signal that the market had confidence in the Federal Reserve and that the money growth rate was not excessive" (p. 62). That remains to be seen.

Turning to fiscal policy, Dornbusch and Fischer assume that sustained fiscal expansion raises long-run aggregate demand. I presume they mean budget deficits. Unless monetized, in my view, deficits have no such effect. If financed by borrowing, deficits will bring about crowding out.

While the crowding-out effect in the goods market is said to lead to appreciation, clearing asset markets in the case of debt finance requires depreciation to maintain portfolio balance. Whether appreciation or depreciation will result, the paper says, depends on the relative importance of portfolio effects versus aggregate demand effects. It seems clear that typically portfolio effects dominate, since budget deficits have usually accompanied depreciating currencies, another reason I do not believe that deficits raise aggregate demand. Dornbusch and Fischer conclude that the risk premiums in financing budget deficits by issuing bonds in the expanding country's currency can be avoided by financing in the currency of other countries so that the currency composition of world outside assets remains unchanged. I note that empirically the model of diversification has not worked very well.

Conclusion

I would like to conclude by reporting a view of the relation between fiscal and foreign sector deficits that Jan Tumlir presented at a recent Shadow Open Market Committee meeting. He noted a decline in the global savings ratio attributable to unprecedented fiscal deficits in both industrial and developing countries and the swing from a large current account surplus to a deficit of the OPEC group. Countries are competing for the limited supply of world savings. While the savings ratio in Japan is 30% of GNP, in the United States it currently is only 15%–16%. Japan, faced with intense trade discrimination abroad, cannot find investment opportunities at home to absorb its national savings. In the United States, on the other hand, investment opportunities are growing so rapidly that domestic savings cannot finance them without inflation. The United States therefore turns to foreign sources of savings. The only way to borrow capital abroad is through a current account deficit.

Tumlir remarked that the role of the real exchange rate in hurting United States exporters has been exaggerated. Despite the high exchange rate of the dollar, cyclical conditions abroad, and increased competition for export orders in the rest of the world, United States total real exports during the initial twelve-month period following the

business cycle trough in November 1982 rose at a somewhat higher rate than they did in the comparable periods following the troughs of March 1975 and July 1980. Only United States real exports to oil-exporting LDCs are currently depressed. At the same time, the exchange rate helps keep domestic prices more competitive. In any event, exchange rate changes are not an independent contribution to inflation or deflation but an integral part of the mechanism by which inflation or deflation develops from the original monetary impulse.

Tumlir ended his remarks by noting possible outcomes given the current account deficit that provides the foreign capital in the absence of adequate savings to finance all attractive United States investment opportunities. Under free trade, the industries most affected by the import competition would be those with the least attractive investment opportunities. Their shrinkage would be irreversible when the investment cycle ran its course or fiscal deficits ended. When a government grants protection to selected industries, however, investment prospects improve in these industries. Industries with more promising prospects then face intensified competition from abroad, since the imports through which it would have been most economical to transfer the capital from abroad are restrained. The more promising prospects in the unprotected industries will deteriorate, and resources will be shifted to the protected industries.

The implication I draw from Tumlir's analysis is that the problem is not the current account deficit or the strong dollar. The problem is the world's low savings ratio, which fiscal deficits exacerbate. As for the level of the real interest rate, it is clearly positive now after years of negative real rates. Whether real rates are regarded as above their equilibrium level depends on an estimate of inflationary expectations. I doubt that averaging the last three years of actual inflation is an adequate measure of United States and world market expectations. We shall do more to restore real rates to whatever their equilibrium level is by eliminating once and for all the recurrence of variable and rising inflation rates.

Discussion Summary

Robert Gordon took issue with the large total effect of exchange rates on wages and prices found by the authors. He noted that the effect was much greater than he had found previously and that, in retrospect, even his coefficients had overstated the impact of exchange rate appreciation on inflation in 1981–83. He felt their finding was due to their arbitrary specification of inflation expectations and their failure to allow

price markups to depend on domestic demand or to attribute some of the acceleration of inflation in 1974 to the lifting of wage and price controls.

Robert Eisner and Geoffrey Moore both expressed concern that the authors had examined the role of foreign variables on the GNP price deflator, which, they argued, would fall when import prices rose, ceteris paribus. Moore noted that the gross domestic purchases deflator did not have this defect and, in addition, was more comprehensive than the deflator for consumers' expenditure.

Allan Meltzer elaborated on his analysis of the effects of tariffs on the domestic economy. He noted that the Fordney-McCumber tariff was harder to dismiss as a contributor to the 1923 recession than was the Smoot-Hawley tariff in the Great Depression. He noted that the retaliation to the Smoot-Hawley tariff may, however, have exacerbated the Great Depression through its impact on agricultural land prices and income, and hence on bank failures in agricultural areas.

Stanley Fischer doubted that the strong impact of exchange rates on output was due to the authors' omission of a variable to capture the relaxation of price controls in 1974, since the lags in the estimated equation were too short to allow price controls to work in the manner Gordon suggested, but he did concede that the price expectations term estimated was possibly misleading. Rudiger Dornbusch noted that agricultural prices in the rest of the world fell by more than those in the United States in the Great Depression. Thus United States agricultural tariffs kept domestic prices higher than world prices and could not have caused land prices to fall by more than they would have without tariffs.

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