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A Synthesis of the Keynesian and Monetarist Approaches to the Short-run Theory of the Balance of Payments

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Abstract

The paper generates the approaches as special cases of a general model, finding out the assumptions necessary to produce their propositions. The monetarist propositions essentially follow from perfect capital mobility, whereas those of the Keynesian elasticity-absorption approach are a consequence of the "Keynesian neutral monetary policy" assumption. This and the fixed-income version of the monetarist approach turn out to be independent special cases of the general model, each approach abstracting from what the other is analyzing. However, the "orthodox neutral monetary policy" version of the Keynesian approach nests the basic monetarist model. Several results, such as the additional assumptions required for the monetarist effects and the inappropriateness of describing this approach as a long-run theory are also derived.

I. Introduction

Balance of payments theory continues to leave the policy-maker thor-

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oughly confused. According to the Keynesian elasticity-absorption approach, an increase in income or the price level, or a decline in the interest rate, all *weaken* the balance of payments *permanently* mainly through imports, while according to the monetarist approach, they *improve* it *temporarily* by increasing the demand for money. Thus fiscal expansion weakens it permanently according to the elasticity-absorption approach, and improves it temporarily according to the variable-income version of the monetarist approach, causing no change in the fixed-income version. The effects of monetary policy and devaluation are likewise permanent according to the Keynesian approach, and temporary according to the monetarist approach. Allen and Kenen [1980, p. 4] conclude from Johnson [1977, p. 251]: "The partners would be incompatible". However, Johnson considered a reconciliation possible [1972, p. 14]: "... the achievement of such a synthesis [between "the short-run Keynesian" and "long-run monetarist" approach] is, to my mind, the really challenging task facing international monetary theory in its next stage of development."

Of earlier syntheses, Frenkel, Gylfason, and Helliwell [1980] take the "Keynesian balance of payments" (the trade balance plus the capital account) and the money market ("monetarist balance of payments") equations and add a goods market equation. A conventional Keynesian open-economy macro model results. They then solve the system with respect to fiscal and monetary policy effects and point out that income and the balance of payments move in the same or in the opposite directions depending on the shock moving them both. Therefore the empirical tests performed on the two balance of payments equations do not provide a basis for discriminating between the approaches. The authors are careful not to claim that the Keynesian balance of payments equation, used in empirical work, is the Keynesian *approach* as a whole. That approach has a position on how monetary policy affects the balance of payments and therefore has to include the money market equation. It follows that the monetarist approach is part of such a version of the Keynesian *approach*. Their model, designed for a much more limited purpose, is a special case of ours and fails to produce many of the predictions of the approaches. (See footnote 6 below).

McCallum and Vines [1981] synthesize the New Cambridge and monetarist approaches and conclude that both schools make essentially the same

central point, the former concentrating on assets in general, while the latter concentrates on money.

The purpose of this paper is to synthesize the Keynesian and monetarist approaches to short-run balance of payments theory. Unlike the previous studies, which have started from the models of the approaches and combined them, we will develop a general enough model to nest both approaches. This involves including an explicit supply side and an appropriately specified money demand function to identify the duration of the policy effects and the effects of exchange rate adjustments, which have been at the center of the Keynesian-monetarist controversy but have not been identified in previous syntheses. We shall then find out what special assumptions are necessary to generate all, rather than some, of the propositions of the approaches also regarding their reasons: the demand for or the supply of money for the monetarists, and trade and capital flows for the Keynesians. This also enables us to 2) check whether the claims made by the proponents of the approaches hold and whether there are necessary assumptions left out, or redundant assumptions, 3) relate the approaches to each other and to the general model, 4) assess the relevance of the approaches on the basis of the empirical evidence on the assumptions behind them, not only of that of their predictions, and 5) evaluate the empirical work done on the approaches.

It will be shown that the key assumption generating basically monetarist propositions is perfect capital mobility. The basic, or fixed-income version of the monetarist approach further calls for the real wage model and purchasing-power parity. The variable-income version calls for the money wage model (the supply of labor a function of the nominal wage) in this regime.

The key assumption in the elasticity-absorption version of the Keynesian approach is "Keynesian neutral" monetary policy, where the central bank uses the interest rate as the policy variable. The money wage model also needs to be added. Comparison of this version with the fixed-income version of the monetarist approach reveals that each approach dichotomizes the general model, the monetarist approach making the money market equation, and the elasticity-absorption approach the goods market and balance of payments equations the independent parts. Thus each approach abstracts from the effects of the market the other is studying: The approaches are independent parts of the general model. It follows that since

the policy regime assumptions are the basic conditions for the balance of payments responses, these responses are qualitatively robust to such earlier conjectures as the issue of stock vs. flow equilibrium or purchasing-power parity.

The other version of the Keynesian approach, where the central bank uses the money supply as the policy variable, basically produces the propositions of the whole model. Thus this version of the Keynesian approach nests the fixed-income version of the monetarist approach.

It will furthermore be shown that

- the monetarist propositions result from the general model under commonly made assumptions, though monetarists have not stated them all. Therefore, contrary to a popular view, the approach is not theoretically "false",
- the monetarist theory does not satisfy the requirements of a long-run theory (*c.f.* Johnson above),
- empirical studies on capital flows and central bank reaction functions having rejected the key assumptions behind the monetarist and the elasticity-absorption approaches, neither approach is normally sufficient, but that they should be married.

The paper will proceed as follows. In section II, the model is developed. In section III, the Keynesian and monetarist models are derived as special cases of the model, and their relationships to each other and to the general model discussed. Finally, section IV is the conclusion.

II. The General Model

We will analyze a small open economy, with exogenous foreign goods prices and foreign interest rate. The foreign demand curve for domestically produced goods is negatively sloped. We will abstract from the different expectation – generating mechanisms and other issues that have not been central to the debate.

$$Y = E^{*}(\underset{+}{Y}, \underset{-}{r}, \underset{+}{V/P^{D}}) + T^{*}(\underset{-}{E^{*}}, \underset{-}{P^{D}/e}) + G = E(\underset{+}{Y}, \underset{-}{r}, \underset{(-)}{e}) + T(\underset{-}{Y}, \underset{+}{e}) + G \quad (1)$$

$$M \equiv M_{-1} + \Delta D + \Delta R = L^{*}(\underset{+}{P^{D}Y/P}, \underset{-}{r},)P = L(\underset{+}{Y}, \underset{-}{r}, \underset{+}{e}) \quad (2)$$

$$\Delta R = T^*(\underset{-}{E^*}, \underset{-}{P^D/e})P^D + K(\underset{+}{r}) = T(\underset{-}{Y}, \underset{+}{e})P^D + K(\underset{+}{r}) \tag{3}$$

$$P \equiv aP^D + (1-a)e \tag{4}$$

$$dP^D = \theta dY + \rho de \tag{5}$$

Eq. (1) represents aggregate demand for the domestic good and is the sum of private expenditures (E^*), the trade balance (T^*), and government expenditures (G), all in terms of the domestic good, and equal total output (Y). Expenditures are a function of income, the domestic interest rate (r), and real wealth (V/P^D, where V is nominal wealth and P^D the domestic goods price). The trade balance is specified as a function of expenditures, imports being functionally part of total expenditure. This deviates from the conventional specification with only income as the argument. That specification implies that all of an expenditure change, caused by a change in the interest rate or real wealth, falls on domestic goods, whereas that caused by an income change falls on both domestic and imported goods. The other argument in the trade balance function is the real exchange rate, where (e) is the price of foreign currency in terms of domestic currency. Foreign goods prices are fixed at unity. We will later return to the quasi-reduced forms on the right.

Eq. (2) is the money market equation. Since cash is held to buy both domestic and imported goods, but not exported goods, real balances (M/P where M is the nominal money supply), have to be defined in terms of the expenditure price (P), as is widely accepted. However, then income in the money demand function (L^*) has to be in terms of the same goods, since otherwise velocity would not be a pure number, as first proposed in Ahtiala (1984). The other argument is the interest rate. The M equals its value at the end of the period M_{-1} plus the change in the central bank's foreign exchange reserves (ΔR) and the central bank's open markets operations (ΔD).

Eq. (3) states that the balance of payments is the sum of the nominal trade balance and capital flows (K), where capital flows are a function of the interest rate, given the exogenous foreign rate.

In Eq. (4), the expenditure price is a weighted average of domestic and foreign goods prices.

Eq. (5) is the reduced-form expression of the supply side from the Appendix. It is notable that θ is positive and finite not only in the money wage model but also in the real wage model (the supply of labor a function of the real wage). The ρ is unity in the real wage model and zero in the money wage model. The initial values of e, P^D, and thereby P will be set at unity by an appropriate choice of units.

Substituting (4) and (5) into (1), (2), and (3) yields their quasi-reduced forms, shown on the right, in Y, r, and ΔR. There, we have simplified the trade balance equation by ignoring the effects of r on T through expenditures to simplify the expressions. This leaves the conclusions unaffected.

Most of the new partials are unambiguous, as can be seen from footnotes 1, 2, and 3, where they have been derived and interpreted. E_Y in Equation (1) is assumed to remain positive and smaller than one partly because of the wealth effect. E_e is negative in the real wage model and zero in the money wage model.[1] T_Y is negative. T_e, L_Y and L_e are positive.[2,3]

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1. The expression for the change in expenditures reads:

$$dE = (E_Y^* - E_{(V/P^D)}^* \theta V)dY + E^* dr - E_{(V/P^D)}^* \rho V de \qquad (B1)$$

The multiplier of dY, which is the new E_Y, is the marginal propensity to spend adjusted for the wealth effect. The multiplier of the second term in the brackets is positive and finite, as shown. Ando and Modigliani [1963] have obtained the value of .06 for $E_{(V/P^D)}^*$. E_e is the marginal effect of the exchange rate on expenditures through the wealth effect. It is negative in the real wage model ($\rho = 1$) and zero in the money wage model ($\rho = 0$).

2. We get from (1):

$$dT = \left(T_E^* E_Y + T_{(P^D/e)}^* \theta\right)dY - \left(T_{(P^D/e)}^* \frac{Y_N - W_P^S}{Y_N - aW_P^S} - T_E^* E_e\right) de \qquad (B2)$$

The multiplier of dY, or T_Y is negative, since both its terms are negative, $T_{(P^D/e)}^*$ being negative if the Marshall-Lerner condition holds. T_e is composed of the expenditure-switching effect and of the effect, on imports, of the exchange rate via real wealth and thereby expenditures. It is positive in the money wage model ($W_P^S = 0$; $E_e = 0$; see the Appendix) if $T_{(P^D/e)}^* < 0$, and in the real wage model ($Y_N = W_P^S$; $E_e < 0$) because of the wealth effect.

3. We get from (2), as above:

$$d(LP) = \{\theta[1-a)L_Y^* Y + aL^*] + L_Y^*\}dY + L_r^* dr + \frac{1-a}{Y_N - aW_P^S}[L^* Y_N - (Y_N - W_P^S)L_Y^* Y)de \qquad (B3)$$

III. The Policy Effects

Totally differentiating the model of equations (1), (2), and (3), we get the matrix equation (6) for the general case, observing that $T = 0$ in the initial stationary state equilibrium. The equilibrium is stable, assuming that excess demand on the goods market leads to a rise in output, that on the money market to a rise in the interest rate, and a balance of payments surplus to an increase in foreign exchange reserves, as the reader can readily verify.

$$\begin{bmatrix} z & -E_r & 0 \\ L_Y & L_r & -1 \\ T_Y & K_r & -1 \end{bmatrix} \begin{bmatrix} dY \\ dr \\ d\Delta R \end{bmatrix} = \begin{bmatrix} dG + (E_e + T_e)de \\ d\Delta R - L_e de \\ -T_e de \end{bmatrix} \tag{6}$$

$$z \equiv 1 - E_Y - T_Y$$

A. The General Model

The policy effects are displayed in Table 1.

D_1 is positive, as became evident from the discussion on stability above.

The effects of fiscal and monetary expansion are standard: a rise in income and a trade balance deficit. Monetary expansion leads to a balance of payments deficit, as well, while fiscal expansion does likewise if the reduced-form LM curve is flatter than the BP curve and vice versa, as the reader can verify.

However, only the trade balance response to devaluation is unambiguous. As to dY/de, there are two distinguishable components, real and monetary, as can best be seen by factoring out $(K_r - L_r)$. The former is composed of a nonpositive wealth effect on expenditures (E_e) and the positive trade balance effect on total demand (T_e). The monetary, or "crowding out", effect is the net effect on expenditures of the monetary consequences of the change

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L_Y is the partial of the demand for *nominal* balances with respect to income and is positive. L_e is the corresponding partial with respect to the exchange rate. As the value of the income elasticity of the demand for money has not been an issue in the debate, we will assume it to be less than unity, implying $L^* - L_Y^* Y > 0$ and making L_e positive. For the consequences of the income elasticity being greater than unity, see Ahtiala [1989].

Table 1

The General Solutions

	$dY/$	$d\Delta R/$	$d(T \cdot P^D)/$
$/dG$	$\frac{(K_r - L_r)}{D_1} > 0$	$\frac{(L_Y K_r - L_r T_Y)}{D_1}$	$\frac{(K_r - L_r)T_Y}{D_1} < 0$
$/d\Delta D$	$\frac{-E_r}{D_1} > 0$	$\frac{-zK_r - E_r T_Y}{D_1} < 0$	$\frac{-E_r T_Y}{D_1} < 0$
$/de$	$\frac{(K_r - L_r)(E_e + T_e) + E_r(L_e - T_e)}{D_1}$	$\frac{f}{D_1}$	$\frac{d}{D_1} > 0$

$$D_1 \equiv (K_r - L_r)z + E_r(T_Y - L_Y) > 0$$

$$z \equiv 1 - E_Y - T_Y$$

$$f \equiv z(L_e K_r - L_r T_e) + E_r(L_e T_Y - L_Y T_e) + (E_e + T_e)(L_Y K_r - L_r T_Y)$$

$$d \equiv (K_r - L_r)\left[(1 - E_Y)T_e + T_Y E_e\right] + E_r(L_e T_Y - L_Y T_e) > 0$$

in the supply of, and demand for money. The net effect is ambiguous.

$d\Delta R/de$, or the balance of payments response to exchange rate adjustments is composed of the interaction of the same factors. A sufficient condition for devaluation to improve the balance of payments is that the third term in the numerator is non-negative: the LM curve is no steeper than the BP curve, or $T_e \geq |E_e|$. The last condition holds *e.g.* in the money wage model, where E_e is zero.

It is worth noting here that whenever the policy effect in the general model is ambiguous, also the direction of the balance of payments effects predicted by the two approaches are opposite, as with fiscal policy.

B. Perfect Capital Mobility in the Model

Perfect capital mobility makes $K_r \to \infty$, making r constant. First, we get the Mundell [1963] – Fleming [1962] income effects: powerless monetary and powerful fiscal policy, as shown in Table 2.

However, the balance of payments responses are essentially monetarist,

Table 2

The Policy Effects under Perfect Capital Mobility

	$dY/$	$d\Delta R/$	$d(TP^D)/$
$/dG$	$1/z > 0$	$L_Y/z > 0$	$T_Y/z < 0$
$/d\Delta D$	0	−1	0
$/de$	$(E_e+T_e)/z$	$L_e+(L_Y/z)(E_e+T_e)$	$\left[T_e(1-E_Y)+T_YE_e\right]/z > 0$

$$z \equiv 1-E_Y-T_Y$$

since they accommodate the change in the demand for, or supply of, money and are therefore temporary (Eq. 2 and 3), the capital account financing the trade balance changes. Fiscal expansion thus causes a *temporary surplus,* and the effect of monetary policy is -1, *i.e.* perfect one-shot offset.

As to exchange rate adjustments, the wealth (E_e) and trade balance (T_e) effects have a straight multiplier effect on income, whose change depends on the supply side. In the money wage model ($E_e = 0$), devaluation is expansionary, and in the real wage model contractionary, the numerator becoming $(1 + T_E^*)E_e$ ⟨see footnote 2⟩. The change in the demand for money, and the balance of payments depend on the direct effect of the price level change L_e, and that caused by the above income change. The effect is therefore positive in the money wage model, and ambiguous in the real wage model. Thus perfect capital mobility produces monetarist balance of payments responses except for the last effect.

B. The Monetarist Model

The monetarist model comes in two versions, the basic fixed-income version, and the variable-income version. Examine a prototype of monetarist assumptions, as summarized by Kreinin and Officer [1978, p. 13]: 1) A stable money demand function, 2) Countries do not pursue sterilization policies, 3) Wage-price flexibility fixes output at its full employment level (the natural rate) at least in the long run, Perfect substitution across countries both on the goods and capital markets, *i.e.* 4) Each good sells at the same

price at home and abroad, 5) $K_r \to \infty$.

However, these assumptions were already in effect with perfect capital mobility above so that they are not sufficient to generate the prediction that devaluation leads to a temporary improvement in the balance of payments. Secondly, there is a problem with the implication stated for the third assumption. Wage-price flexibility does imply full employment but not fixed employment: the classical dichotomy does not hold in the open economy, but the aggregate supply curve is rising and θ is finite in Eq. (5).

For the monetarist proposition for the balance of payments effect of devaluation to hold, the second term in its expression in Table 2 must be nonnegative, which implies that the income change has to be nonnegative. One possibility is that we have the money wage model - an assumption that does not fit in well with the Chicago notion of labor behavior. It is, however, necessary for the variable-income version of the monetarist approach.

The second possibility is two additional assumptions that fix income:

6) The foreign demand elasticity for domestically produced goods is minus infinity (the *PPP* assumption). This is sometimes made by monetarists ⟨*e.g.* Johnson [1976, p. 155]⟩. Letting $T_{P^D/e} \to -\infty$ we obtain, after substitution of the values of T_e and T_Y from footnote 2:

$$\lim_{T_{P^D/e} \to -\infty} (dY / de) = (Y_N - W_P^S) / \theta(Y_N - aW_P^S) \qquad (7)$$

Assuming further

7) the real wage model, where $W_P^S = Y_N$ (see the Appendix) the expression goes to zero, producing the propositions of the fixed-income version of the monetarist approach (Assumption 6 already made $dY/dG = 0$, as $T_Y \to -\infty$).

To sum up, assumptions 6 and 7 together fix the output level, and 5 the interest rate, leading to the stock adjustment equations on the money market as overall balance of payments effects, discussed above. However, income is now an exogenous (*i.e.* supply-determined) variable, making the model overdetermined. Specifically, in the goods market equation, there are now no endogenous variables left. The economics of this market suggests:

8) The change in the trade balance dT_0 has to be the residual term on the goods market: any difference between the given output and expenditures is

Table 3
The Policy Effects in the Fixed in the Fixed-Income Monetarist Model

	$dY/$	$d\Delta R/$	$d(T \cdot P^D)/$
$/dG$	0	0	−1
$/d\Delta D$	0	−1	0
$/de$	0	$L_e > 0$	$-E_e > 0$

passively accommodated by the trade balance — an assumption implicit in 4 and 6. We now get the propositions of the fixed-income version of the monetarist approach under the above assumptions: The fiscal policy effect on the balance of payments is now zero (contrary to Frenkel, Gylfason and Helliwell p. 590), the balance of payments exactly offsets monetary policy, and devaluation causes a temporary improvement in it.

However, the characterization of the monetarist equilibrium as a long-run equilibrium is inappropriate. As can be seen from the third column, the trade balance is left in disequilibrium, which changes real wealth. This is inconsistent with equilibrium in the long run (*c.f.* Johnson in the Introduction).

The monetarist model can be looked at in another way. While the variable-income version can still be regarded as a special case of the model as a whole, the monetarists have dichotomized our general simultaneous model to get the fixed-income version, the money market (2) being the independent equation. It has only one endogenous variable, ΔR. For consistency, the rest of the equations, (1) and (3) must contain two additional endogenous variables, T_0 in (1), and K in (3), given ΔR and T_0. Therefore, *the monetarist model does not contradict the basic Keynesian notions such as the consumption, investment, and import functions,* as is generally proposed, but is *independent* of them. All that it calls for is that whatever the endogenous variables in the rest of the model, they may not appear in the money market equation. The monetary part of the adjustments to policy is the only part which remains when sufficient behavioral assumptions are made so as to

eliminate all the other parts.[4]

C. The Keynesian Model

The Keynesian approach also comes in two versions and implicitly assumes full monetary sterilization by treating either the money supply ("orthodox neutral monetary policy") or the interest-rate ("Keynesian neutral monetary policy"), rather than the domestic component of the money supply, as the control variable. The propositions of the former version are that fiscal expansion leads to a "permanent" balance of payments deficit if the LM curve is flatter than the BP curve, monetary expansion to a permanent deficit, and devaluation to a permanent surplus. The latter version proposes that fiscal expansion leads to a permanent deficit, the remaining two effects being the same as in the former version.[5]

The reader can verify that the assumption of orthodox neutral monetary policy essentially produces the policy responses of the general case in Table 1, except that the balance of payments response to devaluation is ambiguous. Assuming furthermore, the money wage model produces the balance of payments effects of the orthodox neutral monetary policy version of the Keynesian approach. Since the money market equation is part of this case, it nests the fixed-income version of the monetarist approach.

The assumption of Keynesian neutral monetary policy produces the policy responses of the elasticity-absorption approach. In this regime, r becomes a policy variable and ΔD an endogenous variable. The money wage model is further assumed.

Fiscal expansion and devaluation are expansionary as seen from Table 2 above, since E_e is zero. The respective balance of payments effects are the same as the trade balance effects of Table 2. The balance of payments turns into a permanent deficit in response to fiscal expansion. Devaluation improves the balance of payments permanently.

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4. Hahn [1971], p. 246 states "... a desire to accumulate financial assets must always mean a balance of payments surplus *because* it is assumed that the market for goods is always in equilibrium." As shown, the markets for goods do of course clear but the domestic one does not have to be in equilibrium, capital flows financing any trade balance disequilibria.
5. See *e.g.* Alexander [1952], Meade [1951], and Tsiang [1961].

The effects of monetary policy are obtained by letting the monetary authority change the interest rate level. $dY/dr = E_r/z$ is negative. $d\Delta R/dr = K_r + E_r T_Y/z$ is positive. So monetary expansion leads to an increase in income and a permanent deterioration in the balance of payments due to trade and capital flows.

It is worth noting that the balance of payments effects are robust to the two assumptions needed to fix income in the fixed-income version of the monetarist model, thanks to expenditure changes, as can be seen from the third column of Table 3. Therefore, the assumption of Keynesian neutral monetary policy in the money wage model (and with the PPP assumption in the real wage model) is sufficient for the balance of payments propositions of the elasticity-absorption approach. It follows that purchasing power parity does not produce monetarist responses in this any more than in the general model, as the reader can readily verify ⟨*c.f.* Frenkel, Gylfason, and Helliwell [1980]⟩.[6]

The assumption of Keynesian neutral monetary policy also makes the system of (1), (2), and (3) dichotomous. The independent equations are now those of the goods market (1) and the balance of payments (3), which jointly determine Y and ΔR, and contain no other endogenous variables. These variables are then given to the money market, for which it remains to determine ΔD.

There is thus an interesting symmetry with the fixed-income version of the monetarist approach, which was found to be independent of the basic Keynesian functions: *the elasticity-absorption approach does not contradict the money demand function or the monetarist approach,* but is *independent* of

6. Frenkel, Gylfason, and Helliwell study the special case of $E = E(Y, r)$, $T = T(Y, P^D/e)$, $P = P^D = P(Y)$, which implies $\rho = E_e = L_e = T_E = 0$. While appropriate for their main problem, the evaluation of the empirical work on the balance of payments, their model cannot capture the role of the supply side, the demand for money, the duration of the policy effects, and the effects of exchange rate adjustments. Particularly the last three issues are key features of the monetarist approach and therefore at the center of the Keynesian-monetarist controversy. The reader can verify that their Equations (12) and (13) for the Keynesian and monetarist balance of payments (respectively) generate several policy effects that are opposite to those predicted by the approaches. These observations do not constitute a critique of the paper, but rather of the interpretation that it constitutes a full synthesis of the approaches.

them. Under Keynesian neutral monetary policy ΔD is determined residually by the money market and therefore this market does not affect Y or ΔR. All this independence calls for is that the endogenous variable left for the money market equation to determine may not enter the goods market or balance of payments equations. To sum up, where the elasticity-absorption approach makes ΔD the residual variable in the money market equation, the monetarists make dT_0 that on the goods market and K in the balance of payments equation, eliminating the effects of the respective market.

V. Summary and Conclusions

We have provided a synthesis of the monetarist and Keynesian approaches to the short-run balance of payments theory by generating them as special cases of a general macro model. The "orthodox neutral" monetary policy version of the Keynesian approach turned out to study essentially the whole model in the money wage model. The "Keynesian neutral" monetary policy version produces the propositions of the elasticity-absorption approach in the money wage model, but the balance of payments effects are robust to the assumptions needed to fix income in the monetarist model. The key assumption for the monetarist approach is perfect capital mobility. For the propositions of the variable income version of this approach, also the money wage model has to be assumed. The propositions of the fixed-income version are generated by further assuming the real wage model and purchasing-power parity.

The elasticity-absorption approach and the fixed-income version of the monetarist approach are complementary. By their assumptions, each approach dichotomizes the general model, the monetarist approach making the money market, and the Keynesian approach the goods market and balance of payments equations the independent parts, thereby abstracting from the effects of the market the other is studying. Accordingly, if capital flows finance all trade balance disequilibria, as in the monetarist approach, only the money market adjustment (a stock adjustment) is reflected in the balance of payments. If the central bank accommodates both adjustments at a fixed interest rate, only the trade balance adjustment shows in the balance of payments. The two are thus independent, rather than conflicting, comple-

mentary parts of the general model. Since the policy regime assumptions are the basic conditions for the two basic cases, the earlier conjectures such as stock vs. flow equilibrium or purchasing-power parity fail to cause qualitative changes in the balance of payments responses. It also follows that the "orthodox neutral" monetary policy version of the Keynesian approach nests this version of the monetarist approach.

The monetarist propositions result from the general model under generally made assumptions, though some of them do not fit neatly in a classical model. Therefore, the popular view that this approach is theoretically "wrong" is not justified. However, it fails to satisfy the requirements of a long-run theory, since the trade balance is left in disequilibrium.

The acid test between the monetarist and elasticity-absorption approaches then has to be an empirical question on the key assumptions of the approaches: Is capital perfectly mobile or do central banks run Keynesian neutral monetary policies? Studies on capital flows and central bank reaction functions have rejected both polar cases. Consequently, both mechanisms are there. Therefore balance of payments theory should generally be based on the whole model: not only are the parts not incompatible but they should be married. This leaves us nearer the other version of the Keynesian approach, except that central banks have not consistently run orthodox neutral monetary policy either: sometimes the targets are monetary aggregates, sometimes interest rates, and sometimes both or neither.

The above also shows a fundamental flaw in the empirical work on "the" balance of payments equation. Since both mechanisms are there, the estimates measure their joint effects instead of supporting one approach over the other. The studies have also regressed one endogenous variable of a structural model on others, and so the estimates are sensitive to the exogenous variables moving them all, as pointed out by Frenkel, Gylfason, and Helliwell.[7,8]

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7. For a survey of the empirical work, see Kreinin and Officer [1978].
8. McCallum and Vines [1981], in synthesizing the New Cambridge and monetarist approaches assume perfect capital mobility and the real wage model in both cases. Their message is what we showed on p. 480 above: the monetarist model is a special case of the general model with perfect capital mobility (*i.e.* the New Cambridge model) if the foreign demand elasticity for domestic goods is infinity.

It is notable that, although there are significant differences in the policy effects under fixed and flexible exchange rates, the fundamental relationships between the approaches to the balance of payments are the same as to exchange rates, which were derived in Ahtiala [1984].

A final observation. We routinely make such simplifying assumptions as perfect capital mobility or monetary sterilization of one kind or another by the central bank. As seen, these assumptions are far from innocent, and we should be particularly careful when drawing balance of payments conclusions from such models.

Appendix
The Supply Side

$$Y = Y(\underset{+}{\bar{C}}, \underset{+}{N}) \tag{A1}$$

$$W^D = Y_N P^D \tag{A2}$$

$$W^S = W(\underset{+}{N}, \underset{+}{P}) \tag{A3}$$

$$W^S = W^D \tag{A4}$$

$$P \equiv aP^D + (1-a)e \tag{4}$$

Eq. (A1) is the production function, where output is a function of the given capital stock (C) and employment (N). The demand wage W^D is the value of the marginal product of labor, Y_N being the partial of Y with respect to N. The supply wage W^S is a function of employment and the expenditure price: rational labor is concerned with its real wage in terms of the goods it buys, not those it produces. (A4) is the equilibrium condition for the labor market, and (4) the definition of the expenditure price from the text.

We get from (A1) through (4) by total differentiation and substitution:

$$dP^D = \underset{+}{\theta} dY + \underset{+}{\rho} de \tag{A5}$$

where $\theta \equiv \underset{+}{(W_N} - \underset{-}{Y_{NN}}) / \underset{+}{Y_N} (\underset{+}{Y_N} - a\underset{+}{W_P^S})$;

$$\rho \equiv (1-a)W_P^S / (\underset{+}{Y_N} - \underset{+}{aW_P^S}), \; = \begin{cases} 1 \text{ in real wage model} \\ 0 \text{ in money wage model} \end{cases}$$

and Y_{NN} is the second derivative of Y with respect to N. Diminishing returns make it negative.

In the multipliers of (A5), the value of W_P^S, *i.e.* the supply side specification, has a key role. Examine the real wage model, where the supply of labor is a function of the real wage. Equation (A3) obtains the form: $W^S = W(N) \cdot P$ so that we get from (A2) through (A4):

$$W_P^S = W(N) = Y_N \qquad \text{(A6)}$$

It is seen that the denominators in (A5) are positive, keeping θ positive and finite both in this model and in the money wage model with $W_P^S = 0$. This produces the well-known but often neglected fact that the classical dichotomy breaks down in an open economy, making the model simultaneous, with a rising aggregate supply curve.

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