NBER WORKING PAPER SERIES

MACROECONOMIC POLICY, EXCHANGE-RATE DYNAMICS, AND OPTIMAL ASSET ACCUMULATION

Maurice Obstfeld

Working Paper No. 599

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge MA 02138

December 1980

This paper was presented at the National Bureau of Economic Research's 1980 Summer Institute program in International Studies. Any opinions expressed are those of the author and not those of the National Bureau of Economic Research.

NBER Working Paper #599
December 1980

Macroeconomic Policy, Exchange-Rate Dynamics, and Optimal Asset Accumulation

ABSTRACT

This paper studies exchange-rate determination and the external adjustment process in a small economy consisting of infinitely-lived, utility-maximizing households. Agents are assumed to consume a single good, to derive utility from holding domestic money, and to have access to a world market in consumption loans. Both saving behavior and money demand are derived from explicit, intertemporal maximization.

The paper's main results are as follows. A central-bank purchase of foreign exchange has no real effects when central-bank reserves earn interest at the world rate and the proceeds are distributed to the public. In contrast, an increase in the monetary growth rate does have real effects: It gives rise to a current-account surplus that leads, in the long-run, to higher levels of consumption and foreign claims. Finally, the model developed here implies that an increase in government spending may lead to a surplus on current account. A deficit may ensue when government spending produces a public good having a high marginal value to consumers.

Maurice Obstfeld
Department of Economics
Columbia University
New York, NY 10027

(212) 280-5510

Introduction

This paper studies exchange-rate determination and the external adjustment process in a world of infinitely-lived, utility-maximizing households. The setting is similar to the one proposed by Kouri (1976), in that agents are assumed to consume a single good, to hold domestic money, and to have access to a world market in consumption loans. But the approach departs from the one prevalent in the recent balance-of-payments literature by basing saving behavior and money demand on explicit, intertemporal utility maximization.[1]

The framework for the analysis is adapted from the seminal work of Sidrauski (1967), as extended to the context of perfect foresight by Brock (1974), Calvo (1979a), and Fischer (1979). In contrast to these contributions, however, the model explored below allows agents' rate of time preference to be endogenously determined in a manner suggested by Uzawa (1968), rather than fixed.[2] This modification permits the small economy we study to attain a stationary long-run equilibrium under conditions of perfect capital mobility.[2a]

The plan of the paper, and its main results, are as follows.

Guillermo Calvo suggested the line of investigation pursued in this paper. I am grateful for his comments, and for those of Robert Cumby, Ronald Findlay, Jacob Frenkel, and two anonymous referees. Valuable suggestions were made by participants in seminars at Columbia University, the Federal Reserve Board, and the 1980 NBER Summer Institute in International Studies.

[1] Recent efforts along these lines include papers by Calvo (1979b), Helpman (1979), Razin (1979), and Stockman (1980). Obstfeld (1980) describes a two-country extension of this paper's model.

[2] Endogenous time preference has been discussed in the trade literature in papers by Calvo and Findlay (1978) and Findlay (1978). Kouri (1979) adopts a consumption function suggested by Uzawa's theory. The present approach is applied in a somewhat different context in Obstfeld (1981).

[2a] This could be accomplished also by allowing bonds (in addition to real balances) to enter consumers' utility functions, as in Calvo (1980).

wealth is divided between holdings of domestic money and an internationally-traded bond denominated in foreign currency. The economy is small, and can therefore influence neither the world price of the consumption good, P^*, nor the world bond rate, r, both of which are assumed constant. The link between the domestic price level, P, and P^* is provided by the relationship

$$P = EP^*,$$

where E denotes the domestic-money price of foreign exchange. This exchange rate is allowed to float freely by the monetary authority. On the assumption that foreigners do not hold domestic money, E adjusts to maintain equality between the real money supply and domestic real money demand at each instant. We adopt the normalization $P^* = 1$.

The number of households in the economy is, for convenience, also taken to be 1. The household's instantaneous utility is a separable function

$$U(c,m) = u(c) + v(m)$$

of consumtion, c, and real money holdings, m, defined as nominal money holdings, M, deflated by the home price level,

$$m \equiv M/P.$$

The functions $u(.)$ and $v(.)$ are taken to be non-negative, strictly concave, and twice continuously differentiable, with the property that venient.[3] The last of the conditions ensures that the present discounted value $\bar{U}/\delta(\bar{U})$ of a stationary utility stream $\bar{U}$ is increasing in $\bar{U}$.

At each moment t, the household must allocate its income between current consumption and the accumulation of real wealth. Real output per household, y, is taken to be exogenous and fixed. The other components of expected disposable income are interest payments from abroad, equal to the world bond rate, r, times the real value of the family's stock of net foreign claims, F_t; net real transfer payments from the government, τ_t; and capital gains on real balances, equal to $-\pi_t m_t$, where π_t is the expected inflation rate. Defining the household's real assets at time t (not including capitalized future transfer payments) as

$$a_t \equiv \frac{y}{r} + m_t + F_t, \tag{6}$$

the flow constraint linking asset accumulation to saving may be written as

$$\dot{a}_t = ra_t + \tau_t - c_t - (\pi_t + r)m_t. \tag{7}$$

The household's problem is to find paths for consumption, real balances, and total real assets that maximize lifetime welfare (2) subject to the constraints (3) and (7). The calculations are simplified by changing variables from t to Δ using the fact that $d\Delta = \delta(U(c_t, m_t))\,dt$ and writing the household's problem in the form:

---

3 The nature of this convenience becomes apparent in solving the household's maximization problem and in proving the existence of perfect-foresight equilibrium paths. These points are taken up again in context. A general discussion of the concept of time preference is found in Koopmans, Diamond, and Williamson (1964).

Equations (9) and (10) imply the usual necessary condition of static utility maximization,

$$x(c_t, m_t) = U_m(c_t, m_t)/U_c(c_t, m_t) = \pi_t + r, \tag{12}$$

while (11) implies that the time derivative of λ_Δ is given by[5]

$$\dot{\lambda}_t = \lambda_t(\delta(U(c_t, m_t)) - r). \tag{13}$$

As formulated so far, the household's maximization problem has no solution, for it is possible, given the assumption of perfect capital mobility, to borrow arbitrarily large sums in the world capital market and meet all interest payments through further borrowing. To rule out this possibility, we impose on the household the intertemporal budget constraint,

$$\int_0^\infty e^{-rt}(c_t + (\pi_t + r)m_t)\, dt \leq a_0 + \int_0^\infty e^{-rt}\tau_t\, dt. \tag{14}$$

As is shown in Appendix B, constraint (14) implies that the household is restricted to paths along which

$$a_t + \int_t^\infty e^{-r(s-t)}\tau_s\, ds \geq 0, \text{ for all } t.$$

Paths violating this condition are infeasible.

---

[5] Only necessary condition (9) (and by implication, (10)) differs from what it would be in the standard intertemporal optimization framework, where $\delta_t = \delta$, a constant. In the standard set-up, (9) is replaced by $U_c = \lambda$. But in the present context, an increase in consumption today affects not only today's instantaneous utility, but also the discount factor applied to all utilities enjoyed in the future. Note that if the instantaneous discount rate were constant, necessary condition (13) would rule out the possibility of a stationary state, unless it so happened that δ and r were equal.

II. Perfect-Foresight Equilibrium Dynamics

The model of the previous section is closed by the assumption that the path of the price level is a perfect-foresight equilibrium path, in the sense of Brock (1974). Let $\{\hat{P}_t\}$ be a (differentiable) path of the price level, and $\{\hat{P}_t \tau_t\} = \{\mu e^{\mu t} M_0 + \hat{P}_t rR - \hat{P}_t g\}$ the associated path of nominal transfer payments from the government, where M_0 denotes the nominal money stock at $t = 0$. Acting on the belief that these paths of the price level and nominal transfers will prevail, the household can calculate expected real transfers $\{\hat{\tau}_t\}$ and so determine optimal paths for its consumption rate and real balances, subject to (7) and (14) and given initial assets $a_0 = y/r + F_0 + M_0/\hat{P}_0$. The path $\{\hat{P}_t\}$ is a perfect-foresight equilibrium path if the desired path of real balances, $\{\hat{m}_t\}$, equals the actual path, that is, if

$$\hat{m}_t = M_t/\hat{P}_t = e^{\mu t} M_0/\hat{P}_t \tag{16}$$

for all $t \geq 0$.

The necessary conditions derived in the previous section may be used to find the collection of price-level paths $\{P_t\}$ consistent with perfect foresight and the necessary conditions of optimality. The differential equations (7) and (13), together with the conditions (6), (9), (12), (16), and

$$\pi_t = \dot{P}_t/P_t, \tag{17}$$

must be satisfied by any perfect-foresight equilibrium trajectory of the economy. We now investigate the restrictions they place on the possible equilibrium paths of bonds F_t, consumption c_t, real balances m_t, and, by implication, the price-level. Recalling our earlier convention that the holdings. It should be noted that the variable F_t is predetermined by the past history of the current account. Unlike consumption and real balances, it cannot jump instantaneously in response to a disturbance, and must adjust gradually, over time.

It remains to derive the differential equation governing movements in consumption. Using the necessary condition (9), we may solve for the costate variable λ_t with the help of (15) and (17)-(19):

$$\lambda_t = \lambda(c_t, m_t, F_t + R)$$

$$= \frac{[\delta(U_t) - U_t\delta'(U_t)]u'(c_t)}{\delta(U_t) + \{y + r(F_t+R) + [\mu+r-x(c_t,m_t)]m_t - g - c_t\}\delta'(U_t)u'(c_t)} .$$

Differentiating λ with respect to time and applying (13) yields

$$\dot{\lambda}_t = \lambda_c\dot{c}_t + \lambda_m\dot{m}_t + \lambda_F\dot{F}_t = \lambda_t(\delta(U(c_t,m_t)) - r),$$

which may be solved for the time derivative of consumption,

$$\dot{c}_t = \lambda_c^{-1}[\lambda_t(\delta(U(c_t,m_t)) - r) - \lambda_m\dot{m}_t - \lambda_F\dot{F}_t] \equiv \Psi(c_t,m_t,F_t + R). \qquad (21)$$

Equation (21) is the final differential equation of a three-equation system.[7] Together, equations (19) - (21) must describe the evolution of the economy along any perfect-foresight equilibrium path.

---

[7] The equation for $\dot{c}$ cannot be defined if $\lambda_c = 0$. It is shown in Appendix A that $\lambda_c < 0$ in a neighborhood of the system's stationary state.

To find the saddlepath, we let θ_1 denote the system's negative characteristic root and $\vec{\omega} = [\omega_{11}, \omega_{21}, \omega_{31}]'$ an eigenvector belonging to θ_1. Any <u>convergent</u> solution of the linearized system must take the form

$$c_t - \bar{c} = \omega_{11} k \exp(\theta_1 t),$$

$$m_t - \bar{m} = \omega_{21} k \exp(\theta_1 t),$$

$$F_t - \bar{F} = \omega_{31} k \exp(\theta_1 t),$$

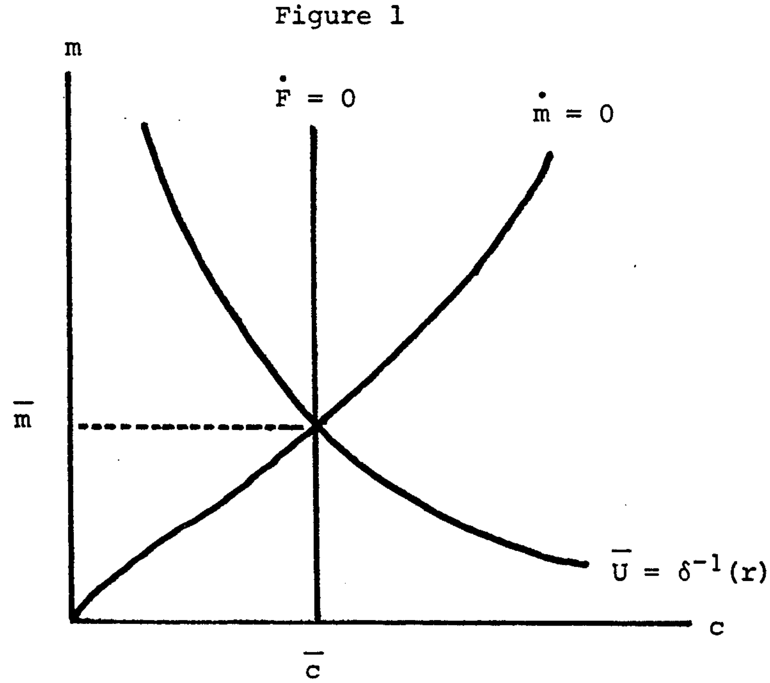
where k is an arbitrary constant determined by the value of F at time fall short of the rate of monetary growth when there is an external surplus and exceed it when there is a deficit. This fundamental relationship between exchange-rate depreciation and the current account has of course been emphasized by Kouri (1976), Calvo and Rodriguez (1977), and others. But it emerges here from the hypothesis of optimizing behavior, and not as a consequence of assuming mechanistic consumption and money-demand functions.

Figure 1 shows how the economy's long-run equilibrium is found. From (13), stationary-state utility $\bar{U}$ is determined by the equality of the marginal rate of time preference and the world bond rate,[11]

$$\delta(\bar{U}) = r, \tag{26}$$

and so stationary-state consumption $\bar{c}$ and real balances $\bar{m}$ must satisfy

Figure 1



---

[11] From (9), $\bar{\lambda} = (1 - \bar{U}\delta'(\bar{U})/\delta(\bar{U}))u'(\bar{c})$. The last inequality in (5) therefore implies that $\bar{\lambda}$ must be positive. This justifies condition (26).

the nominal money supply. However, the <u>sum</u> $\overline{F} + R$ of privately-held bonds and central-bank reserves is unaffected by this transfer.

Now equations (20) and (21) involve only the economy's aggregate claims on the rest of the world; their distribution between the public and the central bank is irrelevant. Thus, the long-run value of F simply declines from $\overline{F}$ to $\overline{F} - \Delta R$ as a result of intervention. And since the economy is on the saddlepath, and so subject to (23) - (25), consumption and real balances must remain at the stationary-state levels $\overline{c}$ and $\overline{m}$, respectively. The monetary authority's action causes a rise in the price level (and a depreciation of the exchange rate) exactly proportional to the increase in money; it has no real effects. Money creation accomplished through a purchase of foreign exchange has the same impact as a "helicopter" money-supply change of equal magnitude.

In contrast, the formulations prevalent in the literature seem to imply that there <u>is</u> a difference between these two financial policies, in that intervention leads to a current surplus as domestic residents seek to restore their hodings of external claims to the original level.[12] This does not occur here because households capitalize all transfers from the government, and, thanks to the government budget constraint (15), do not suffer a fall in disposable income when a portion of their bond holdings is transferred to the central bank. The stream of interest earnings taken away through intervention is returned in the form of transfers.

This neutrality result would clearly break down if, for example, reserves were held in some "barren," non-interest-bearing form, or if increased central-bank earnings were used to augment government con-

---

[12] See, e.g., Kouri (1978).

Our knowledge of the long-run effects of the policy shift allows us to describe its impact effects using the properties of the saddlepath discussed in the previous section. Because the eventual level of external assets is higher after the rise in μ, consumption must initially decline to bring about the implied current-account surplus. As we have seen, this entails a sharp fall in real balances as well, and so, a depreciation of the exchange rate. Both consumption and real balances subsequently rise as the stock of foreign assets approaches its higher asymptotic level. This implies, in particular, that the rate of depreciation of the exchange rate during the transition will fall short of the higher rate of monetary expansion. The exchange rate thus exhibits "overshooting" behavior, in that the impact fall in real balances exaggerates their eventual decline. Exchange-rate overshooting is therefore consistent with utility maximization by asset holders. The results confirm those obtained by Kouri (1976), Calvo and Rodriguez (1977), and Flood (1979) on the basis of assumed aggregate relationships.

An Increase in Government Consumption

We finally analyze the consequences of an increase in government consumption, g, assuming, initially, that government consumption is wasteful, in that it does not directly increase the utility of the household. An example in which government spending produces a public good complementary with private consumption is analyzed next.

In the absence of any change in private consumption, a rise absorption.

The economy travels to long-run equilibrium along the saddlepath, and so the current account must go into surplus when the rise in g takes place. Consumption therefore declines by an amount greater than the increase in government spending. And because consumption, real balances, and foreign bond holdings rise together along the saddlepath, the exchange rate necessarily depreciates on impact, reducing real balances below their initial level, $\bar{m}$.[13] The initial short-run equilibrium of the economy is at a point like E in Figure 3. As the level of private bond holdings rises, the $\dot{F} = 0$ locus moves rightward, eventually returning to its original position.

When the monetary growth rate, μ, is zero, the government's action is simply a tax-financed increase in government spending. The results contradict the standard Keynesian presumption that the concomitant short-run fall in disposable income reduces saving as well as expenditure, so pushing the current account into deficit. In the present framework, saving must actually increase in order that the economy attain, in the long run, the higher level of national income consistent with the pre-disturbance private consumption level. Looked at another way, a tax-financed increase in government spending entails a more-than-complete crowding out of private aggregate demand in the short run.

The preceding discussion has been based on the assumption

---

[13] It should be noted that the model's prediction of an exchange-rate depreciation following an increase in government spending is at variance with the Mundell-Fleming model's prediction of an exchange-rate appreciation. See Mundell (1968).

$$\frac{d\bar{m}}{dg} = rD^{-1}(\mu + r)(u_c u_{cg} - u_g u_{cc}), \tag{32}$$

$$\frac{d\bar{F}}{dg} = D^{-1}((u_c - u_g)v'' + v'(\mu + r)(u_{cc} - u_{cg})) \tag{33}$$

where

$$D = r(u_c v'' + (\mu + r)u_{cc}v') < 0.$$

With the exception of (32), which is unambiguously negative under the assumption $u_{cg} > 0$,[14] the long-run derivatives are of ambiguous sign. If the marginal utility of private consumption is sufficiently low relative to that of public consumption, for example, an increase in g may result in a current deficit, by (33), contrary to the earlier analysis.

In the event that the level of public-good provision is initially at the Samuelson optimum, so that $u_c = u_g$, (33) implies that an increase in g must occasion a current surplus. Long-run private consumption may still rise or fall, but if it does fall, it falls by an amount smaller than the increase in g.

---

[14] The following considerations imply this result. Because $u_{cg} > 0$, the increase in g would entail an increase in the marginal utility of consumption at the initial private consumption level. If $\bar{m}$ were to rise, v' would fall, and (29) would not be satisfied in the long-run in the absence of a higher stationary consumption level. But with $\bar{c}$, $\bar{m}$, and g all higher, the household's long-run utility would exceed $\bar{U}$, contrary to (28). Thus, long-run real balances decline, causing an eventual rise in v'.

Appendix A

This appendix provides the proof of local saddlepath stability for the system (19)-(21), and characterizes the unique path leading to stationary-state equilibrium.

The model involves two state variables, c and m, which may take (unanticipated) discrete jumps, and a third state variable, F, which is predetermined by the past history of external asset accumulation. Thus, to prove saddlepath stability, it must be shown that the differential equation system

$$\dot{c} = \frac{\lambda[\delta(u(c)+v(m)) - r] - \lambda_m[\mu + r - x(c,m)]m - \lambda_F[y + r(F+R) - c - g]}{\lambda_c}$$

$$= \Psi(c,m,F+R),$$

$$\dot{m} = [\mu + r - x(c,m)]m,$$

$$\dot{F} = y + r(F+R) - c - g,$$

possesses two positive characteristic roots and one negative characteristic root, implying the existence of a unique path to long-run equilibrium. (Recall that

$$\lambda = \frac{[\delta - (u(c)+v(m))\delta']u'}{\delta + [y + r(F+R) + [\mu + r - x(c,m)]m - c - g]\delta'u'},$$

$$x(c,m) \equiv v'(m)/u'(c).)$$

$$\overline{\lambda}_F = \frac{-(\overline{\delta} - (\overline{u} + \overline{v})\overline{\delta}')\overline{\delta}'(\overline{u}')^2}{\overline{\delta}} < 0. \qquad \text{(A6)}$$

Now $\overline{x}_c = -v'(\overline{m})u''(\overline{c})/(u'(\overline{c}))^2 > 0$ and $\overline{x}_m = v''(\overline{m})/u'(\overline{c}) < 0$, and since $\delta - U\delta' > 0$ and $\delta'' > 0$ by assumption,

$$\overline{\lambda}_m < 0. \qquad \text{(A7)}$$

Further, substituting for $\overline{x}_c$ in (A4) yields

$$\overline{\lambda}_c = \frac{(\overline{\delta} - (\overline{u} + \overline{v})\overline{\delta}')(\overline{\delta} - \overline{\delta}'\overline{v}'\overline{m})\overline{u}'' - (\overline{u} + \overline{v})(\overline{u}')^2\overline{\delta}\overline{\delta}''}{\overline{\delta}^2} . \qquad \text{(A8)}$$

By our assumption (1) and by concavity of v(m), we deduce that

$$\overline{\delta} - \overline{\delta}'\overline{v}'\overline{m} > \overline{\delta} - \overline{v}\overline{\delta}' > \overline{\delta} - (\overline{u} + \overline{v})\overline{\delta}' > 0,$$

and (A8) implies immediately that

$$\overline{\lambda}_c < 0. \qquad \text{(A9)}$$

We note, finally, that because $\overline{\lambda} = [\overline{\delta} - (u(\overline{c})+v(\overline{m}))\overline{\delta}']u'/\overline{\delta}$, (A1), (A4), and (A6) imply that

$$\overline{\Psi}_c = (\overline{\lambda}_m/\overline{\lambda}_c)\overline{x}_c\overline{m} > 0. \qquad \text{(A10)}$$

Using (A10), the linearized system becomes

First, we note that if one of the components of $\vec{\omega}$ is zero, all must be zero, and so all components must be strictly positive or negative. To see this, suppose $\omega_{11} = 0$. Then, using the last equation of (All),

$$-\omega_{11} + r\omega_{31} = \theta_1\omega_{31},$$

and so $\omega_{31} = 0$. But using the second equation of (All), we find that $\omega_{21} = 0$ as well; and so $\vec{\omega} = 0$. Similar arguments dispose of the possibilities that $\omega_{21} = 0$ and that $\omega_{31} = 0$.

So suppose $\omega_{31} > 0$. From (All),

$$-\omega_{11} + r\omega_{31} = \theta_1\omega_{31} < 0,$$

and so it must be the case that $\omega_{11} > 0$. Again using (All), we see that

$$(-\overline{x}_c\overline{m})\omega_{11} + (-\overline{x}_m\overline{m})\omega_{21} = \theta_1\omega_{21}.$$

If ω_{21} were negative, the left-hand side of this equation would be negative but the right hand-side positive; so we must have $\omega_{12} > 0$. Thus, in this case, all components of $\vec{\omega}$ have the same sign.

In the case $\omega_{31} < 0$, an identical argument shows that ω_{11}, $\omega_{21} < 0$ as well. This completes the proof.

$$\lim_{t\to\infty} a_t e^{-rt} = e^{-rt'}[a_{t'} + \int_{t'}^{\infty} e^{-r(s-t')}(\hat{\tau}_s - c_s - (\hat{\pi}_s + r)m_s)\, ds]. \quad (B4)$$

Because consumption and real balances are non-negative, the right-hand side of (B4) must be negative if (B2) is false at t'.[15] This contradicts (B1), showing that (B2) must hold at each instant.

Define

$$k \equiv \sup_t \{ \int_t^{\infty} e^{-r(s-t)}\hat{\tau}_s\, ds \}.$$

The number k is finite as a result of the boundedness of the sequence $\{\hat{\tau}_s\}$ along the convergent path. From (B2),

$$a_t + k \geq 0, \text{ for all t.} \quad (B5)$$

It is now straightforward to apply the sufficiency theorem. Redefine the state variable for the household's problem to be $w_t = a_t + k$. The flow constraint (7) becomes

$$\dot{w}_t = rw_t + \hat{\tau}_t - c_t - (\hat{\pi}_t + r)m_t - rk.$$

The differential equation system (19)-(21) is unchanged as a result of this modification, and along its convergent path,

$$\lim_{\Delta\to\infty} w_\Delta \lambda_\Delta e^{-\Delta} = 0, \lim_{\Delta\to\infty} \lambda_\Delta e^{-\Delta} \geq 0.$$

---

[15] By the assumption that satiation in real balances is impossible, the nominal interest rate $\hat{\pi} + r$ must always be positive.

References

Arrow, K.J., and Kurz, M. Public Investment, the Rate of Return, and Optimal Fiscal Policy, Baltimore: The Johns Hopkins Press, 1970.

Brock, W.A., "Money and Growth: The Case of Long Run Perfect Foresight," International Economic Review 15 (October 1974): 750-77.

Calvo, G.A. "On Models of Money and Perfect Foresight," International Economic Review 20 (February 1979): 83-103 (a).

__________, "Stabilization Rules and the Managed Float: A Search for the Essentials," Columbia University, Discussion Paper no. 23, 1979 (b).

__________, "Financial Opening, Crawling Peg and the Real Exchange Rate," C.E.M.A., manuscript, 1980.

Calvo, G.A. and Findlay, R., "On the Optimal Acquisition of Foreign Capital through Investment of Oil Export Revenues," Journal of International Economics 8 (December 1978): 513-24.

Calvo, G.A. and Rodriguez, C.A., "A Model of Exchange-Rate Determination under Currency Substitution and Rational Expectations," Journal of Political Economy 85 (June 1977): 617-25.

Findlay, R., "An 'Austrian' Model of International Trade and Interest Rate Equalization," Journal of Political Economy 86 (December 1978): 989-1008.

Fischer, S., "Capital Accumulation on the Transition Path in a Monetary Optimizing Model," Econometrica 47 (November 1979): 1433-40.

Flood, R.P., "An Example of Exchange Rate Overshooting," Southern Economic Journal 46 (July 1979): 168-78.

Helpman, E., "Inflation and Balance of Payments Adjustments with Maximizing Consumers," University of Stockholm, Institute for International Economic Studies Seminar Paper no. 129, 1979.

Hirsch, M.W., and Smale, S., Differential Equations, Dynamical Systems, and Linear Algebra, New York: Academic Press, 1974.

Koopmans, T.C.; Diamond, P.A.; and Williamson, R.E.; "Stationary Utility and Time Perspective," Econometrica 32 (January-April 1964): 82-100.

Kouri, P.J.K., "The Exchange Rate and the Balance of Payments in the Short Run and in the Long Run: A Monetary Approach," Scandinavian Journal of Economics 78 (May 1976): 280-304.

__________, "Balance of Payments and the Foreign Exchange Market: A Dynamic Partial Equilibrium Model," Cowles Foundation Discussion Paper, Yale University, 1978.

SOME RECENT NBER WORKING PAPERS

Number	Author	Title	Date
547	Alan J. Auerbach	Inflation and the Tax Treatment of Firm Behavior	9/80
548	Daniel S. Hamermesh	Transfers, Taxes and the Nairu	9/80
549	Anthony Cassese and James R. Lothian	The Timing of Monetary and Price Changes and the International Transmission of Inflation	9/80
550	Jon Frye and Robert J. Gordon	Government Intervention in the Inflation Process: The Econometrics of "Self-Inflicted Wounds"	9/80
551	Jon Frye and Robert J. Gordon	The Variance and Acceleration of Inflation in the 1970s: Alternative Explanatory Models and Methods	9/80
552	Ann Bartel	Wages, Nonwage Job Characteristics and Labor Mobility	9/80
553	James M. Poterba	Inflation, Income Taxes and Owner-Occupied Housing	9/80
554	Paul Krugman	Oil and the Dollar	9/80
555	Rudiger Dornbusch	Inflation Stabilization and Capital Mobility	9/80
556	J. David Richardson	Trade Adjustment Assistance Under The U.S. Trade Act of 1974: An Analytical Examination and Worker Survey	9/80
557	Maurice Obstfeld	Capital Mobility and Devaluation in an Optimizing Model with Rational Expectations	10/80
558	John F. Boschen and Herschel I. Grossman	Tests of Equilibrium Macroeconomics Using Contemporaneous Monetary Data	10/80
559	Bennett T. McCallum	Price Level Determinacy with an Interest Rate Policy Rule and Rational Expectations	10/80
560	Robert E. Hall	The Importance of Lifetime Jobs in the U.S. Economy	10/80

Number	Author	Title	Date
576	Roger H. Gordon and Burton G. Malkiel	Taxation and Corporation Finance	11/80
577	Martin Feldstein	Inflation, Tax Rules and Investment: Some Econometric Evidence	11/80
578	Wolfgang Franz	The Reservation Wage of Unemployed Persons in the Federal Republic of Germany: Theory and Empirical Tests	11/80
579	Martin Feldstein	Social Security, Induced Retirement, and Aggregate Capital Accumulation: A Correction and Update	11/80
580	Willem H. Buiter	The Role of Economic Policy after the New Classical Macroeconomics	11/80
581	David Hartman	International Effects on the U.S. Capital Market	11/80
582	Jeffrey Sachs	Energy and Growth Under Flexible Exchange Rates: A Simulation Study	11/80
583	Michael J. Boskin, Marcy Avrin and Kenneth Cone	Modelling Alternative Solutions to the Long-Run Social Security Funding Problem	11/80
584	Victor R. Fuchs	Self-Employment and Labor Force Participation of Older Males	11/80
585	Michael R. Darby	International Transmission Under Pegged and Floating Exchange Rates: An Empirical Comparison	12/80
586	V. Vance Roley	The Effect of Fiscal Debt Management Policy on Corporate Bond and Equity Yields	12/80
587	Benjamin M. Friedman	Effects of Shifting Saving Patterns on Interest Rates and Economic Activity	12/80
588	Roger H. Gordon	Inflation, Taxation, and Corporate Behavior	12/80
589	Michael Darby	Unanticipated or Actual Changes in Aggregate Demand Variables: A Cross-Country Analysis	12/80