

PRINCETON STUDIES IN INTERNATIONAL FINANCE NO. 16

The Implications of International
Economic Integration for Monetary,
Fiscal, and Exchange-Rate Policy

Ronald I. McKinnon
and
Wallace E. Oates

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Director

Princeton University
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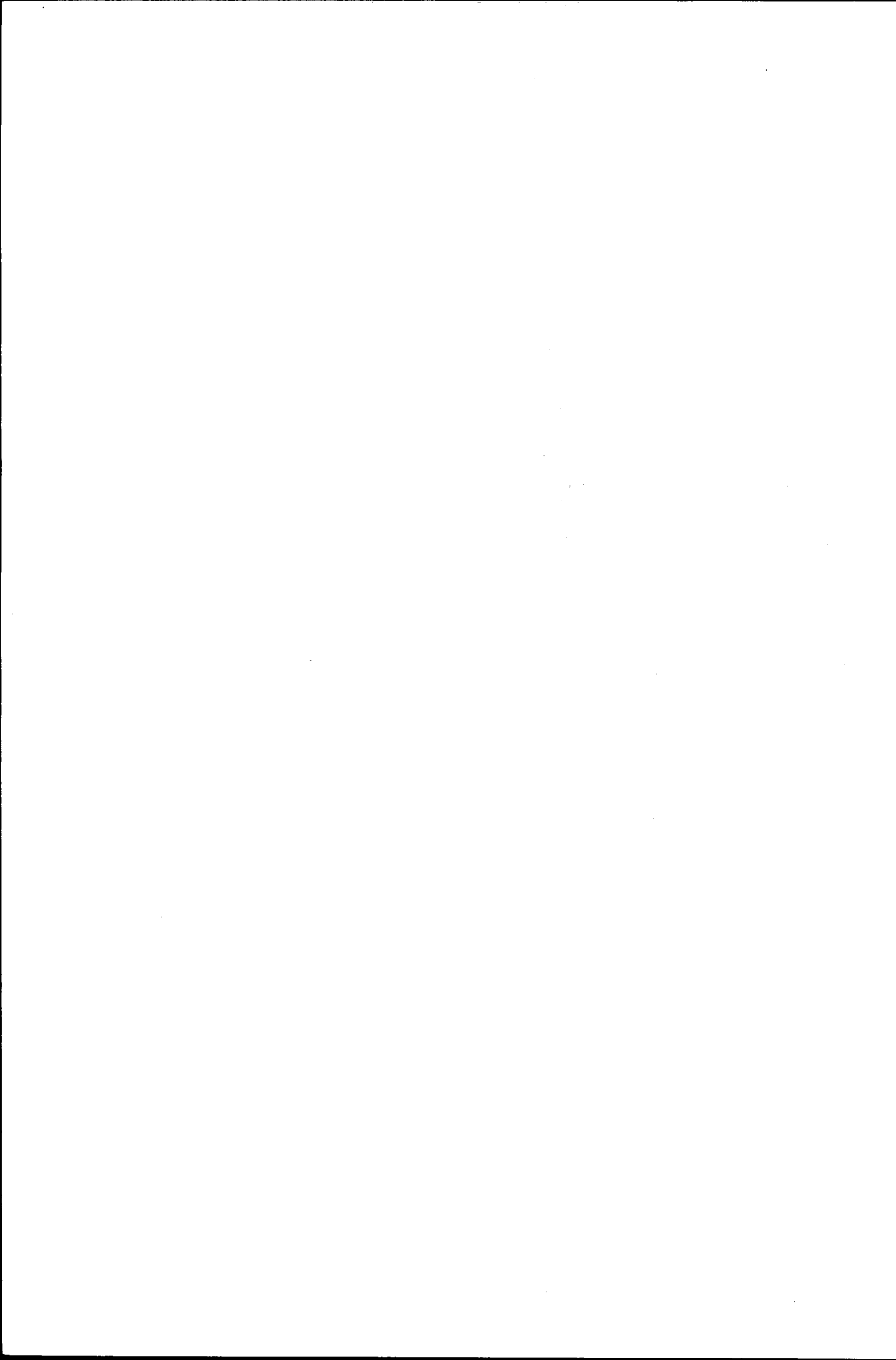
INTERNATIONAL FINANCE SECTION
DEPARTMENT OF ECONOMICS
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THE IMPLICATIONS OF INTERNATIONAL ECONOMIC INTEGRATION FOR MONETARY, FISCAL, AND EXCHANGE-RATE POLICY

INTRODUCTION

The basic macroeconomic problem in international-trade theory, now firmly imbedded in most textbooks on the subject, is the reconciliation of a country's internal employment-income equilibrium with an external balance in its international payments.¹ Monetary, fiscal, and exchange-rate policies with differential effects are viewed as instruments to be used in achieving this reconciliation. Although this traditional neo-Keynesian viewpoint is still very relevant for many current policy issues, increasing economic integration in commodity trade and in international capital markets suggests that a somewhat different basic analytical approach may also be useful.

Let us begin by assuming that there exists an *automatic* adjustment mechanism of a kind that would restore balance in a country's or region's external payments, if given time to work itself out free from official interference—even in the absence of floating exchange rates or flexible internal prices. The exact nature of this adjustment mechanism will be developed in due course, but it is clear that its existence resolves one of the two central problems of the neo-Keynesian approach—the achievement of external balance. In this sense, this assumption is more “classical” in outlook. However, it is undoubtedly a highly relevant assumption for interregional payments adjustment within a country and is becoming more relevant for intercountry payments flows as economic integration proceeds—as recent experiences in Canada, Germany, and Israel tend to suggest. It has significant implications for the ability of regional and national governments to control their internal income and employment. In this paper, we propose to accomplish the following:

1. To build a simplified model of the automatic adjustment mechanism based on modern methods of portfolio-balance analysis describing the private sector of the economy; and to outline the circumstances under which this mechanism will be a powerful

We are indebted to Professor Paul David of Stanford University for his helpful comments on an earlier draft of this paper.

¹ Meade's original treatise on the subject [6] still stands as the most comprehensive work available.

economic force in adjusting the balance of payments in response to exogenous shocks.

2. To link this model to the exchange-reserve requirements of a system of fixed exchange rates where different degrees of economic integration among nations exist. For example, does the size of a country's foreign-trade sector or the size of its GNP determine its reserve requirements?
3. To look at the internal income-generating effects of inside and outside money creation in the presence of such an adjustment mechanism under alternative arrangements of fixed and floating exchange rates.
4. To look at the impact on domestic income and employment of both balanced-budget and deficit-financed fiscal policy under fixed and floating exchange rates. Special emphasis will be placed on the income-generating capacity of regional governments in a federal system with obvious parallels to be drawn for national governments in the emerging free-trade areas of Western Europe.
5. To interpret important questions of economic policy for both regional and national governments.

Points 3 and 4 are extensions of and amendments to the paper by R. A. Mundell [7], which in turn is related to the work of J. Marcus Fleming [1]. Mundell's path-breaking paper does not incorporate a complete model of portfolio balance, nor does it distinguish between inside and outside money creation or alternative kinds of fiscal policy. Yet, it will become obvious that the present paper is highly dependent on Mundell's work.

I. THE ECONOMIC ENVIRONMENT AND THE ADJUSTMENT MECHANISM

Capital Mobility, Portfolio Balance, and Aggregate Expenditures

Economic integration among nations has two dimensions: the size of commodity trade relative to GNP and the degree of capital mobility.² Both dimensions are important in determining the strength of automatic adjustment tendencies among countries. We shall follow Mundell in using the limiting assumption of perfect mobility of international capital in order to simplify our analysis. By perfect capital mobility we mean that there exists a large body of financial assets that are perfectly mobile internationally so that the market rates of interest established on these assets are the same inside the economy and in

² It is quite possible for integration in commodity trade to be well developed without capital mobility, as within the EEC. It is also possible to have capital mobility without much commodity trade, as between Europe and the United States prior to American restrictions on capital movements.

the outside world. It is a matter of complete indifference to the holders of these financial assets whether or not they are denominated in foreign or domestic currency—they do not feel any exchange risk.³ If, in addition, we assume the country in question is small relative to the world's financial markets, then we can also assume that this interest-rate structure is determined externally through international arbitrage and cannot be influenced by domestic economic policy. For convenience, we shall refer to this externally fixed structure of interest rates on internationally mobile assets as “the rate of interest.”⁴

It is important to place some limitations on the extent to which capital mobility is being assumed. All financial claims in the economy need not have this property of perfect international substitutability. As an illustration, within the United States and only in this century have federal government securities been established as interest-bearing assets which are perfectly mobile nationally. There are still plenty of local or regional financial claims for which national markets are not established. However, for our model to work, the body of internationally acceptable claims must be significant; and, most importantly, *these international assets must be the financial instruments that the government uses in changing the money supply or in covering any current-account budget deficits.* In addition, individuals in the private sector of the economy must attempt to maintain portfolio balance in terms of these international assets. That is, for a given rate of interest and level of real income, individuals will attempt to maintain a definite portfolio mix of money and internationally mobile securities. Money is assumed *not* to be an international asset, being only legal tender within the country under consideration.⁵ Presumably individuals also make portfolio-balance adjustment in noninternational financial assets, but our model does not explicitly recognize this fact. For example, the ratio between internationally mobile assets and other less mobile domestic assets may be a goal of portfolio balance and is perfectly consistent with our model.

The second dimension of international economic integration is inter-

³ It may seem strange that one would associate this extreme assumption with floating exchange rates. However, given the existence of well-developed forward-exchange markets, the Canadian experience does suggest this assumption has empirical relevance.

⁴ This invariance of the rate of interest to domestic economic policy is strongly reminiscent of the Keynesian liquidity trap. If the country in question is “large” in the world's capital markets, its economic policies can only affect its internal rate of interest insofar as it affects worldwide interest rates. For analytical convenience, we shall maintain the small country assumption.

⁵ One does not have to go far to find examples where a country uses other nations' currencies, legally or illegally, in its domestic circulation.

national trade in physical commodities. As long as "domestic" prices remain fixed relative to foreign prices, we assume that expenditures at the margin by domestic nationals at any given income level will be distributed in a given proportion between domestic and imported goods, that is, marginal imports are proportional to marginal aggregate expenditures. The greater these expenditures for imports as a proportion of total expenditures, the more "open" is the economy in our terminology. Belgium, for example, has a highly open economy with 45 per cent of its expenditures going for imports, and the American economy is relatively closed with less than 4 per cent of total expenditures going for imports. If one relies on variations in aggregate expenditures as a control device, the trade balance of an open economy can be controlled more efficiently: a one dollar decrease in aggregate expenditures improves the Belgian balance of payments by \$.45 and by only \$.04 for the American, if marginal and average propensities to import are the same. Throughout the paper we shall be concerned with variations in aggregate expenditures arising out of deliberate monetary and fiscal policy, as well as those due to changes in the individuals' portfolio positions originating in the trade balance itself.

Inside and Outside Money Creation

Our simple open economy with its stationary equilibrium positions and fixed external rate of interest can be easily described by a set of equations relating the stock of money, the stock of international securities (henceforth simply called "bonds"), the level of real income, and the trade balance. This is done in the following section. However, an informal preview of the workings of the automatic external-adjustment mechanism can be obtained simultaneously with the consideration of inside and outside methods of money creation. It turns out that the degree of economic integration that we have assumed completely frustrates *both* kinds of monetary policy if the monetary authorities attempt to maintain a fixed exchange rate.

Consider how the government can attempt to alter the composition and total stock of financial assets in the economy. Government monetary policy acts on the money supply either: (1) through an *inside* creation of money, which is usually accomplished through the purchase of bonds from the private sector; or (2) through an *outside* injection of new money into the system by some means which does not involve a withdrawal of assets from the private sector, as, for instance, by means of temporary budget deficits covered by money issue. Inside money creation, that is, the creation of money through open-market operations, leaves the *net* stock of financial assets held by the private sector unchanged; thus, it has no direct wealth effect on expenditures

for real commodities. In contrast, outside money creation, where the injection of new money is not accompanied by an equivalent removal of financial assets from the private sector, does increase the net asset holdings of the private sector and its propensity to spend. Thus, an outside creation of money has a positive wealth effect on spending on commodities, while an inside injection of new money into the economy has no such effect. This distinction between inside and outside means of money creation is interesting analytically in a closed system because the equilibrium rate of interest is dependent upon the method of money creation chosen by the authorities, as shown by Gurley and Shaw.⁶ However, in our small economy with perfect international mobility of capital, the rate of interest is fixed externally so that it is independent of the method of money creation adopted. Thus, monetary policy cannot operate through the usual route of changing interest rates.

What international mechanisms are analogous to the inside-outside methods of money creation, and how might these offset official government policy? If private individuals sell bonds to foreigners in order to acquire domestic money—which they can do in a system of fixed exchange rates—the effect is analogous to an inside creation of money. The net wealth holdings of the private sector remain unchanged. Suppose we start off with an economy in a state of equilibrium and the government makes a nonrecurrent purchase of bonds from the private sector—an inside creation of money. The resulting downward pressure on the domestic interest rate (which is only temporary, since, as noted above, the equilibrium rate of interest is fixed externally) induces private individuals to purchase bonds from foreigners at the fixed foreign rate of interest. This purchase of foreign bonds takes the newly created domestic money out of the hands of private individuals and places it with the foreign-exchange authorities, who must draw on their foreign-exchange reserves in order to provide the foreign currency which the buyers of the securities need to pay the sellers abroad. Thus, the government will find that its commitment to a fixed exchange rate means it cannot control, by inside means, the amount of money in the economy in the presence of capital mobility.⁷ The effect is the same as if the government in a closed economy attempted to peg the price of bonds by buying and selling freely at a fixed rate of interest to private individuals at their request. The supply of money is then determined by the private sector.

⁶ J. G. Gurley and E. S. Shaw, [3]. For a very good, concise statement and further development of their ideas, see Don Patinkin, [11].

⁷ Mundell's analysis [7] was in terms of inside money creation only and he reached this conclusion.

Commodity trade and the possibility of deficits or surpluses in the balance of trade provide an avenue for changing the *net* stock of financial assets in the economy. Thus, here we have a means of injecting new financial assets into the economy which is analogous to an outside creation of money. This is true under systems of both fixed and floating exchange rates. The financial counterpart of a surplus in the trade balance with the outside world is the acquisition of financial assets (the liabilities of foreigners). This acquisition can take the form of increases in net bond holdings as a *quid pro quo* for the surplus commodity flow, or part of these incremental bond holdings can be converted into domestic money in the case of fixed exchange rates. Thus, the net stock of financial assets of the private economy increases as a result of the trade surplus, just as it would in the case of a deficit in the government budget.

Notice the implications of these outside methods of changing the stock of financial assets in the economy. Consider a government policy that achieves a "once-and-for-all" outside increase in the economy's stock of financial assets. At the old level of income, there will be portfolio imbalance with an excess supply of financial assets and an excess demand for commodities. Spending for commodities will rise and will temporarily increase money income. Imports increase and the trade balance goes into deficit if a fixed exchange rate is maintained. This deficit drains financial assets out of the system, removing their excess supply and forcing the equilibrium level of income down to its original position. Thus, *under fixed exchange rates, the government finds that it cannot permanently alter the stock of assets in the economy, although the offsetting international mechanism is somewhat different from that operating in the case of inside money creation. It depends on commodity flows through the trade balance rather than on purely financial capital movements.*

The Formal Model

For the most part, our analysis assumes a Keynesian environment with rigid internal prices of domestic goods and services (including labor) denominated in the domestic currency. Slack in the economy exists with involuntarily unemployed resources. The economy is sufficiently small that tradable goods—importables and exportables—have their prices fixed externally (in terms of foreign currency) and thus the domestic-currency prices of these goods are determined by the exchange rate. Hence, a fixed exchange rate implies constancy of relative prices between tradables and nontradables⁸ and constancy also in

⁸ For a more extensive discussion of the distinction between tradables and nontradables, see R. I. McKinnon, [4].

the share of imports in total expenditures. However, the profitability of exporting is assumed to depend on relative domestic and foreign prices. Thus, with Keynesian conditions existing both internally and externally, the exchange rate determines the level of exports and, under a system of fixed exchange rates, exports will be fixed unless external demand shifts.⁹

The case of fixed exchange rates avoids any index-number problems in the definition of "real" income, Y , associated with the production of physical commodities. The relative prices of goods and services that would enter foreign trade (tradables) are fixed relative to those that cannot (nontradables). Hence, these fixed prices can be used as weights in constructing Y . However, if we raise the exchange rate, k (the domestic-currency price of foreign exchange), the domestic-currency prices of tradables rise while the domestic prices of nontradables are constant. Economic incentive then exists for traders to expand exports and curtail imports, which of course stimulates domestic income. However, the rise in money income will be proportionately greater than the rise in real income because of the increase in the domestic-currency prices of tradables (due to the increase in the exchange rate). An index-number problem now arises in evaluating real income relative to its initial position. But it is sufficient for our analysis simply to note that real income moves qualitatively in the same direction as money income in response to a shift in the exchange rate, although the shift in real income is not as large.

Throughout, we shall use the analytical convenience of comparing equilibrium income positions of a *stationary* character where net investment is zero, although the *marginal* propensity to save is positive.¹⁰

⁹ In a Keynesian environment, the barrier to achieving a full-employment level of output is insufficient aggregate demand. If we were to assume that domestic producers could export unlimited quantities at a given domestic price, then the whole problem of income generation would vanish, for the economy would move directly to a full-employment state. The usual Keynesian escape from this difficulty is simply to take the level of exports as exogenously determined. It is more useful for our purposes to constrain export demand by assuming what amounts to increasing selling costs at a given exchange rate. Because the outside world is also "Keynesian," the economy in question is constrained in what it can sell at any given price but not in what it can buy.

¹⁰ In constructing a simple stationary Keynesian model of the circular flow of real income, we must make sure that it is consistent with portfolio-balance considerations. The well-known difficulty that a stationary-equilibrium level of income is inconsistent with positive net investment can be thought of in portfolio terms where positive net investment increases the stock of real wealth in the economy—which may or may not be associated with the creation of liquid financial assets. Mundell has recently shown [10] that for a closed economy, these increments to the stock of assets cannot be ignored in determining the rate of interest or the equilibrium level of income. We avoid this problem by assuming that net savings

However, it is not difficult to extend our conclusions to cover growth situations.

We are now ready to specify formally the relationships linking portfolio balance, aggregate expenditures, and balanced commodity trade within our highly simplified economic environment. We shall assume a fixed exchange rate, $k = k_0$, throughout most of the formal presentation. Where the presence of floating exchange rates would alter our conclusions, this will be indicated; but the reader will be spared the details of a complete alternate formal presentation which must be worked out in "money" rather than "real" terms.

It is very convenient analytically to make further use of the assumption of an externally fixed interest rate (the relative price of money and bonds) to combine money and bonds into a single financial variable.

Let A denote the actual stock of net financial assets in the economy. It consists of money plus bonds where bond holdings can be negative, $A = M + B$.

Let $L(Y, A, i_0)$ denote the total ex ante demand for financial assets, which is a function of income, actual asset holdings, and the rate of interest—a given parameter. Behind the scenes, individuals also have a desired bond-money mix for given values of Y, A , and i_0 .

Let $F = F(Y, A, k_0, i_0)$ denote the total ex ante *domestic* demand for commodities, both domestically and foreign produced. It should be noted that the demand for commodities is a demand for a *flow*, while the demand for financial assets is for a *stock*.

Let $X = X(k_0)$ denote exports.

Let $I = I(Y, A, k_0, i_0)$ denote the demand for imports which is a portion of F depending on the economy's openness.

In equilibrium, the aggregate demand for commodities equals their aggregate supply, a balance exists in international flows of commodities, and the demand for and the supply of financial assets are equal.

$$(1.1) \quad F(Y, A, k_0, i_0) + X(k_0) - I(Y, A, k_0, i_0) - Y = 0. \quad \text{Commodities}$$

$$(1.2) \quad X(k_0) - I(Y, A, k_0, i_0) = 0. \quad \text{Trade Balance}$$

$$(1.3) \quad L(Y, A, i_0) - A = 0. \quad \text{Net Financial Assets}$$

in the economy are zero when equilibrium income levels are attained. In equilibrium, the marginal propensity to save is positive, but individual behavior is such that the average propensity to save is zero. More precisely, if income in the private sector of the economy increases while private holdings of financial assets remain unchanged, individuals will endeavor to "save" ex ante out of this incremental income in order to build up a commensurate increase in their holdings. However, once asset holdings increase in the desired proportions, private net saving ceases.

Notice that we have three equations and only two variables to be endogenously determined: A and Y . Equation (1.1) is the familiar Keynesian condition for determination of the equilibrium level of income when the problem of portfolio balance is ignored. That is, the net domestic demand for commodities, F , plus *net* foreign demand, $X - I$, must equal the realized level of income, Y , when the economy is in equilibrium. Equilibrium condition (1.2) specifies a zero trade balance, which is a necessary condition for A to remain unchanged. Together, (1.1) and (1.2) imply (1.3); that is to say, individuals achieve their desired asset holdings. The easiest way to see why (1.1) and (1.2) together make (1.3) redundant and assure the achievement of portfolio balance is to subtract (1.2) from (1.1) to get

$$(1.1) - (1.2) \quad F(Y, A, k_0, i_0) - Y = 0.$$

(1.1) - (1.2) simply says that total *domestic* demand for commodities, F , equals realized production, Y . Thus, there is no excess domestic demand for commodities. Since individuals are limited in using their purchasing power to acquire *either* commodities *or* financial assets, from Walras' law we know that zero excess demand for commodities implies zero excess demand for financial assets. Therefore, (1.3) is redundant, and our equilibrium conditions reduce to two independent equations in two unknowns, Y and A . Nevertheless, symmetrical consideration of (1.3) is conceptually useful as an explicit specification of portfolio balance.

What are the stabilizing forces which assure that our equilibrium conditions (1.1) and (1.2) are meaningful so that Y and A tend to converge to their equilibrium values? As in all simple Keynesian models, we assume a positive net marginal propensity to save *ex ante* out of current income for a given A . Thus, the usual Keynesian argument for stability applies when the *ex ante* demand for commodities (both domestic and foreign) and realized income differ. However, in addition, we have assumed that individuals wish to keep their net asset holdings, A , in a specified relation to the level of income, Y . This last assumption implies that any deficit or surplus in the trade balance must eventually be eliminated. For example, in the case of a trade deficit, the economy will tend to lose outside financial assets. Individuals then curb their real expenditures for commodities in order to rebuild their financial asset position. This depresses income in general and the demand for tradables, including imports, in particular. Thus, eventually the trade deficit must be eliminated. The more open the economy, the faster and more powerful will be this equilibrating tendency.

Size, Openness, and Exchange-Reserve Requirements

Current debate regarding the "liquidity needs" of nations attempting to maintain a system of fixed exchange rates has been distressingly vague, because the way in which an economy adjusts to external imbalance has not been specified. We shall confine our discussion to the impact of exogenous shocks in the trade balance on a nation's exchange reserves.¹¹ As a matter of convenience, consider exogenous shocks in the trade balance to be confined to export earnings and suppose they can be classified as permanent and transitory. Transitory shocks are those quickly reversed which do not force the economy to adjust. Permanent shocks are those which—in a system of fixed exchange rates—are sufficiently prolonged that an internal income adjustment (money or real) is forced on the economy (in the absence of official intervention), which restores balance in commodity trade. We shall be concerned exclusively with these permanent shocks and the exchange reserves necessary to preserve external convertibility while adjustment takes place.

It should be stressed that, in the discussion which follows, changes in income levels are assumed to constitute the whole of the adjustment mechanism. We have assumed a "Keynesian environment" with a constant price level, which, combined with a system of fixed exchange rates, implies that there is no scope for adjustment of the trade balance through changes in relative prices. In addition, based on the assumption that our economy is small, we abstract from any possible repercussion effects through induced changes in incomes abroad.

Consider two economies where each has a GNP of \$1,000 per year and, within each, individuals have the same desired ratio of financial assets (money and bonds) to GNP, say 1:2 (a stock-flow ratio). However, one of the economies is relatively open with a marginal and average propensity to import of 0.5 and the other is relatively closed with a propensity to import of 0.05. Consider the impact of a "permanent" \$10 fall in export earnings on each economy. Both lose outside assets, which forces a curtailment of internal aggregate expenditures. Equilibrium is restored when income falls by \$20 in the open economy and by \$200 in the closed economy, causing imports to fall by \$10 in both cases. In the new equilibrium, portfolio balance requires that a *cumulative* total of \$10 of financial assets be drained out of the open economy and \$100 out of the closed economy to maintain the 1:2 asset:GNP ratio.

¹¹ Exogenous capital movements responding to differential profit opportunities in a changing economic environment are also important but are not considered here. Stationary-state models are not good vehicles for examining problems in real-capital accumulation.

What are the exchange-reserve losses for each economy? To the extent that domestic nationals reduce their *bond* holdings, these will simply pass into the hands of foreigners (a capital inflow) with no losses of exchange reserves. However, to the extent that domestic holdings of money are reduced, an equivalent amount of foreign-exchange reserves will be lost, since foreigners convert receipts of domestic money into their own currency. For example, if half of total financial-asset holdings, A, were in the form of money so that the desired money:GNP ratio was 1:4, the open economy would lose \$5 of exchange reserves and the closed economy would lose \$50. Paradoxically, for the given absolute fall in export earnings, *the closed economy with its small foreign-trade sector requires much greater exchange reserves* to permit adjustment to take place.

A more conservative case in this regard would be one that compared equal proportional losses in export earnings, say 10 per cent for each economy, which amounts to a loss of \$50 of exports for the open one and \$5 of exports for the closed. Even here, where incomes in both countries will also fall by 10 per cent, the exchange-reserve losses will be the same, \$25 in each country.¹² If, in contrast, one of our economies had a GNP of \$2,000 (versus \$1,000) with a trade sector of the same proportionate size, a 10 per cent loss in export earnings would result in exchange-reserve losses of \$50. Thus, doubling the size of the economy in this case doubles the need for exchange reserves.

We conclude that the amounts of foreign-exchange reserves required to finance a country's foreign trade are directly dependent on the size of the economy (GNP) and the ratio of money holdings to GNP,¹³ but may be uncorrelated or even negatively correlated with the size of its foreign-trade sector. For example, a newly formed free-trade area which greatly expands its intra-area trade relative to total money income need not require more exchange reserves if its initial reserves have been adequate to maintain free convertibility. These results contradict the usual methods of projecting the world's "liquidity" needs by

¹² The usefulness of comparing shocks of equal absolute magnitude or shocks proportional to the size of exports depends on the probability assumptions one is willing to make. The statistical law of large numbers might suggest that comparing proportional changes is too "conservative," that is to say, shocks should tend to be proportionally smaller in the country with the larger export sector. In practice, such considerations are probably dominated by the extent to which a trading country manages to diversify both imports and exports. Large countries would seem to have an advantage in this last respect.

¹³ Scitovsky [12, pages 101-109] has a discussion relating domestic-money holdings to foreign-reserve requirements. He notes that within a common-currency system, individual money holdings are in fact the same as foreign-exchange reserves so there can be no exchange-reserve problem.

simply extrapolating trade trends. Our analysis also points out *the inappropriateness of relatively closed economies relying on internal adjustment to external shocks by maintaining a fixed exchange rate*. Not only are their needs of exchange reserves large relative to the amount of their foreign trade, but severe fluctuations in internal income can arise from relatively small changes in the trade balance. Control devices would better be applied directly to the small foreign-trade sector of the relatively closed economy, and the simplest such control device is a floating exchange rate.¹⁴

¹⁴ It has been demonstrated by McKinnon [5, page 19] that small exchange-rate fluctuations will efficiently control the balance of trade provided that the size of the foreign-trade sector is small relative to GNP. The converse is also true, that a floating exchange rate is likely to be an inefficient control device when dependence on foreign trade is high.

II. DOMESTIC FISCAL POLICY IN AN OPEN ECONOMY

How can government fiscal policy be used to affect expenditure decisions and hence income levels? Mundell's conclusion [7] was that fiscal policy can be effective in the presence of perfect capital mobility with fixed exchange rates, although not in the case of a floating exchange rate. We shall incorporate fiscal-policy parameters in order to examine these conclusions critically, beginning with the case of fixed exchange rates. In particular, we shall distinguish the effects of a policy of a balanced budget from fiscal policy associated with deficit financing, because only in the latter case is Mundell correct.

Let G be a parameter representing *tax-financed government expenditures*. It has an expansionary impact on the ex ante demand for commodities at any given level of income, as we assume a positive marginal propensity to save out of disposable income with given asset holdings. Correspondingly, it can be expected, given Y , to have a negative effect on the ex ante demand for holdings of financial assets, since it is assumed that the government has no desire to hold financial assets.

Let D be a parameter representing the level of the *deficit* in the government budget. Note that under our assumption of a fixed interest rate, the expansionary effect that D has on the ex ante demand for commodities will be greater than in a closed economy where the interest rate must be bid up in the process of absorbing the new securities issued.

Tax-Financed Government Expenditures under Fixed Exchange Rates

Consider the introduction of the parameter G into the previous set of equilibrium equations.

$$(2.1) \quad F(Y, A, i_0, k_0, G_0) + X_0 - I(Y, A, i_0, k_0, G_0) - Y = 0.$$

$$(2.2) \quad I(Y, A, i_0, k_0, G_0) - X_0 = 0. \quad \begin{array}{l} \text{Commodities} \\ \text{Trade Balance} \end{array}$$

$$(2.3) \quad L(Y, A, i_0, G_0) - A = 0. \quad \text{Net Financial Assets}$$

We assume, as explained above, that $\frac{\partial F}{\partial G} > 0$, $\frac{\partial I}{\partial G} > 0$, and $\frac{\partial A}{\partial G} < 0$.

In a simple closed Keynesian system, balanced-budget expenditures result in a multiplier of unity. However, in an open economy, this result is modified by the existence of import leakages, and, in our model, by a balance-of-payments constraint. If, for example, government expenditures increase and are distributed between domestic and foreign goods in the same proportion as private expenditures, then,

assuming negligible repercussion effects, *additional import leakages will exactly offset the expansionary effect of the increase in tax-financed expenditures so that the equilibrium level of income will be unchanged.* The point here is that so long as the level of income remains above its initial equilibrium level, the system will generate imports in excess of the exogenously given level of exports. The resulting trade deficit will drain the economy of financial assets and thereby depress spending until the initial level of income, and hence balance-of-trade equilibrium, is restored. This conclusion depends on complete symmetry in expenditure patterns: the import content of government expenditures is exactly the same as that of private expenditures whether the latter be induced by changes in private disposable income or by changes in private holdings of financial assets. That is to say, where α is the common marginal propensity to import out of domestic expenditures, our *symmetry conditions* are

$$\frac{\partial I}{\partial G} = \alpha \frac{\partial F}{\partial G};$$

$$\frac{\partial I}{\partial A} = \alpha \frac{\partial F}{\partial A}; \text{ and}$$

$$\frac{\partial I}{\partial Y} = \alpha \frac{\partial F}{\partial Y}.$$

Thus, the loss in financial assets causes private expenditures to contract, which exactly offsets the rise in G_0 .¹⁵

What scope is left for balanced-budget policy for a small economy highly integrated with the outside world? Tax-financed government expenditures for goods and services can only affect the level of income to the extent that the symmetry conditions are violated and the government biases its expenditures towards domestic goods. In the limiting

¹⁵ One can formally deduce what has happened by further consideration of (2.1), (2.2), and the symmetry conditions on the understanding that $dG_0 > 0$. If exports are fixed, we have that

$$dI = \alpha dF = \alpha \left[\frac{\partial F}{\partial G} \cdot dG_0 + \frac{\partial F}{\partial A} \cdot dA + \frac{\partial F}{\partial Y} \cdot dY \right] = 0,$$

and that

$$dY = dF - dI = 0.$$

From the above expressions it follows that

$$\frac{\partial F}{\partial G} \cdot dG_0 = - \frac{\partial F}{\partial A} \cdot dA,$$

and thus $dA < 0$, which causes private expenditures to contract and exactly offset the impact of dG_0 .

case, where $\frac{\partial I}{\partial G} = 0$, the balanced-budget multiplier is unity; otherwise

it is less than one and can conceivably be negative. Thus, conventional expenditure policy is limited in scope. A much more promising avenue of generating internal income is to subsidize export industries from tax revenues—a policy not unlike that followed by many American states and municipalities in their efforts to attract new industries. A policy of government subsidy inducing exports to expand 10 per cent would permit an approximate 10 per cent increase in income levels if import leakages from incremental private expenditures were proportionate to the level of income. Thus, the key to a successful balanced-budget program of income stimulation is the direct impact it has on the trade balance rather than increases in government expenditures per se. The income-stimulating effects of the latter are soon dissipated by foreign-trade leakages draining financial assets out of the economy. But export expansion pumps more financial assets into the economy, which bids up the equilibrium level of income. Of course, export-expansion programs in a Keynesian environment amount to “Beggart-hy-Neighbor” and would cancel out if applied with equal effectiveness by all regional governments.

Deficit-Financed Government Expenditures under Fixed Exchange Rates

The parameter D has been defined as that portion of the government expenditure budget which is financed by the continuous printing of new financial assets. It does not matter whether money or bonds are printed—individuals receiving these financial assets (as a *quid pro quo* for the rendering of services) are free to trade money for bonds at a fixed interest rate in the world's capital markets.

Consider an economy in equilibrium, with no deficit spending, $D = 0$. Then deficit spending is suddenly increased to a positive amount, D_0 , and kept there indefinitely. This increases the ex ante demand for commodities in general and imports in particular, as before; however, unlike the case of the balanced budget, a new excess supply of financial assets is thrown into the system. As income is bid up, the trade balance deteriorates, which of course tends to drain financial assets out of the economy. This process yields a rising income with a deteriorating trade balance until the loss of financial assets through the trade deficit is exactly equal to the flow of new assets being created by the government. Only at this point will private holdings of financial assets remain unchanged. The following three equations describe the new equilibrium position of the economy:

$$(2.4) F(Y, A, i_0, k_0, G_0, D_0) + X_0 - I(Y, A, i_0, k_0, G_0, D_0) - Y = 0. \quad \text{Commodities}$$

$$(2.5) I(Y, A, i_0, k_0, G_0, D_0) - X = D_0. \quad \text{Trade Balance}$$

$$(2.6) L(Y, A, i_0, G_0) - A = 0. \quad \text{Net Financial Assets}$$

Our equilibrium conditions state that there will eventually be a permanent import surplus equal to the deficit D_0 , which will be financed by a continuous outflow of financial assets issued by the government.¹⁶ This equilibrium state is possible because of the *unlimited willingness of the government to alter its net asset holdings*, which is what running a steady deficit implies. Equation (2.6) simply represents equilibrium in private asset holdings, the stock of which rises to match the increased equilibrium income. (To the extent that private individuals augment their holdings of money, there will be an equivalent rise in exchange reserves if the government confines itself to issuing bonds.) It should be stressed that in contrast to the closed-economy case, deficit-financed expenditures imply the creation of an *external* debt. The flow of assets out of the economy means that the public debt issued will move into foreign-asset portfolios; it will not be held by domestic residents. Hence, the government is limited in using this kind of fiscal policy by the amount of external indebtedness it is willing to incur.

Can anything more concrete be said regarding the multiplier impact of D on Y ? Fortunately, it can, if we add one more symmetry condition, $\frac{\partial I}{\partial D} = \alpha \frac{\partial F}{\partial D}$, to those of the preceding section. Together, our

¹⁶ We assume that individuals react to changes in their own but ignore those in their government's portfolio positions. Thus, we abstract from any possible negative wealth effects that might result from the anticipation of future tax payments to finance the debt. It can be argued that the issue of public debt implies an increase in the present value of the future tax burden of private economic units, and that this implies a negative wealth effect in the demand functions. If it were to be assumed that an equivalent increase in bond holdings and in the present value of future tax liabilities resulted in equal wealth effects in opposite directions and that there were an absence of distribution effects, then the issue of public debt would have no net wealth effect. In this case, issues of government debt would presumably be accumulated by individuals as an offset to their growing liabilities in terms of rising future tax obligations, and the right-hand side of equation (2.5) would become zero. The analytic results for deficit-financed expenditures would then become similar to those for balanced-budget spending. To avoid this result, one can assume either that individuals suffer from some sort of "tax illusion" in that they fail to react to changes in the present value of their future tax obligations, or that they expect future payments to meet public debt obligations to be themselves financed by further debt issues. Thus, an individual might expect that, in his lifetime, repayment of the debt would never be required.

symmetry conditions and equilibrium equation (2.5) imply

$$(2.7) \quad dI = \alpha dF = \alpha \left[\frac{\partial F}{\partial D} \cdot dD + \frac{\partial F}{\partial A} \cdot dA + \frac{\partial F}{\partial Y} \cdot dY \right] = dD,$$

and symmetry together with (2.4) implies

$$(2.8) \quad (1 - \alpha) dF = dY.$$

Combining (2.7) and (2.8) yields

$$(2.9) \quad \frac{dY}{dD} = \frac{1 - \alpha}{\alpha}, \quad \text{where } 0 < \alpha < 1.$$

The conventional multiplier impact of deficit-financed government expenditures on the level of income, (2.9), depends only on the marginal propensity to import, α , and is independent of the domestic marginal propensity to save. In summary, the more closed the economy, the more income-stimulating punch will the government get out of a given amount of deficit financing with its concomitant rise in external indebtedness. For example, in a relatively open economy with $\alpha = \frac{1}{2}$, the multiplier is only one.

Fiscal Policy under Floating Exchange Rates

Mundell suggested [7] that deficit-financed fiscal policy will be nullified in the presence of floating exchange rates. Without going into formal detail, we shall consider both his case and that of a fiscal policy with a balanced budget. Suppose the government confines itself to "pure" fiscal policy where any deficit financing that occurs is covered by the issue of bonds and not by the issue of money. *In a system of floating exchange rates, there exists no mechanism by which the domestic money supply can expand in response to an income stimulus.* Since we are assuming a fixed interest rate throughout and individuals attempt to keep their money holdings commensurate with their disposable income, we cannot get a permanent increase in disposable income with a constant money supply. In the case of fixed exchange rates, the money supply was free to increase, as individuals could always sell bonds to foreigners and get domestic money from the foreign-exchange authorities. However, under floating exchange rates this avenue of money creation is not open, and the constant rate of interest tends to leave unchanged the velocity of circulation of existing cash balances. Hence, "pure" deficit-financed fiscal policy is relatively impotent in its effects on the level of income and employment.

To illustrate this point in the case of deficit financing, suppose the

government increases D from 0 to D_0 . Disposable private income rises from the proceeds of these government expenditures, and individuals respond by selling bonds to foreigners to try to augment their cash balances (which they cannot do in the aggregate). The attempt to do so, however, lowers the exchange rate, k , diminishing exports and increasing imports, thus dampening the temporary rise in domestic income. A new equilibrium is reached where imports exceed exports by exactly D_0 . Money income will then be in equilibrium with the fixed money supply, and the continuous stream of financial assets being pumped into the economy is completely siphoned off by the trade deficit. The increase in D has left money income unchanged, although real income will have risen very slightly because of the fall in k —which lowers the domestic prices of goods entering trade. The size of the government sector has expanded, but this has largely been offset by a contraction in private income and expenditures due to the fall in exports and rise in imports.

Consider now what happens to balanced-budget policy in a system of floating exchange rates. Since the domestic money supply and interest rates are effectively fixed, income can only rise if the velocity of circulation of money rises. If the government taxes and spends without “saving” like private individuals to build up cash balances and bond holdings (which is really what balanced-budget multiplier theory assumes), then this transfer of disposable income from the private to the public sector does increase velocity. *In this limiting case, where the increase in G requires no rise in government money balances, a balanced-budget multiplier of unity is restored under floating exchange rates.* Disposable money income in the private sector rises to its original level and in addition we have the new increment in tax-financed government spending in total money income. Some increase in k occurs in the new equilibrium to keep exports equal to imports. Thus, the associated rise in internal domestic prices will mean that real income does not rise quite so much as money income.

III. MONETARY POLICY AND INTERNATIONAL ECONOMIC INTEGRATION

In our previous discussion of alternative methods of inside and outside money creation under a system of fixed exchange rates, we noted that government monetary policy would be frustrated in both cases. Individuals would buy bonds from foreigners to offset inside money creation, and trade deficits would occur which drained newly created assets from the economy and thereby offset any outside injections of financial assets. In either case, foreign-exchange authorities wind up accumulating newly-issued domestic money and lose an equivalent amount of foreign-exchange reserves. If, however, the government has no commitment to maintain a fixed exchange rate, domestic money created by either inside or outside means remains in the economy and must have an expansionary effect on domestic money income. *Thus, monetary policy regains its effectiveness under floating exchange rates*, as Mundell suggested, but the mechanism by which this happens is quite different from that which he envisaged.¹⁷

Suppose the central bank makes a nonrecurrent open-market purchase of bonds to increase the stock of money. How does the economy react? Individuals find themselves with an excess supply of money and an excess demand for bonds at the unchanged rate of interest. They attempt to purchase bonds from foreigners with domestic money, which bids up k , the price of foreign exchange. The rise in k stimulates exports and curtails imports, thus bidding up money income. This temporary surplus in the balance of trade is the mechanism by which the economy increases its net bond holdings so as to relieve the excess demand for bonds. However, this leaves the economy with a net increment in financial assets—both money and bonds. Thus, there will exist an excess demand for commodities until money income is bid up proportionately to the increment in financial assets. Final equilibrium is attained when money income is sufficiently high to induce enough imports to eliminate the surplus in the balance of trade. This stops the flow of financial assets into the economy, and the upward pressures on the level of money income come to an end. In this new equilibrium position, then, *money income and bond holdings will have risen proportionately to the increase in the money supply*—if asset preferences per dollar of money income remain unchanged. The same results hold if the central bank adopts outside methods to inject money into the

¹⁷ Mundell [7] suggests that an increase in the money supply will raise the equilibrium level of income “because it induces a capital outflow, depreciates the exchange rate and causes an export surplus” [page 148]. However, a permanent export surplus pumps assets into the economy and hence is inconsistent with equilibrium portfolio balance.

economy. In final equilibrium, k will also have moved to a permanently higher level. The higher level of money income induces more imports, and the equilibrium value of k must rise to expand exports so as to establish equilibrium in the balance of trade.

In contrast to the possibilities for using fiscal policy, monetary policy is necessarily confined to "national" governments with independent currencies. Regional governments cannot be given the opportunity to issue money which is legal tender in a larger federal system. This would be equivalent to giving the regional government claims on resources outside the region with no *quid pro quo* in return. Thus, the evolution of a free-trade area, among nations with fixed exchange rates, into a common-currency system does require that an international authority assume sole responsibility for the issue of money.

Adjustable-Peg Exchange Rates and the Sterilization Problem

In contrast to a floating exchange rate, where government authorities make no direct attempt to intervene in the foreign-exchange market, an adjustable peg system is defined as one in which monetary authorities change the exchange rate in discrete amounts (jumps) at widely separated points in time. For purposes of our analysis, exchange reserves are assumed to be sufficient to preserve free convertibility at any pegged rate chosen by the authorities. Also, it makes no difference analytically whether we consider a rise in k to be due to an official devaluation or due to an inflation in the foreign prices of tradables relative to nontradable domestic goods. In both cases, the initial impact is to expand exports and curtail imports.

Although direct attempts to alter the money supply (by either inside or outside methods) are doomed to failure in the presence of a pegged exchange rate, changes in the pegged value of k can have an economic impact which is equivalent to a monetary expansion or contraction. Suppose the government increases the pegged value of k (devalues the domestic currency) to what is imagined by speculators to be a permanently higher level. Exports expand and imports contract, improving the trade balance and increasing domestic income. In addition, the export surplus pumps financial assets into the economy, and these assets will eventually go into excess supply, and cause domestic expenditures to rise even further. This process continues until money income and expenditures have risen sufficiently greatly to eliminate the export surplus. The government accumulates exchange reserves during this adjustment to the extent that domestic nationals decide to augment their money holdings by turning over foreign-currency earnings to the exchange authorities. By the back door of the exchange-stabilization fund, the government finds it can successfully

inject domestic money into the economy. *Thus the increase in the exchange rate successfully increases money income, exports, and holdings of financial assets, including both money and bonds.*

This result bears directly on the question of *sterilization* of unwanted payments surpluses. Suppose we temporarily depart from the assumption of a Keynesian economic environment in order to consider an economy which is in full-employment equilibrium without inflation. Suddenly it finds itself facing the problem of dealing with an effective rise in the value of k which is potentially associated with a higher equilibrium level of money income and price inflation. This "effective" rise in k could be due to inflation abroad (economically equivalent to formal exchange-rate increases, as discussed earlier); or it may find it has devalued too far—a situation not unlike that of Israel, as discussed below. The easiest and most rational economic policy would be to adjust or readjust the actual exchange rate downward until it was associated with the desired equilibrium level of money income. However, there may be institutional or political prohibitions on changing the existing pegged rate, particularly given the irrational nature of current world monetary arrangements.

How then can a government sterilize a payments surplus without altering its exchange rate? The surplus itself can be highly inflationary, since domestic money is continuously created as the counterpart of the acquisition of foreign exchange by the monetary authorities. We have emphasized that monetary policy is helpless with a fixed exchange rate, and this case is no exception. Thus, traditional sterilization techniques such as open-market sales of bonds to soak up domestic liquidity will not work. Individuals simply turn around and sell more bonds to foreigners for cash at the fixed interest rate. This capital inflow causes the payments surplus to widen even further. Without government interference, this surplus will continue, increasing the demand for commodities and bidding up money income until a new inflated equilibrium position is reached.

Suppose, however, the government increases taxes and runs a budgetary surplus which it employs to drain financial assets from the private sector. An equilibrium can be found where the budgetary surplus just equals the inflow of financial assets which is equal to the export surplus. Thus, the level of money income *and* financial-asset holdings in the private sector can be prevented from rising. *Sterilization of a payments surplus is accomplished by fiscal policy alone.* Such a sterilized state with its "equilibrium" surplus in the balance of trade and improving net asset position of the government can continue until the rest of the world takes measures to halt the deterioration of its net asset position.

Germany and Israel

The preceding discussion of sterilization problems bears directly on the recent experience of both West Germany and Israel. Confronted by inflows of foreign exchange coupled with inflationary pressures, both countries have in recent years resorted at various times to restrictive monetary policies with highly unsatisfactory results. In the case of Germany, capital inflows have, over the past decade, hindered the efforts of the Deutsche Bundesbank to restrain inflationary forces. It should be stressed in this regard that price inflation is a problem of paramount concern in West Germany. With two hyperinflations that destroyed German currencies as part of modern German experience, the officials of the Deutsche Bundesbank, a legally autonomous institution, have repeatedly reaffirmed their basic commitment to monetary stability. This commitment, however, has at times proved difficult to reconcile with their additional responsibility to support the existing exchange rate, for the Bundesbank administers German foreign-exchange reserves so that every purchase of foreign exchange directly creates domestic money; and, conversely, sales of foreign exchange result in an equivalent destruction of money.

These strains were perhaps most evident in 1959-60, when Germany launched a restrictive monetary policy to combat growing inflationary pressures. This experience has been described by Milton Gilbert [2, page 178]:

Germany has had experience with extreme inflation in our time, more than once, and it is understandable that the authorities have placed a high priority on price stability ever since the currency reform. When the internal boom showed signs of overheating in the autumn of 1959, therefore, they began to tighten down the lid on credit expansion, and they followed this policy with increasing severity for a little better than a year. The main instruments used were successive increases in reserve requirements and decreases in rediscount quotas, which quite effectively tightened up the credit situation and sent interest rates sharply upward.

The result was that almost everything went wrong: the current external surplus increased; the net outflow of ordinary long-term capital decreased; the banks brought home their short-term foreign assets and a flood of other short-term money came into Germany, so that a net outflow of over \$0.5 billion in 1959 rose to a net inflow of almost \$1 billion in 1960; and finally, the increase in gold and foreign-exchange reserves, which was less than zero in 1959, exceeded \$2 billion in 1960. Here was a clear demonstration that, in these days of freer capital movements, there is real substance to the need for

policy to follow the rules of the game. The German authorities hauled up anchor late in 1960, and in about six months their policy was fully on the other tack. With delightful candor, they described how it had all been a mistake. Ironically, so much capital was coming from abroad, the policy of monetary restriction had very little effect on the boom; and a business that really needed funds and couldn't find them at home could generally do so across the border in Amsterdam or Zurich.

It should not be inferred, however, that Germany has circumvented this problem since 1960 with complete success, although the small appreciation of the mark in 1961 gave her a temporary respite. In 1963, for example, German analysts observed that capital movements were again an important contributor to growing liquidity in Germany:

There is no doubt that the main problem affecting the balance of payments in 1963 was that of capital movements. . . . At the end of October, the surplus stood at DM 1,400 million, a genuine and acute danger. If this development continues, this would have an adverse influence on liquidity within Germany. The Federal government therefore ought to consider seriously how to canalize this capital flow. [13]

From January through December of 1963, the holdings of gold and foreign exchange of the Bundesbank increased by some DM 1,700 million, while the domestic money supply underwent a concomitant expansion of about 12 per cent. Attempts to resist these inflationary pressures by tightening monetary conditions further accentuated capital inflows, as is evidenced by the protests of U.S. officials to rising German interest rates. These events lead to the conclusion that if domestic monetary policy is to remain an effective anti-inflationary force, some measures must be taken to reduce the inflow of capital from abroad. Interestingly enough, some observers have recommended an interest-equalization tax *to repel* foreign funds (in contrast to the purpose of a similar U.S. measure). [13]

As our model suggests, if the existing exchange rate is to be maintained and if extensive controls over capital movements are to be avoided, more reliance must be placed on a budget surplus. In fact, budget surpluses during certain years in the past decade appear to have made an important contribution to maintaining stable prices in West Germany. An alternative to the politically difficult task of running a budget surplus is extended controls over capital flows so as to enhance the efficacy of domestic monetary policy in maintaining internal balance. However, this requires recognition of the adminis-

trative difficulties and resource misallocation which almost inevitably result from such controls. It should also be stressed that even optimum use of fiscal policy to "sterilize" Germany's payments surplus and prevent internal inflation can only work for limited time periods. Unless the external "shocks" generating Germany's payments surplus are of a temporary character, the rest of the world is likely to run out of credible foreign-exchange reserves. If this happens, Germany's commitment to a convertible currency pegged at an undervalued level will become inconsistent with her commitment to internal monetary stability.

An even more striking case appears to be that of Israel in the period since the devaluation of the Israeli pound in February of 1962. At that time, the Israeli pound was devalued from IL 1.80 per \$1 to a new rate of IL 3.00 per \$1 in an attempt to improve the Israeli balance of trade. Given the normal large capital inflows into Israel, this substantial devaluation was overly successful and caused a significant surplus in the balance of payments to develop, which has led to large expansions in the domestic money supply even though other restrictions on trade were simultaneously removed. The concern in Israel over rising prices has been very great, for it is feared that inflation will lead to a renewal of the balance-of-payments difficulties which it was the purpose of the devaluation to remedy—see, for example, [16, page 1] or [17, page 1]. Hence, strong monetary measures and wage policies have been instituted to the purpose of maintaining monetary stability.

Monetary policy in Israel has consisted primarily of the energetic use of bank-liquidity ratios (that is, reserve requirements); open-market operations have been used only sparingly. In fact, the marginal-liquidity ratio in the first quarter of 1964 was raised to an extraordinary 89 per cent. One result of this policy has been that commercial banks, virtually driven out of the direct-lending business by the high marginal-liquidity ratios, have resorted to acting as intermediaries between foreign lenders and domestic borrowers because of the commissions available in this brisk trade. The rapid inflow of foreign capital has resulted in large part from high domestic interest rates. (For example, one-year government bonds in January 1963 carried an annual interest rate of 8.35 per cent, tax free.)

The increase in the money supply resulting from this inflow of capital has greatly concerned Israeli officials and interested observers. From the time of the devaluation in February 1962, to November 1963, the money supply grew by some 60 per cent in spite of Israeli attempts to absorb excess liquidity.¹⁸ Prices rose by 14 per cent in 1962, and,

¹⁸ Changes in the money supply and changes in Israeli international reserves on a month-to-month basis show a substantial correlation (i.e. $r = .7$) in the period following the devaluation.

although the price rise was more moderate in 1963, Israeli economists have pointed out that much of the 28 per cent increase in the money supply in 1963 was directed into stock shares and real estate, where prices rose very rapidly. This has led to appeals by the Governor of the Bank of Israel to discourage conversion of foreign-currency deposits and to serious consideration of new controls to reduce capital inflows.

It seems somewhat paradoxical in this situation to find some advisors calling for yet more stringent monetary policy—see [15, page 1]—which would cause capital to flow in even faster. This response of the Israeli authorities to their inflation problem seems to indicate that traditional monetary policy aimed at easing inflationary pressure in a closed economy can be very inappropriate. External capital mobility has become too great. Orthodox attempts to tighten credit through restraints on the domestic banking system are not only likely to fail but may distort natural channels of financial intermediation. However, it should be noted that the crucial role the public sector has played in the remarkable economic development of Israel makes the realization of a budget surplus a somewhat difficult goal, even though it would have successfully sterilized the payments surplus. Therefore, the authorities really had the choice of either (1) waiting out the inflation until the new higher level of money income induced greater imports and eliminated the payments surplus, or (2) adjusting the price of foreign exchange downwards or simply letting it float to compensate for the overvaluation. Inadvertently, they chose (1), when (2) would have so easily avoided the inflationary pressures. Furthermore, it may prove to have been rather lucky that their extremely stringent monetary policies were circumvented by further inflows of foreign capital. If effective controls on capital imports had been successful in making the repressive domestic monetary policy effective, this could have led to a severe cut-back in investment expenditures. Curtailment of such investment expenditures could seriously interfere with Israel's very successful economic development. Thus, an exchange-rate adjustment or a government budgetary surplus (raised via consumption taxes) would seem to have been a much better solution for the internal inflation. However, this point evidently was not recognized by the Israeli authorities.

The Canadian Experience under Floating Exchange Rates

From 1950 to 1962, Canada provided the world with a most interesting example of an economy operating under a system of floating exchange rates. At the same time, capital mobility and large trade flows existed between it and the much larger American economy. The

model presented in this paper (and also that of Mundell) suggests that, in such a floating-rate system, monetary policy should come into its own, while fiscal policy will be rendered relatively impotent. And indeed the Canadian experience suggests just this. Unfortunately, the Canadian authorities chose, during the latter part of this period, to rely on deficit-financed expenditures, which, as the preceding analysis would imply, were unsuccessful in providing the desired expansionary stimulus. To make matters worse, monetary policy, which the evidence suggests was quite effective, was generally employed in an inappropriate manner.

Mundell, in a recent article [8], has examined the Canadian experience during these years and has concluded that "The best solution for the Canadian economy at the present time is a resumption of the flexible exchange rate system." [8, page 86] While a resumé of his discussion is useful as an application of our model and his, we would like to suggest that there exist good reasons, given the large and growing Canadian commodity trade with the United States, for Canadian authorities to stick with a system of fixed exchange rates. This is an issue of substantial importance, for the considerations which enter into this choice of fixed or floating rates are of quite general interest for developed economies throughout the world, especially with the current absence of an efficacious international adjustment mechanism.

A long-recognized advantage of a system of floating rates is that the domestic economy can presumably be insulated from external instability. However, in the Canadian case—as Mundell shows in some detail [8, page 82]—we find that Canadian levels of unemployment moved almost perfectly in phase with those in the United States over the 1950-62 interval. Like the United States, Canada experienced a recession in 1953-54, a more severe recession in 1957-58, an abortive recovery in 1959, and another recession in 1960-61. During these latter recessions, Canadian unemployment rates were substantially above those in the United States, and it took until 1962 for per capita GNP to regain its 1956 level. The question is thus posed as to why, with a floating-rate system, Canada found herself so vulnerable to fluctuations in the United States. An answer to this question can be found in the monetary policies adopted by the Canadian authorities.

It should be noted at the outset that the Canadian economy has been connected to the much larger U.S. economy through large trade flows and by a high degree of capital mobility, with Canadian banks operating extensively in the New York money markets. Thus, interest-rate differentials between the two countries result in substantial capital flows. Canadian interest rates generally fell less than U.S. interest

rates in recessions, and rose less than U.S. rates in booms. This had the effect of turning the interest-rate differential between the two countries in favor of Canada during recessions and against it in booms. Aside from the initial 1950-52 period, where there was an upward movement in the value of the Canadian dollar, because it had previously been pegged at an artificially low level, fluctuations in the value of the Canadian dollar were largely positively correlated with this interest-rate differential [8, page 83]. Apparently, the capital flows induced by these differentials were sufficient to cause the value of the Canadian dollar to appreciate in recessions (treating the whole period 1957-60 as a recession) and decline in booms, thereby offsetting the "natural" external forces operating through the trade balance in response to cyclical fluctuations in the United States. Thus, the exchange rate tended to move slightly perversely, or at best neutrally, with respect to the needs of the Canadian economy in insulating it from external shocks. Ideally, the value of the Canadian dollar should undergo significant depreciation in response to foreign recessions—thus halting the decline in Canadian exports and stimulating import-competing activities—and significant appreciation in response to foreign booms. Such movements in the value of the Canadian dollar would tend to occur naturally as the result of balance-of-trade forces. For example, when the United States slides into a recession, the resulting decline in the demand for Canadian exports will tend to depreciate the Canadian dollar and thereby insulate the Canadian economy from the U.S. recession. Thus, the fault was not with the floating exchange rate. The cause of the problem can instead be traced to an insufficiently vigorous countercyclical monetary policy, which had become the crucial policy variable. Canadian monetary authorities failed to allow sufficient "ease" to develop in money markets during Canadian recessions.

To emphasize the importance of monetary policy and the impotence of fiscal policy under a floating-rate system, we can compare the fiscal policies of Canada and the United States during the 1957-61 interval when Canada was generally more depressed and where government budgetary deficits in Canada were quite high relative to those in the United States. From April 1, 1957, to April 1, 1962, the cumulative budgetary deficit in Canada was Can. \$2.825 billion and the cumulative budgetary deficit in the United States from June 30, 1957, to June 20, 1962, U.S. \$21.99 billion [14]. There is some difficulty in making a comparison because of the floating exchange rate, but the U.S. deficit is about seven or eight times as great as the Canadian deficit, whereas U.S. GNP during the period was some fifteen times greater. Thus, relative to GNP, the Canadian deficit was large in com-

parison with the American deficit. By simply looking at deficits, it is difficult to distinguish cause and effect,¹⁹ but nevertheless it appears that the Canadian authorities did undertake a significantly more expansive fiscal policy with even less success. Mundell's and our model would predict this result since the newly created government securities would (in the absence of an expansionary monetary policy) tend to increase the capital inflow which in turn kept the value of the Canadian dollar relatively high, thus adversely affecting the trade balance and income and employment in Canada.

The Canadian authorities responded to their dilemma late in 1960 by trying to "talk" and eventually to force the value of the Canadian dollar downwards by selling Canadian dollars and threatening to implement restrictions on capital inflows. These threats of restrictions had generally disruptive effects on the economy. In 1962, they pegged the Canadian dollar at the significantly discounted rate of U.S. \$0.925, which, from a longer-term point of view, may well be undervalued. Undoubtedly, the correct policy would have been a sustained (and smooth) monetary expansion beginning in 1957 or 1958 so as to reduce the Canadian interest rates vis-à-vis United States rates, and thus indirectly to depreciate the Canadian dollar to its appropriate level, thereby raising income and employment. Because of this failure to carry out the correct monetary policy, the whole floating-exchange-rate experiment fell into unwarranted discredit in the eyes of the Canadian authorities as, to a lesser extent, did deficit financing. A final irony was that the significant incremental capital inflows from the United States attracted by the tight-money policy aroused nationalistic concern in Canada against the American "take-over" of Canadian assets—not the least of which concern was manifested by the Governor of the Bank of Canada, Mr. Coyne.

The choice of economic policies confronting Canada in the future thus reduces to (1) a floating exchange rate coupled with a vigorous countercyclical monetary policy to control internal income and employment, and a passive fiscal policy; or (2) a fixed exchange rate, which subjects monetary policy to constraints associated with the balance of payments but permits more flexibility for fiscal policy in controlling aggregate internal demand. The relative efficiency of these choices depends on some additional considerations affecting the Canadian economy outside of the simple financial model which we have presented.

¹⁹ A better measure of the relative expansiveness of the federal budgets of both countries would be to compare the hypothetical deficits under the assumption that each country attained full employment. Unfortunately, comparable data are hard to obtain.

The degree of integration in commodity trade with the United States has been substantial but fairly constant in the postwar period, with Canadian exports to the United States amounting to about 12½ per cent of Canadian national income. (Total Canadian exports are, incidentally, about 21 per cent of national income.) There is reason to believe [4] that the efficiency of changes in exchange rates in controlling the trade balance declines as the degree of integration between two economic entities increases. In this regard, Canada has recently taken significant steps to increase trade in industrial products with the United States. Completely free trade in automobiles and automobile components has lately been successfully negotiated. Extensions of these free-trade provisions to other industries would greatly increase productivity in Canada's relatively small-scale and sheltered manufacturing sector. Free-trade agreements of this kind amount to prohibitions on tariffs and subsidies or other "artificial" restraints on trade. However, a floating exchange rate subject to monetary manipulation would make such agreements difficult to conclude precisely because a currency depreciation is equivalent to an import tariff coupled with an export subsidy. Thus, the desirability of increasing economic integration does point towards a fixed exchange rate. If, in addition, Canadian authorities felt that the American government has finally learned certain Keynesian lessons regarding the possibility of virtually eliminating the business cycle (even in its relatively mild postwar form), these two considerations together suggest that Canadian policy should move towards an efficiently operated fixed-exchange-rate system and increasing free trade with the United States. This is, in our opinion, the optimum policy from an economic point of view. However, if Canadian policy turns more protectionist and nationalistic, or if the United States should pursue perverse countercyclical policies, then an *efficiently* operated floating-exchange-rate system would probably minimize the economic losses to Canada.

SUMMARY OF MAIN CONCLUSIONS

Given our simplifying assumptions that the country under consideration is "small" and that there is perfect capital mobility and significant commodity trade with the outside world, we have proposed the following theses:

1. There exists an automatic external-adjustment mechanism among nations which can be derived from portfolio-balance considerations.
2. There are important concepts directly analogous to the Gurley-Shaw distinction of inside and outside money creation. Specifically, we find that under fixed exchange rates, sales of financial assets to

- foreigners lead to an increase in the domestic money supply which is of an "inside" variety. In contrast, expansions in the holdings of domestic financial assets resulting from a surplus on current account are of an "outside" character.
3. Under fixed exchange rates, the domestic monetary authority loses control over the stocks of financial assets in the system, as Mundell has indicated. Attempts to alter the equilibrium level of income through monetary policy are therefore doomed to failure.
 4. Balanced-budget fiscal policy cannot alter the equilibrium level of income under fixed exchange rates unless the government is able to improve the trade balance directly. However, deficit-financed expenditures have an expansionary impact inversely related to the marginal propensity to import but independent of the marginal propensity to save. These situations are reversed under floating exchange rates.
 5. Exchange-reserve requirements are directly proportional to the size of GNP and the ratio of cash balances to GNP but may be inversely related to the size of a country's foreign-trade sector. In general, nations with relatively small foreign-trade sectors are ill advised to maintain a fixed-exchange-rate system.
 6. Alterations of the exchange rate under an adjustable-peg system can provide monetary expansion and increase or decrease the equilibrium level of income. If, however, the government is constrained from adjusting the exchange rate in the face of a balance-of-payments surplus, "sterilization" operations can be accomplished by the use of *fiscal* instruments, and not monetary ones.
 7. Under floating exchange rates, the domestic monetary authorities regain control over the domestic money supply and money income. In contrast to Mundell, our model of portfolio balance suggests that changes in the money supply will not be associated with *permanent* changes in capital flows into the economy.
 8. Government authorities do not fully grasp the implications of international economic integration for monetary and fiscal policy, as the recent experiences of Canada, Germany, and Israel tend to indicate.

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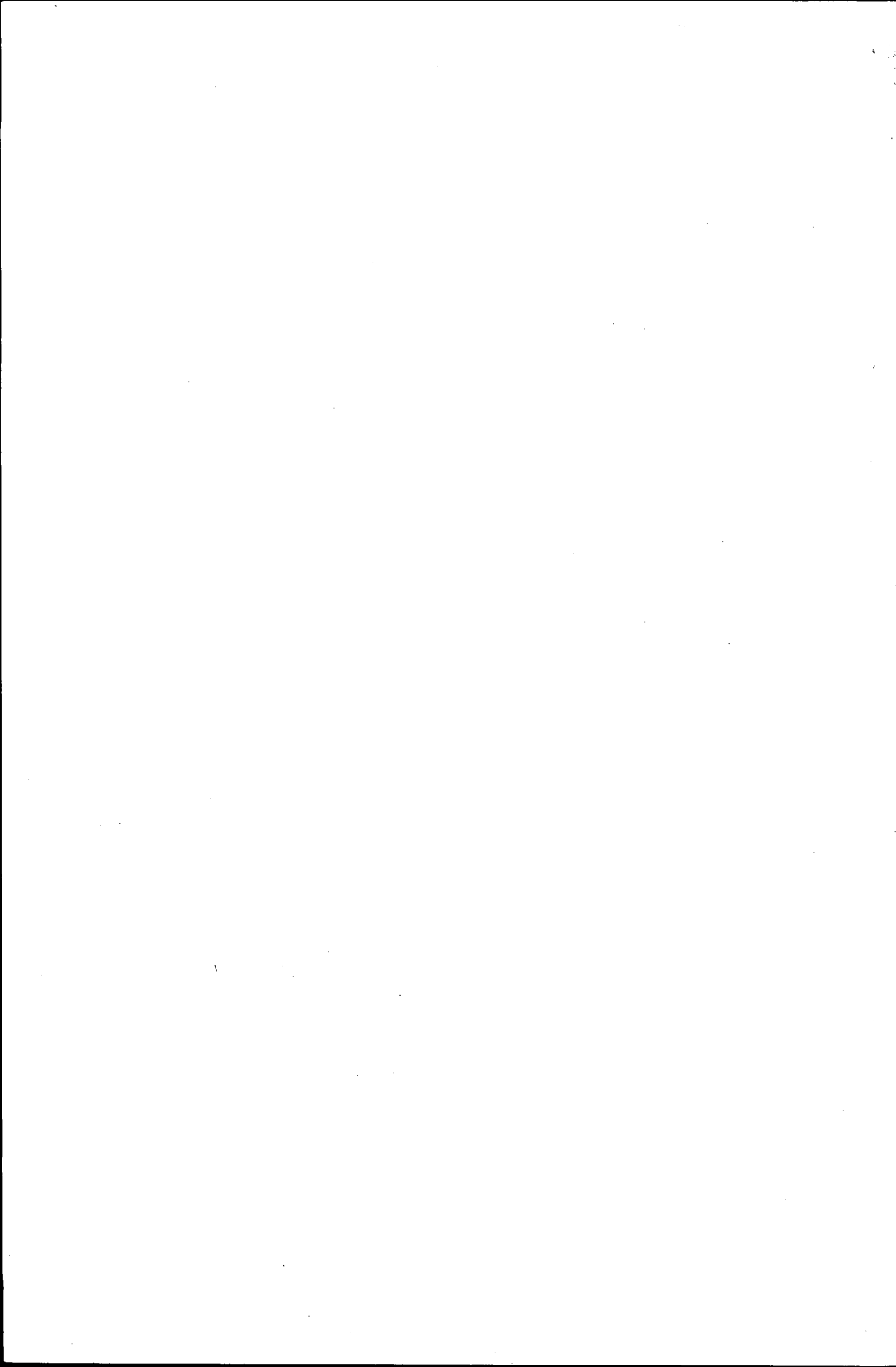
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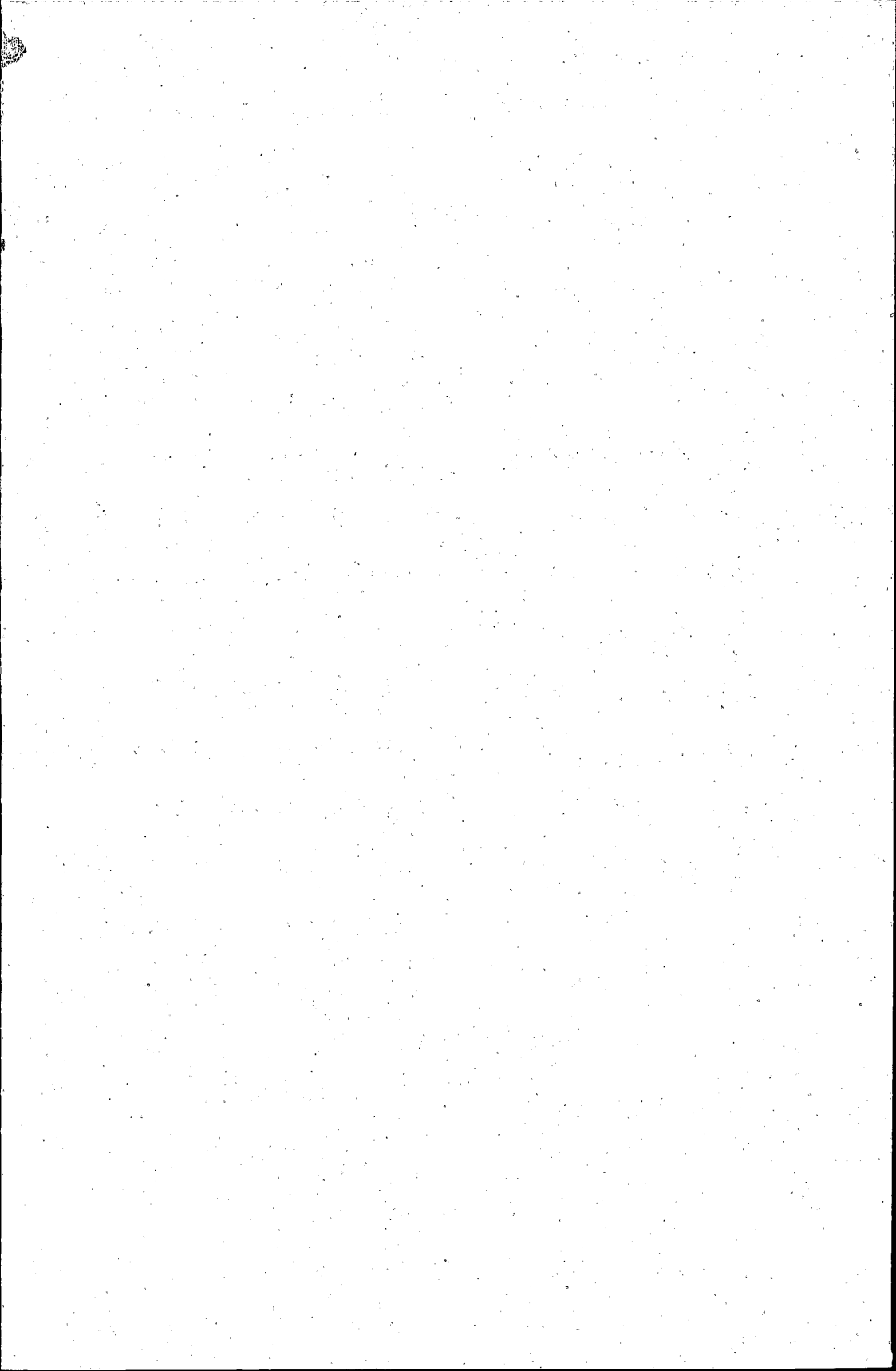
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