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The *Two* Monetary Approaches to the
Balance of Payments:
Keynesian and Johnsonian

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Abstract

This paper emphasizes the distinction between two 'monetary approaches to the balance of payments', one developed in the IMF, the other under the leadership of Harry Johnson in Chicago. The IMF approach is presented as an evolutionary development of the Kahn/Keynes multiplier model in an open economy. Johnson's approach is anti-Keynesian and self-proclaimed revolutionary. It posits the 'essentially monetary character' of the balance of payments. The IMF model tests satisfactorily as an explanation of income and imports over time. The long-run equilibrium approach of the Chicago model precludes statistical testing, and its short-run tests prove statistically meaningless.

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I. INTRODUCTION

In the 1950s and 60s, a number of new approaches were developed with the aim of understanding better the sequences of economic events that could lead countries into balance of payments problems and the policy measures that could prevent or correct such problems. Two places in particular where these intellectual activities flourished were the Research Department of the International Monetary Fund and the Department of Economics of the University of Chicago. The London School of Economics should probably be mentioned in the same breath, in as much as Harry G. Johnson, with whose name these activities are inexorably linked, taught the new gospel in both places as a commuting professor.

By the middle of the 1970s, a considerable body of new balance-of-payments theory and statistical verification had been built up in both Washington and Chicago, and each decided that the time had come for a book that would bring together the results of their respective research activities. The two books appeared almost simultaneously, under the identical title "The Monetary Approach to the Balance of Payments" (Frenkel and Johnson, (eds) 1976; Rhomberg and Heller (eds), 1977). The preface to the Chicago book mentions "recent research of the International Monetary Fund" *en passant* as a welcome indication of serious research on the same general range of problems taking place outside Chicago and the LSE—although Johnson had shed a rather different (and no doubt audience-pleasing) light on the origin of the Chicago monetary approach in a 1971 lecture in Amsterdam: "While the emergence of this new approach has been very largely the work of my colleague R.A. Mundell and our students at the University of Chicago, ...I believe myself...that its intellectual lineage can be traced back, via Mundell's period of service in the research department of the International Monetary Fund under J.J. Polak, to the 1930s work on monetary equilibrium of the Dutch economist J.G. Koopmans and the subsequent development by M.W. Holtrop and the Netherlands Bank of its practical expression in the Bank's model of monetary analysis." (Johnson 1972a, pp. 84/5.) The preface to the Fund book concludes with a discussion of similarities and differences "between the earlier Fund work and the approach developed in the academic literature of the last decade" (p. 12). The emphasis in this preface is clearly on the similarities, and the inclusion in the book of three papers by Fund staff members with a Chicago or LSE background is seen as a joining of the roots of the two approaches.[2] The basic view that the two approaches are little more than variations on the same theme is continued in Blejer et al., with the academic literature being credited for its 'more refined and robust formulation' (Blejer et al 1995, p. 710).

After the untimely death of Johnson in 1977, a few attempts were made to reconcile the "Washington" and the "Chicago" versions of the monetary approach to the balance of payments. Helliwell (1978) trawled through a large number of writings by Johnson as well

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[2] The gentle timing references in the passages cited from the two prefaces suggest the jockeying for intellectual primacy noted by Blejer et al (1995, p. 710).

as others of the Chicago school, finding many common sense observations about relations between the real world of output and prices and the balance of payments, beyond the all-pervasive mantra of that school which sees the balance of payments as a uniquely monetary phenomenon. And he, together with Frenkel (Chicago) and Gylfason (IMF), produced an elegant synthesis of the prewar Keynesian with the Chicago monetary approach to the balance of payments (Frenkel, Gylfason, and Helliwell 1980).

Since then, the subject has received little critical comment. While this is no doubt in part due to the fact that the role of monetary elements has been incorporated in conventional macroeconomic thinking (Blejer et al 1995, p. 715), the lack of attention given to the monetary approach is, nevertheless, a pity. The prominence of that approach in academic thinking for a number of decades, as well as its continued place in the conditionality of the lending policies of the IMF (Polak 1998), justify an effort to explore somewhat further the origin of the two approaches, to compare their analytical structures, and to draw some conclusions on their validity.

With these objectives in mind, this paper presents and appraises, in Section II, the evolution of the Fund's "monetary approach" from the Kahn-Keynes multiplier model of the 1930s, in which no monetary variables appear and which, of course, was all that the profession had to offer in terms of macroeconomic models prior to the arrival of Tinbergen's empirically tested econometric models. This presentation acknowledges more fully than in Polak (1957) the gradual evolution of ideas on this subject in the literature of the 1930s and 40s. Section III then describes the nature and origin of the "monetary approach" as developed independently by Johnson and his followers. The result of this comparative treatment is a picture of *two* monetary approaches that are distinct both in their origins and in their contents. In recognition of its historic linkages, I shall refer to the Fund approach as the "Keynesian," or the "evolutionary," monetary approach. The "Johnsonian" monetary approach, by contrast, arose from the rejection of Keynesian economics; it was, in Johnson's own words, a "revolutionary" approach (Johnson 1971).

To some extent, the differences between the two approaches may be attributable to different policy concerns that inspired the two seminal papers that gave rise to them. The stated purpose of Polak (1957#, p. 15)[3] was to "integrat[e] monetary and credit factors in the explanation of income or of payments developments." The analysis assumed a regime of par values, which were intended to remain unchanged except in the event of a "fundamental disequilibrium." By contrast, Johnson (1958*) was a survey article on recent attempts to study the effect of devaluation on the trade balance, and devaluation remained

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[3] Since many of the journal articles referred to in this paper have been reprinted in the two compendia mentioned earlier, all page references are to these convenient sources. Papers marked by an * after the year of original publication were published or republished in Frenkel and Johnson (1976). Papers marked by a # after the year of original publication were published or republished in Rhomberg and Heller (1977).

"the standard question" (Mussa 1976*, p. 187) on which the Chicago School would demonstrate its version of the monetary approach to the balance of payments.[1] That specific objective allowed an approach that disregarded shocks originating in the balance of payments, an essential ingredient in the Polak model. At the same time, the view that in the postwar context—in contrast to the 1930s—devaluation should be analyzed on the assumption of full employment of domestic factors of production was shared by economists in the Fund who wrote on that subject. (See Polak (1948) and Alexander (1952). Johnson's 1958 review paper took the latter paper, which had introduced the "absorption approach" to the analysis of devaluation, as his starting point.)

After the comparison of the two approaches, the paper presents a critical review of the attempts made by their proponents to provide empirical support for their theoretical findings. A final section summarizes the main conclusions.

I. THE EVOLUTIONARY VERSION OF THE MONETARY APPROACH

The 1957 Polak model, in its simplest form, is shown in Box 1. Our interest here is not primarily in that model itself, but rather in its development from Kahn's 1931 multiplier model through a process of "monetization." Three steps can be recognized in this process of monetization: (a) in the definition of the multiplicand—the autonomous expenditure stimulus that sets off a cumulative process of economic expansion, (b) in the determination of the magnitude of the marginal propensity to spend, and (c) in the determination of the time lag between two successive rounds of spending.

A. The Multiplicand

Kahn's presentation of the multiplier process runs in terms of an initial stimulus provided by additional government expenditure on roads. But he makes it clear, first, that the mechanism he analyzes is not confined to expenditure by the government or on any particular asset and, second, that it does assume monetary financing. The necessary funds are not supposed to be raised by taxation but by borrowing, and "the intelligent cooperation of the banking system" is taken for granted so that the money supply will be allowed to expand as needed (p. 174). In the Cambridge approach, "investment" as the autonomous domestic demand factor came to be understood as the sum of private investment and the government deficit, with the latter ennobled as "honorary investment" by Dennis Robertson (cited by Machlup 1943, p. 9).

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[1] Johnson's posthumous paper on the subject still describes his "new approach to balance-of-payments theory" in terms of "alternative approaches to devaluation theory" (Johnson 1977, pp. 251–52)

Box 1. The Fund Model in Its Simplest Form

The model consists of two behavior equations and two definitional equations:

$$MO = kY \tag{1}$$
$$M = mY \tag{2}$$
$$\Delta MO = \Delta R + \Delta D \tag{3}$$
$$\Delta R = X - M + K, \tag{4}$$

where
MO = money supply
Y = GNP;
M = imports:
R = reserves:
D = domestic credit of the banking system:
X = exports;
K = net capital inflow of the nonbanking sector:
k = the inverse of the velocity of circulation[5]; and
m = the marginal propensity to import.

No explicit lags are shown in the behavior equations, but the model acquires its dynamic character from the fact that while the flow variables in it (Y, M, X and K) are measured as totals over the unit period selected; the stock variables (MO, R and D) are measured as amounts outstanding at the end of the period. Thus, combining the four equations shown above:

$$\Delta Y = 1/k[\Delta D + X + K - mY], \tag{5}$$

where the time series for the three exogenous variables ΔD, X and K determine the development of Y, MO and M over time.

As pointed out by Machlup (1943, p. 14) any statements about income-creating disbursements can also be expressed in terms of the monetary mechanisms involved, that is in terms of credit creation and dishoarding. But Machlup sticks to his multiplicand in non-monetary terms. The Polak model, however, introduced the acquisition of domestic assets by the banking system (ΔD in equation (3) below) as the domestic component of the

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[5] If the period selected is one year (as in Holtrop 1959), k equals the inverse of the *annual* velocity of circulation; if the unit period is taken as the income period of circulation (as in Polak, 1957), $k = 1$. Note that the results of the model are not invariant to changes in the length of the unit period, combined with the corresponding change in k. If the period is one year, the adjustment of MO to an autonomous change in D (or in X or K) is much slower then with a period of, say, three months, and the real effects of the change will be correspondingly greater—as we shall see when we discuss Prais's improvement of the model below.

multiplicand. This choice implied that variations in the velocity of circulation of money (hoarding or dishoarding unrelated to changes in income) could be disregarded as minor compared to fluctuations in net credit creation by the banking system. If this is a valid assumption,[6] ΔD in equation (3) in the model would be a good approximation of the sum of all relevant domestic expansionary factors: business investment, to the extent that it was not self-financed or financed from the proceeds of shares and bonds sold to savers; consumer expenditure financed by bank credit; and government deficit spending financed by the banking system.

ΔD (or DCE, "domestic credit expansion" as it became known in the discussions between the Fund and the monetary authorities in the United Kingdom) also happened to be a variable to which monetary economists, following the work by Triffin on Latin American banking statistics, had paid a good deal attention in the 1940s. *International Financial Statistics*, the statistical monthly that the IMF started to publish in 1948, organized each country's consolidated banking data in a "monetary survey," patterned on Triffin's dichotomy of money of domestic origin (domestic credit creation) and money of foreign origin (international reserves). Even at that time, data to produce these "surveys" were available in almost all countries, with a lag of only a few weeks, from the balance sheets of commercial banks, which most central banks collected and presented in a consolidated format.

In an open economy, autonomous impulses coming from abroad typically dominate fluctuations in national income and it was natural, therefore, that practitioners of the multiplier approach from a small country originated the idea of including them. In an empirical study of the national income of Australia, Clark and Crawford (1938) presented a multiplicand which was the sum of four elements: private investment, the government deficit, exports and import replacement (that is, changes in imports not caused by changes in income)[7]. A few years later, Machlup (1943) worked out a broad range of numerical examples of multipliers applied to changes in both home investment and exports.[8]

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[6] Polak 1957#, pp. 18–21 presents charts for 44 countries to support the view that the annual data for the velocity of circulation "show considerable evidence of year-to-year stability or of a tendency for movements in one year to be subsequently reversed" (p. 17).

[7] Colin Clark explained the underlying reasoning as follows: "Neither Mr. Keynes nor Mr. Kahn...throw any light on the problem of the effect of changes in exports on general economic activity. In Australia (and for that matter in Great Britain) this is a problem of most urgent importance. In our analysis of the Australian statistics, Mr. Crawford and I adopted the definition of putting changes in value of exports on exactly the same footing as changes in the level of investment" (Clark 1938, p. 438).

[8]The temptation to follow statistical nomenclature rather than economic analysis by adding to the multiplicand "foreign investment"—the trade balance, rather than its presumed autonomous component, represented by exports as a first approximation—was overcome

These strands are found back in the Fund model, where the multiplicand was developed as the sum of domestic credit creation, exports, and capital imports—a combination for which Fleming created the appellation of "gross money creation" (Fleming and Boissonneault 1961#).

B. The Marginal Propensity to Spend

Kahn's multiplier was based on estimates for two behavior coefficients: the marginal propensity to consume—based on a weighted average of the marginal propensities to consume of workers and entrepreneurs, and the marginal propensity to import. Angell (1941) and Metzler (1942) added "a marginal propensity to invest" to capture secondary investment effects, thus broadening Kahn's first propensity into a "marginal propensity to spend." This change affected the multiplier analysis in a number of ways.

First, it removed the expectation of a geometric decline in successive spending rounds, since the marginal propensity to spend might well equal, or perhaps exceed, unity.[9] Indeed, if one assumes—a is typical for many developing countries—that bank credit is rationed, there should be every incentive for savers and investors to seek ways for the savings of the former, beyond the amounts desired as additions to their holdings of money, to flow into additional investments.

Second, the merger of a marginal propensity to consume and a marginal propensity to invest makes the concept of a marginal propensity to save irrelevant from the point of view of the multiplier process. There is, however, room for a "marginal propensity to hoard" which expresses the stock demand for money as a function of the flow of income.[10]

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only after a long and heated debate. Machlup (1943, Chapter III) relates the prewar debate on this issue; see also Polak (1947), Haberler (1947), and Polak and Haberler (1947).

[9] Nurkse's comment on this possibility foreshadows the Keynesian monetary approach: "...the successive spending of additional incomes earned in the first instance in the export trades will tend to produce an increase in total income which in turn will tend to increase imports so as to balance the higher exports. Some part of the additional income will be saved; and if there were no increased investment to absorb this saving, the rise in income would be checked and the adjustment of imports to the increased exports would be incomplete. In fact, however, the rise in current domestic expenditure is likely to induce a higher rate of capital expenditure, which will tend to absorb the additional saving" (Nurkse 1943, p. 101).

[10] Frenkel and Johnson (1976*, p. 30) criticize Meade for confusing the two propensities.

Third, if the relation between money and income is one of proportionality, that implies a marginal propensity to spend of unity.[11] But because the adjustment of expenditure to income is not instantaneous, saving-in-the-form-of-money during that adjustment equals spending-below-income.

Although Kahn's estimate for the marginal propensity to consume in the United Kingdom in the depression is far below unity (in large measure because he assumes that the government will not spend the "savings on the dole" and the extra tax revenue), he does also consider the effect of a propensity equal to 1. He combines this with the assumption of a closed system (that is, a system without an import leak) to conclude that the ratio of secondary to primary effects would then go to infinity. In those circumstances, Kahn writes, "one man put to work on the roads would then place all the remainder of the unemployed into secondary employment" (p. 184, repeated *verbatim* on p. 190.)

C. The Multiplier Process over Time

Kahn does not address the multiplier process period by period but considers only "the final position of equilibrium when everything has settled down". He admits that "because wages and profits are not spent quite as soon as they are earned, some time will, of course, elapse between the point when the primary employment begins and the point when the secondary employment reaches its full dimensions" (footnote 2 on p. 183).[12] To define the multiplier process over time requires estimating the lag between one income round and the next, through consumption expenditure, retail and wholesale restocking, the flow (perhaps through intermediaries) of savings into investment expenditures, and increases in production and employment in both the consumption goods and investment goods industries. Since the microeconomic information necessary to estimate this lag is not available, a number of authors have tried to answer this question with the help of monetary statistics.

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[11] Polak (1957#, pp. 24–6). The same argument is found in Dornbusch (1973*, p. 170): "...when monetary stock equilibrium is attained, the average [and hence also the marginal] propensity to spend equals unity." Also Johnson (1976, p. 450): "the monetary approach ...implies that the level of expenditure...must converge on the point...[where it is] equal to income". This had not been Johnson's original position; his 1958* paper (p. 55, footnote 12) still featured the Keynesian trace of a marginal propensity to spend of less than unity, which (it appears) he endows with some *a priori* probability by stating that it is the precondition for "multiplier stability."

[12] His description of the time dimension also understates its quantitative importance. Some, rather modest, time periods will elapse between *each round of spending*, but to achieve even a large proportion of the full effects will take a substantial number of these periods.

The first to do this was J.M. Clark (1935, pp. 96–99). He starts out from a figure of about 1.6 for the cyclical average for the (annual) circuit velocity of money in the United States, which might correspond to a marginal figure of about twice that size in a pronounced cyclical upswing brought about by an expansionary fiscal policy. This leads him to a rough guess of the income-to-income lag of about three months. Machlup estimates, in a somewhat different way, a "marginal income propagation period" (which he assumes to be equal to the average period) for the United States, which also works out at three months (Machlup 1939, p. 10).[13] Polak (1957) uses the inverse of the average annual income velocity of money as the length of the income period, which he calculates for a large number of countries.[14]

Further work on the model made clear, however, that this third monetary innovation applied to the Kahn model lacked a solid microeconomic foundation. It implies that next-round spending for each household or business starts only after it has accumulated the full amount of money it desires to hold in the light of the increase in its income or turnover. But it seems highly unlikely that a household or a business would opt for the corner solution of giving total priority to the adjustment of its stock of money to its new income level over making any increase in its level of expenditure. A more general approach would be to assume that each agent would use part of its new income to raise expenditure and the remainder to initiate a partial restoration of its liquidity ratio. This was the approach developed by Prais (1961). He added to the Polak model an equation explaining domestic expenditure (E), which incorporates the concept that both the stock of money and expenditure are adjusted gradually to their desired levels as functions of income. (See Box 2).

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[13] His estimate of the income velocity of four per year relates to 'active balances' only, derived by the exclusion of between 50 and 60 percent of the money supply as 'minimum balances, with zero velocity of circulation'.

[14] As specified most clearly by Fleming and Boissonneault (1961#, p. 133), the model assumes that "money coming into existence as the counterpart of domestic credit expansion ...enters immediately into income and is successively respent at the end of each subsequent income period."

**Box 2. Expansion of the Fund Model to Incorporate a Gradual
Adjustment of Money to its Desired Level as a Function of Income**

A new variable E (for expenditure) is introduced, defined as

$$E = Y - X + M, \tag{6}$$

and a new behavior equation relating E to Y by means of a unitary marginal propensity to spend, but adjusting E by a fraction a of the difference between actual and desired money holdings:

$$E = Y + a(MO - kY). \tag{7}$$

Note: Equation (7) combines Prais's equations (1) and (3) (not shown here); with the symbols adjusted to those used in Box 1. See Prais 1961#, pp. 148.

The effect of this change in the model was to lengthen the time taken to adjust the stock of money to its desired level, and accordingly to speed up the adjustment of income and imports and reduce their lag behind the autonomous expansionary factors. Prais stated his conclusion in somewhat cryptic terms ("The slower adjustment of liquidity has the consequence of giving greater weight to current exogenous elements in determining current imports, at the expense of preceding values" (p. 158)), which may help explain why it was overlooked by others in the Fund (see below).

III. JOHNSON'S MONETARY APPROACH TO THE BALANCE OF PAYMENTS

In contrast to the evolutionary development of the Kahn-Keynes model described in the preceding section, Johnson presents his monetary approach as "revolutionary," more specifically as a counterrevolution to the Keynesian revolution (Johnson 1971). Having begun his academic career as a "Cambridge Keynesian", Johnson, by the mid-fifties, had become disillusioned with the intellectual climate at Cambridge, moved to the University of Manchester and distanced himself from orthodox Keynesianism (Laidler 1984, pp. 595–98). The 1958 paper referred to above was written in this period. His discovery of the monetary approach as a completely new starting point for balance of payments analysis seemed to have had the liberating force of an epiphany.

In embracing this approach, Johnson and his followers shook off some of the attributes of the Keynesian orthodoxy, such as 'the assumption of mass unemployment' or

the "elasticities approach." Johnson himself, moreover, sometimes displayed a strong personal anti-Keynes animus.[15]

In the Johnsonian, revolutionary, version of the monetary approach, money is not brought in as a contributing factor in the explanation of the balance of payments. It enters at the very beginning of the story, as a kind of anti-Keynesian manifesto. Thus, the first sentence of the Introductory Essay by Frenkel and Johnson in their *Monetary Approach to the Balance of Payments* (1976*, p. 21) reads: "The main characteristic of the monetary approach to the balance of payments can be summarized in the proposition that the balance of payments is essentially a monetary phenomenon." The "essentially monetary" epithet made its first appearance in Harry Johnson's (1958) "basic article" (to use the Chicago volume's description of this paper) on the subject, where it appears three times, with the conclusion that "[f]ormulation of the balance of payments as the difference between aggregate payments and aggregate receipts thus illuminates the monetary aspects of balance-of-payments disequilibrium, and emphasizes its essentially monetary nature" (Johnson 1958*, p. 51). That was long before Mundell moved to Chicago, indeed before he joined the Fund staff in 1961—which suggests that Johnson's genealogy of the Chicago monetary approach cited in the Introduction was unduly modest.

The "essentially monetary phenomenon" mantra reappears as the mandatory point of departure in the writings of many of Johnson's followers. Thus, for example, Mussa (1976*, p. 89) in a section carrying the magic words as its heading: "The official settlements balance is in surplus (deficit) when the monetary authorities of a country are purchasing (selling) foreign exchange in order to prevent their own money from appreciating (depreciating) relative to other monies. Thus, analysis of the balance of payments only makes sense in an explicitly monetary model, and, in this sense, the balance of payments is an essentially monetary phenomenon. Or, to give the point a more provocative tone, analysis of the balance of payments in as theoretical framework where money is not explicitly present is, prima facie, nonsense."

Note that what is new here is not the behavior equation that expresses the demand for money, and which has its place in Keynes's writings as well. The new discoveries are the definitional equations referred to above, the balance of payments equation and the balance sheet of the banking system. It is perhaps hard to see anything new in these—until

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[15] Thus for example: "The assumption of normally full employment reflects the passage of time and the accumulation of experience of reasonably full employment as the historical norm rather than the historical rarity that Keynes's theory and left-wing Keynesian mythology made it out to be" (Frenkel and Johnson 1976*, p. 25). And his verdict on Keynes, the man: "In retrospect, I believe, Keynes can be legitimately and strongly criticized for a sophisticated type of intellectual opportunism—characteristic of the man's personality and philosophy of life—which has had seriously adverse long-term effects both for the welfare of his country and for the relevance of economics" (Johnson 1972a, p. 78).

one acknowledges that the traditional Keynesian approach washed these two definitional equations out of its system by its assumptions with respect to policies. Kahn, for example, expects the additional imports caused by public works to have their effect on net foreign lending by the United Kingdom, via a modest rise in interest rates, not on the level of reserves, and hence by implication on the money supply—assuming the government did not counteract the trade effect by restrictions on foreign lending or the imposition of tariffs (1931, pp. 193, 195–196).

Kahn's assuming away the effect of increased imports on reserves was perhaps unusual, but British economists routinely assumed away the effect of changes in reserves on the money supply. Meade's assumption of a "neutral economy" as the basis for the discussion of economic shocks may be cited as typical for this approach. "We assume...that the banking system must be prepared to expand (or contract) the total supply of money to the extent necessary to prevent any scarcity (or plenty) of funds in the capital market which may be induced by any other disturbing factor, from causing a rise (or fall) in interest rates" (Meade 1951, p. 48). Johnson's criticism of the Keynesian model was specifically directed against the "basic assumption on which this [Keynes's] system of balance-of-payments analysis rests,...that the monetary consequences of balance-of-payments surpluses or deficits can be and are absorbed (sterilized) by the monetary authorities so that a surplus or deficit can be treated as a flow equilibrium. The new ['monetary'] approach assumes—in some cases asserts—that these monetary inflows or outflows...are not sterilized—or cannot be, within a period relevant to policy analysis—but instead influence the domestic money supply" (Johnson 1972, pp. 152–3).

By rediscovering the "essentially monetary character" of the balance of payments, Johnson and his followers went, however, well beyond rescuing the two "money identities"—equations (3) and (4) in Box 1—from the neglect they had suffered at the hands of the Keynesians during the 1940s and 50s, especially in the United Kingdom and the United States. They introduced a new causal approach to the balance of payments, namely "that it is the expenditure of unwanted cash balances that leads to the import surplus and the corresponding outflow of gold" (Johnson, 1972b, p. 91), criticizing Hume and Viner for failing to make this clear. Or as restated by two of his followers: "In the framework of the monetary approach, the balance of payments position of a country is considered to be a reflection of decisions on the part of its residents to accumulate or to run down their stock of money balances" (Aghevli and Khan 1977#, p. 275). These are not formulations of an intuitively obvious proposition, even if one assumes that economic agents determine the amount of money they want to hold on the basis of a simple and stable function of a limited number of variables. The proposition linking excess holdings of money to the balance of payments does not stand for a behavior equation, but rather for a reduced form equation that traces the effects of an initial creation of money through a complete model of a country's economy.

In sharp contrast to the evolutionary monetary approach, which considers (as we saw) credit creation as a measure of domestic autonomous demand, the Johnsonian approach can only be understood if one assumes that credit creation has no impact on the

demand for money, at least in the long-run equilibrium situation that will establish itself after the effects of the credit creation have fully worked themselves out. For that longer run, the approach assumes: (i) conditions in the labor market that will restore the economy to full employment, assuming the initial shock has moved it some distance above or below that level: (ii) conditions in the goods markets ("the law of one price," all goods considered tradable) that ensure that prices in the country experiencing the shock stay at the world level (or return to that level, if they are temporarily pulled away from it); and (iii) conditions in asset markets ensuring the equality of domestic and foreign interest rates (See Box 2). The first assumption, together with disregard of economic growth (Johnson 1977, pp. 256, 259), means that real income does not change. Add assumption (ii), and money income does not change either. With interest rates also constant by assumption (iii), the demand for money must also be unchanged, once equilibrium has been attained. The entire injection of new money is therefore excessive, and must be made undone if economic agents are to return to the comfort of their preferred cash balance equation. And "the money account" (Mussa's description of the official settlements balance) is the place where the excess money must be disposed off. Hence, credit creation must cause a balance of payments deficit of equal size.

A model along these lines is presented in Box 3. A more explicitly dynamic monetary model used by some Chicago writers is referred to on pp. 23 below.

Box 3. The Johnsonian Model in its Simplest (Long-Run Equilibrium) Form

$MO = kY + qr$	(J-1)
$\Delta MO = \Delta R + \Delta D$	(J-2)
$Y = y.p$	(J-3)
$y = y(\text{full employment}) = \text{constant}$	(J-4)
$p = p(\text{world}) = \text{constant}$	(J-5)
$r = r(\text{world}) = \text{constant}$	(J-6)

where:
y = output
p = price level
r = interest rate
From (J-1), (J-3), J-4), (J-5) and J-6):

$\Delta MO = 0$, and hence	(J-7)
$\Delta R = -\Delta D.$	(J-8)

The monetary approach does not tell us through which account "above the line" this will happen (Mussa 1976*, p. 190), but in its simplicity it derives a proposition of major importance—credit creation causes a balance of payments deficit of equal size—on the basis of an economic model that contains only one explicit behavior equation, that for the demand for money. Mussa hails this simplicity by noting that "[t]he narrowness of the monetary approach in its concentration on the official settlements account is complemented by the breadth of the monetary approach in its conception of 'an essentially monetary phenomenon'" (Mussa 1976*, p. 190). I am not sure I fully grasp the value of this complementary benefit but I do want to draw attention to a negative effect of the

"narrowness" of the approach: by focusing on the *balance* of payments as a residual, it turns a blind eye to exogenous impulses originating in the balance of payments.[16] With exports, and more recently also capital movements, as the dominant autonomous determinants of all but the largest economies, any approach that ignores these aspects risks incurring a heavy cost in terms of relevance.

In any event, the proposition in its simplicity is obviously wrong, even if all its assumptions are fulfilled. There are two "money accounts," not one. The monetary authorities can create (base) money in two ways, by buying foreign assets or domestic assets. By the same token, economic agents can get rid of excess holdings of money in two ways, by buying foreign goods or securities or, much more easily, by repaying domestic credit to the banking system. Whether and to what extent credit creation leads to one or the other result will, to begin with, depend on how it takes place.

When credit creation takes the form of open-market operation in a fully equilibrated credit market, the Johnsonian assumption that the operation has no effect on the demand for money, so that economic agents find themselves with a corresponding amount of excess money, may approximate reality. In those circumstances, however, they are most likely to react to the imbalance in their cash position by the repayment of loans from domestic banks, and only a small part of the credit creation will lead to a loss of reserves—unless the linkage of the country to the international capital market is so perfect that most of the newly created money will at once flow abroad.

In many developing countries, on the other hand, credit is rationed and credit creation—made possible, for example, by a relaxation of credit restraint of the commercial banks, or as a result of government deficits financed by the banks—is associated with the creation of additional incomes.[17] Indeed, as noted above, the Fund's monetary approach takes domestic credit creation as a proxy for an autonomous increase in demand, and the model introduced to describe that approach then finds that the full amount of the credit creation will over time leak out through the balance of payments.

But note that that model does not support Johnson's *dictum* that the loss of reserves reflects the presence of excess money in the economy. The increase in the rate of credit creation, or the higher level of exports caused, for example, by an increase in the price of the country's main export staple, will raise the money supply only gradually, week by week, as the new economic situation persists. But these impulses will, more or less at once, raise the annual level of incomes of those who benefit from it, and thereafter income in the country will continue to rise as a result of successive spending rounds. As the demand for

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[16] This is also one of the criticisms of the Chicago approach in Rabin and Yeager (1982).

[17] This is also Mundell's assumption, namely "that the country under consideration is a small economy ...[and] that it lacks a credit market" (Mundell, 1967*, p. 67).

holding money increases correspondingly, the economy will experience a shortage of money, to be met only gradually by an increase in its supply. Yet in spite of this shortage of money, money will be sent abroad to pay for additional imports, as expenditure is at least partially adjusted to the higher income level. In the step-by-step approach of the Polak model, the stock of money remains below its income equivalent until the end of each income period; as soon as that point is reached, a new expenditure round starts which, by raising income of a new group of beneficiaries, recreates at once a shortfall of money for them. On average, therefore, money will be below the desired level.[18] Prais's more elegant formula for the adjustment of money holdings implies a continuous shortfall as the stock of money approaches asymptotically *from below* to the demand for it, which itself rises asymptotically to its equilibrium value.[19] The equivalent of Prais's demand-for-money equation is also used (without attribution) in two Chicago papers that do not rely on the full-employment postulate (Dornbusch 1973*, pp. 169–70 and Rodriguez 1976*, pp. 234);[20] but perhaps because their focus is on the ultimate equilibrium situation rather than on the process by which it is reached, these papers do not record how the stock of money adjusts to the demand for it.

Reality will not be as hard-edged as the description in these models suggests. Price increases for export crops, for example, rarely take place in large annual steps, then staying for a long period at the new level. Exporters may know of them in advance, and may have sold part of their crop in forward markets. They may also not fully trust the increase in their annual income level from day one of the higher prices, and for that reason may moderate the adjustment of both their expenditure and their preferred cash balance levels. Nevertheless, if one accepts the basic model in which the demand for money is a function of the level of income and the supply of money builds up only gradually over time, the conclusion must be that any cause which raises income while creating additional money will be accompanied by a shortage of money.[21]

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[18] This lag is not evident in Polak's Chart 2 (Polak 1957#, p. 34), where the same curve describes the growth of money and, with a different scale, income. But this hides an average lag of half an income period, as money is measured at the end of the period and income as the average for the same period.

[19] Prais describes the working of the model in a footnote on p. 149.

[20] It is also used, more recently and with attribution, by Mundell (1991, p. 499).

[21] In an equilibrated money market, the 'shortage of money' would be reflected by a rise in the rate of interest. But when the credit market is subject to severe rationing, bank interest rates would probably fail to register any such shortage. If there were data on the interest rate in a curb market, it might be possible to test whether that rate fluctuated in association with the value of exports *and* the money supply.

IV. Empirical Evidence

The developers of both "monetary approaches" engaged in econometric studies to find support for their theoretical constructs. A brief survey of the success, or lack of it, of these efforts brings our appraisal of the two approaches to its conclusion.

A. Testing the Keynesian Version

On the basis of the assumptions of the Polak model, one can calculate expected values for the dependent variables (GNP, imports and money) as weighted averages of current and past values of the sum of the autonomous variables ($\Delta D + X + K$), with weights that are simple functions of the country's income period and the marginal propensity to import. Polak and Boissonneault (1960#) compared imports calculated according to this formula with actual imports and found the results to be reasonably satisfactory. But a follow-up study (Fleming and Boissonneault 1961#) found a systemic lag of predicted behind actual imports and suggested a number of possible causes for it, such as the effect of higher export earnings on import restrictions, the above-average import content of investment in raw or semi-manufactured materials financed by bank credit, or perhaps reverse causality (pp. 140–41). Although their data had not enough degrees of freedom to determine a precise lag, they noted that actual import correlated on the whole better with current autonomous factors than with these factors as lagged according to the Polak coefficients.

What appears not to have been noticed at the time, nor even 15 years later, when the Fund volume was brought out (Rhomberg and Heller 1977, p. 10), was that the introduction by Prais of an improved demand-for-money equation would by itself lead to a reduction in the lag structure of the model. Interest in that lag structure has, in any event, waned. It plays no role in the Fund's "financial programming." Awareness of the lag is still useful as a reminder that an initial payments surplus, consequent upon a rise in exports, will not persist as the economy adjusts. But from a policy point of view, the lesson that excessive credit creation produces an equivalent loss of reserves, and that it will do so pretty soon, is more important than knowing how long the lag will be.

B. Testing the Johnsonian Version

In contrast to the precise—perhaps overly precise—timing characteristics of the Fund's monetary model, the Johnsonian approach leads to propositions that are expected to hold in an unspecified long-run equilibrium situation. As Mussa (1976#, p. 193) noticed, this seemed to put their policy relevance into question: "because the horizon of the policy maker is typically much shorter than a decade, ...the advocacy of a monetary approach to the balance of payments necessarily involves the assertion that these "longer run consequences" materialize within a time horizon of two or three years. As pointed out by Hahn (1977, pp. 243, 246) *assertion* is in this context hardly a substitute for evidence.

The empirical contributions in the Chicago book appear to provide a more than satisfactory answer to this conundrum. All four correlate quarterly data for reserves (for Australia, Sweden, Japan, and Spain respectively) with *simultaneous* quarterly data for central bank credit and the money multiplier, plus the three factors entering in the demand-for-money function (real income, the price level, and the rate of interest), and all find coefficients for central bank credit reasonably close to the hoped-for value of *minus* 1. They all interpret this as a confirmation of the validity of the monetary approach.[22] As noted first by Magee (1975), these findings are a surprising outcome of an exercise subjecting a long-run theory to empirical tests with unlagged data. They are also too good to be true, as hinted by Magee and demonstrated by Frenkel, Gylfason, and Helliwell (1980, pp. 585–86). Given the definition,

$$\Delta R = \Delta M - \Delta D \tag{7}$$

and a well-fitting demand-for-money function

$$\Delta M = f(x, y, z), \tag{8}$$

the fact that the correlation

$$\Delta R = F(x, y, z; \Delta D) \tag{9}$$

yields a coefficient for ΔD close to *minus* 1 says nothing about the validity or otherwise of the monetary approach.[23]

Similar problems bedevil some of the attempts to measure the 'offset coefficient', that is 'the fraction of any policy-induced change in bank reserves which is offset through the capital account' (Herring and Marston 1977, p. 26). To estimate this coefficient for a number of countries (Germany, Australia, Italy and the Netherlands), Argy and Kouri (1974) and Kouri and Porter (1974) ran correlations on reduced-form equations derived

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[22] "Australian international reserve flows over the past two decades are consistent with the pattern implied by the monetary approach to the balance of payments." (Zecher 1976*, p. 296); "The monetary approach has passed our tests both as far as its underlying view of the world is concerned and in its implications with respect to the balance of payments." (Genberg 1976*, p. 323); "The empirical analysis of Japan presented in this study strongly supports the theses of the monetary approach..." (Bean 1976*, p. 334); and "These initial results strongly point at the monetary character of balance-of- payments disequilibria." (Guitian 1976*, p. 347).

[23] Even if the explanation of the money supply is poor, as was the case in the study on Spain, the identity of the central bank balance sheet may still produce a coefficient for ΔD close to *minus* 1.

from a quite ambitious (though remarkably incomplete—see below) model. Their theoretical model includes foreign and domestic variables for wealth, incomes, interest rates and demand for foreign and domestic bonds. A number of these variables are, however, dropped on account of lack of data, and the foreign interest rate (taken as the Eurodollar rate) turns up statistically insignificant in all cases. Thus the operative reduced-form equation that they tested on quarterly data for the four countries boils down to the following:

$$K = \alpha\Delta Y - \beta\Delta D - \gamma CA, \tag{10}$$

in which CA stands for the current account which, like ΔY and ΔD, is treated as an exogenous variable. Their correlations produce extremely good fits for various definitions of K for each of the four countries. That quarterly figures for capital movements can be explained so well by a simple formula may seem surprising, until one recalls that, by definition,

$$\Delta MO = K + \Delta D + CA, \tag{11}$$

from which it follows that the estimation of the coefficients in (10) by correlation is merely an inefficient way to estimate the relation between money and income, with the expected values for β and γ close to 1. The γ's found by the authors turn out to be very close to unity, but the β's (which according to their model should be the same as the γ's) are closer to 0.5. But when Neumann (1978) redid these correlations for Germany with revised data, he found values for β that also did not significantly differ from unity.[24]

Porter and Kouri infer from their correlations that (i) "changes in income are highly significant in explaining capital flows,...(ii) "capital flows are to a large part the result of changes in monetary policy;" and (iii) "the current account balance tends to induce offsetting capital flows, thereby stabilizing the balance of payments" (p. 464). These conclusions follow, not from the correlations, but from the assumptions of their model, namely that ΔY and CA are both exogenous—that exports and credit creation do not affect income and that income does not affect imports. Thus, for example, if exports do not affect income, they cannot affect the demand for money, and the money they bring into the country is excessive. The excess money cannot be used to repay bank credit which is also exogenous, so it must go out by the only way left, as an outflow of capital.

There was no logical necessity for the Chicago monetary approach to limit itself to the effects of measures of monetary expansion in the very long run. On the theoretical side, the excursions of Dornbusch and Rodriguez into shorter-term developments have already

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[24] Obstfeld (1982) raised additional questions about the reduced–form approach to the estimation of the offset coefficient.

been mentioned. An explicit "short-run monetary approach" is presented by Blejer and Fernandez (1978) and a statistical test of this approach is provided in Blejer (1977). The latter paper studies the distribution of the impact of excess monetary expansion in Mexico, 1950–73, between inflation—acknowledging that the price of nontradables can move away from the world price level even in an open economy—and the balance of payments as measured by the change in reserves. The theoretical model is tested in correlations that (unlike those reviewed in the preceding paragraph) allow for lagged effects and produce respectable correlation coefficients for the two short-run effects. These findings are again somewhat surprising, because they are based on one component of gross money creation, credit creation, disregarding exports and capital flows.

V. Conclusions

Although the two monetary approaches analyzed in this paper share an important policy conclusion, namely that a sustained excessive creation of credit will lead to a sustained loss of reserves of equal size, they differ in the reasoning that supports this conclusion and in the time frame within which it can be expected to materialize.

1. Under the Johnsonian approach, the loss of reserves occurs because credit creation produces "unwanted cash balances," which , it is argued, can work their way out of the system only by means of a negative "balance" of international payments. This conclusion overlooks the possibility that holders of unwanted money balances have a second way to reduce them, namely by repaying credit. While the Johnsonian approach bases itself on the assumption that in the long run neither output nor prices can be affected by monetary policy, the Keynesian monetary approach focuses on the immediate impact on income and perhaps also on prices of an expansionary shock, whether that shock arises from credit creation, a rise in export income, or capital inflows. It finds that excess credit creation leads to a balance of payments deficit *in spite of the fact* that the economy experiences a continuous shortage of money, which is gradually eliminated as the process of adjustment toward a new equilibrium takes place.

2. The conclusions of the Johnsonian approach are presented as valid "in the long run." The length of this run depends on processes, set off by an initial disturbance, that are acknowledged as being possibly quite slow, such as the return of the economy to full employment, or the working of "the law of one price." Accordingly, the policy relevance of this approach, and of the monetary approach in general, has been widely questioned. The Keynesian monetary approach does not rest on unspecified assumptions of long-run equilibrium but on short-run behavior equations; its underlying model can be expressed in terms of successive short time periods, and the model itself indicates how soon the balance-of-payments results can be expected. Improvements in the model, as well as statistical tests, suggest that the balance-of-payments effects of autonomous shocks materialize with less delay than predicted by the original version of the Fund model. The Johnsonian approach did not generally see a need for short run adjustment equations, but it did not rule them out either. There is reason, therefore, to accept the empirical findings of the Keynesian approach as confirming the general validity of the policy implications of the monetary

approach, in either version, a validity of which the practitioners of monetary policy in central banks—with the Bank of England in the early postwar decades as the most notable exception—had long been convinced.

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[25] Papers marked by an * were published or republished in Frenkel and Johnson (1976). Papers marked by an # were published or republished in Rhomberg and Heller (1977). The years shown are those of first publication, but page numbers refer to the books indicated, not to the original source.

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