Open economy macroeconomics is not a new field of theoretical inquiry. Its origins can be traced back to mercantilist and classical notions of the impact of the trade balance, gold flows, and exchange rate mechanisms (e.g., Hume [1752] 1970). But formal mathematical and geometric models of trade and capital flows and exchange rate movements are a much more recent development, emerging only over the past seventy years. Roy Harrod and James Meade published early works, parts of which dealt with floating exchange rates and “free capital movements” (Harrod 1933, 1936; Meade 1936). This and subsequent work of Meade and Lloyd Metzler, among others, stimulated a generation of theorists to develop what Robert Mundell (2002) calls the “international macroeconomic model.”

In previous work, we examined the development of the early mathematical models of IS-LM closed economy vintage (Darity and Young 1995). Here, we attempt to do the same for the open economy version of IS-LM. There are a number of general accounts of the evolution of the open economy model, including Kenen 1985, Flanders 1989, and Isard 1995, and specific accounts of the evolution of the “Mundell-Fleming model” (Blejer, Kahn, and Masson 1995; Boyer 2002; Boughton 2003),
and Mundell himself (1999, 2001, 2002). But up to now, the specific development of IS-LM-BP (balance of payments) as distinct from the Mundell-Fleming story as told by Mundell, among others, has not been dealt with. Indeed, IS-LM-BP has a history parallel to that of Mundell’s models and J. Marcus Fleming’s model as told by Mundell, R. Boyer, and J. Boughton. In this context we must distinguish between the Mundell-Fleming model synthesized by Rudiger Dornbusch, that is, with flexible exchange rates and perfect capital mobility only (Dornbusch 1980b, 193–94), and the more general IS-LM-BP framework, which encompasses both fixed and flexible exchange rates and all degrees of capital mobility. Recently Mundell has told his side of the story (1999, 2001, 2002), and this will not be repeated at length here. The full story of Fleming’s contribution has never been told, despite some recent work in this direction (Boyer 2002; Boughton 2003), and a serious attempt is currently being made to rectify this (Boyer and Young forthcoming). It must also be recalled that at least three alternate models of the open economy—the Swan-Salter-Meade-Corden framework, the Polak-IMF framework, and the Johnsonian-monetary approach framework—were developed immediately prior to the IS-LM-BP framework. But IS-LM-BP, and its Mundell-Fleming “special case,” became the model of preference for both policy analysis and pedagogy.

The essay is divided into three sections. Section 1 deals with the early mathematical and geometric models of the open economy, including Metzler’s pioneering 1942 model and the Laursen-Metzler model (1950); Metzler’s 1951 model is also briefly discussed as it influenced Mundell, on Mundell’s own account. This section also deals with the impact of Meade’s 1951 model and Metzler’s models on Mundell’s work. In this context, we integrate the relevant parts of Mundell’s accounts of the development of his models (1999, 2001, 2002). Section 1 also briefly surveys the early alternatives to IS-LM-BP, that is, the Swan-Salter-Meade-Corden framework, on the one hand, and the Polak-IMF and Johnsonian-monetary balance approach frameworks, on the other. Section 2 surveys the characteristics of Mundell’s models from 1960 to 1964 and compares them with Fleming’s 1962 model. Section 3 deals with the diagrammatic development of IS-LM-BP as it emanated from the important generalized model of Anne Krueger (1965); the “overlooked” linkage of Krueger’s model to the “Hicksian IS-LL construct” made by Michael Michaely (1968); Akira Takayama’s 1969 “general equilibrium model” based on the open economy extension, that is, “straightforward use,”
of IS-LM; the somewhat forgotten “IS-LM-EE” approach of Dwayne Wrightsman (1970); and the appearance, in William Branson’s widely used 1972 textbook, of IS-LM-BP with fixed exchange rates; all this before Dornbusch’s synthesis of Mundell’s models and Fleming’s model into what he called the Mundell-Fleming model (1976–80). This section also deals with Dornbusch’s contribution to the IS-LM-BP story, that is, his Mundell-Fleming synthesis and its extensions. Finally, this section attempts to answer the question of why IS-LM-BP came to “rule the roost,” at the pedagogical level at least.

Early Mathematical and Geometric Models

Meade, Metzler, and Samuelsonian Methods: 
Metzler and Laursen-Metzler, 1942–51

Metzler’s 1942 *Econometrica* paper, “Underemployment Equilibrium in International Trade,” is a pioneer among the early mathematical models of the open economy after the publication of John Maynard Keynes’s *General Theory* (1936) and Harrod’s *Trade Cycle* (1936). In the initial footnote to his 1942 paper, Metzler wrote that he had “confined” his “analysis” to the “real income approach” to the balance of trade (97 n. 1), as set out by Harrod (1933, 1936). Metzler’s “static scheme” (1942, 99; emphasis in the original) is based on national accounts equations for an open economy, albeit extended to the two-country case. But the object of Metzler’s model was not simply to analyze investment-consumption relations. For, as he wrote, “if certain stability conditions...are satisfied, this fundamental system determines the equilibrium of investment and consumption in each country, and hence total incomes and the balance of trade” (99), or in other words, the general equilibrium of the two-country system.

Metzler then turned his “static scheme” into a “dynamic system” by dating the variables and analyzing the stability and equilibrium of the system he proposed (100). By doing this, he departed from Harrod’s methodological approach and adopted that of John Hicks’s *Value and Capital* and Paul Samuelson’s *Foundations* (see Young 1989, 1991). But more is involved here, for Metzler was among the first to utilize the Samuelsonian “Correspondence Principle” (Samuelson 1941; 1947, 258, 262); and this was based on Samuelson’s then unpublished book, which Metzler (1942, 100 n. 6) cited as “the foundations of analytical economics.” This is readily seen in Metzler’s summary of Samuelson’s view
that “stability depends not only upon the characteristics of the static equations . . . but also upon the nature of the assumed dynamic system” (100).

Metzler’s 1942 model is a two-country model, with domestic prices, interest rate, and exchange rate fixed and no capital movements. His dynamic system consists of “linear difference equations with constant coefficients” (98, 101). Using Samuelson’s methods, Metzler is able to analyze “four types” of parametric variation as they affect total consumption, investment, and income, in the respective countries, and the trade balance, dependent on whether one or both of the countries are stable or unstable “in isolation.” For example, as he writes, “domestic expansion will lead to a drain on foreign balances only if the country with which the expanding country deals is stable in isolation.” Thus, Metzler continues,

one should always specify which of the countries is assumed to be unstable in isolation and which stable. Many economists will probably prefer to assume that all countries are stable in isolation. . . . With stability conditions specified, directions of change may be determined for all variables except investment in one of the two countries. This remaining ambiguity is attributable to the dual nature of such investment. That is, whenever the balance of trade of a country declines while domestic investment rises (or conversely), the direction of change of total investment cannot be determined without further information. . . . the final outcome under these circumstances depends . . . upon such nonstability conditions as the relation between marginal propensity to invest and marginal propensity to import. (110–12)

Interestingly enough, Metzler’s paper antedates Franco Modigliani’s *Econometrica* paper by two years, but while the latter is recognized as the apex of the “neoclassical synthesis” of IS-LM closed economy vintage (Fischer 1987), the former is not recognized as one of the key starting points of the general equilibrium IS-LM-BP approach to the open economy. For example, Peter Isard (1995) does not mention Metzler’s 1942 paper, nor do M. Blejer, M. Kahn, and P. Masson (1995).

In their 1950 *Review of Economics and Statistics* paper, Svend Laurisen and Metzler extended the analysis of Metzler’s 1942 paper to the case of flexible exchange rates. Indeed, as they indicated in their mathematical appendix (which greatly influenced Mundell, among others, as will be seen below), similar questions had been addressed in Metzler’s 1942
paper (Laursen and Metzler 1950, 297–98; 298 n. 6). The 1950 model is a two-country model with fixed interest rate and no capital movements but with the possibility of price flexibility (292) under a flexible exchange rate regime. As Laursen and Metzler wrote, if “the exchange rate is [a] flexible rate . . . it accordingly takes on a value at which the international payments and receipts between the two countries are equalized. If capital movements are prohibited, the equilibrium exchange rate will be that rate at which each country’s exports are equal to its imports” (293). Based on this, they then presented an equation system that “with given expenditure functions and price levels in both countries” indicated “the equilibrium levels of income as well as the equilibrium exchange rate” (293). The Samuelsonian “Correspondence Principle” method was also used by Laursen and Metzler; that is, they examined the conditions of stability and dynamic behavior of their proposed equation system before evaluating their “static equations” (295). But the main thing to remember here is that the Laursen-Metzler model does not flow from “Keynesian headwaters.” Rather, “the fundamental problem” the paper tries to address—“the degree of economic insulation that can be achieved by a system of flexible exchange rates” (291)—emanated from issues raised a decade earlier by Gottfried Haberler in the “revised edition” of *Prosperity and Depression* (Laursen and Metzler 1950, 284 n. 10).

Metzler’s 1951 paper “Wealth, Saving, and the Rate of Interest”—while a closed economy model—also emanated from what Metzler called “the remodeled classical theory,” or general equilibrium approach of Haberler ([1937] 1941), among others (Metzler 1951, 93 n. 3; 98). The formal model, as presented in the mathematical appendix to the paper, consists of two markets: goods and services, and securities, and a system of equations determining the equilibrium values of variables. Metzler first presents a static system (113) and then goes on to present two “dynamic” postulates, that is to say, “equations of adjustment” (115), which “are the dynamic counterpart” of two of his static equations. He then presents his “complete dynamic system” by utilizing the “definitional equations” of the static system (115). He goes on to analyze the stability of the system and its “approach toward equilibrium,” in addition to the possibility of cyclical fluctuations, by means of Samuelsonian methods—that is, analysis of the roots of his dynamical equations—in a manner similar to the 1950 Laursen-Metzler paper (1951, 115–16; see also 1950, 295–97). And, as will be seen below, it is this paper that stimulated Mundell into extending Metzler’s approach to the open economy, according to Mundell himself.
Meade, Metzler, and Mundell:
Meade’s *Mathematical Supplement* (1951)

According to Mundell’s accounts, there were three major influences on his work: Meade, Metzler, and Samuelson. After completing his doctoral exams at MIT, where he was “especially influenced by Samuelson and Kindleberger” (Mundell 2001, 216), Mundell chose to visit the London School of Economics from mid-1955 for a year and work on completing his thesis under the supervision of Meade (Mundell 1999; 2001, 216; 2002, 1–2), because he “was fascinated” with, as he put it, Meade’s 1952 “Geometry of International Trade” (1999). While at LSE, Mundell met Meade weekly, but Mundell focused on trade theory and not macroeconomics (1999, 2001, 2002).

In his 1999 letter to one of the present authors—which became the basis for his 2001 *IMF Staff Papers* article and his subsequent “Notes on the Development of the International Macroeconomic Model” (Mundell 2002, 15–16 n. 1)—Mundell assessed the mathematical supplement (MS) to Meade’s 1951 volume *The Balance of Payments*, which he did not include in his published accounts (Mundell 2001, 2002). In his letter, Mundell talks about his “own methods” of solving mathematical problems involving equational systems. And, as he writes, “it is almost true to say that I didn’t get any of my international macroeconomics from Meade’s MS” (1999). Mundell goes on to say, “My interest in macroeconomics was very much below the surface that year 1955–56 in London, which was taken up with a thesis that had an entirely classical flavor” (3). He repeated this more or less verbatim in his subsequent accounts. With regard to Meade’s indirect influence on his work, however, Mundell said, “I was able to develop his work in some new areas, develop some of the dynamics, and generalize the model, following up on Mosak, in a multi-country framework” (2001, 217; Mosak 1944).

Now, according to Mundell (2001, 217), Meade’s MS does contain “the equations of an international macroeconomic model.” Mundell (2002, 3) goes on to say, “But when I was doing my work on this subject a few years later, I never made any connections to it, although it must have influenced me at least subconsciously. The reason, I think, is that my approach came through a Walrasian-like general equilibrium theory, which was at best only implicit in Meade’s analysis.” Mundell then distinguishes his approach from that of Meade by citing Meade’s effort to bring about, in his model, “a marriage of the Keynesian and Hicksian
type of analysis” for “balance of payments theory” (Meade 1951b, 2–3), something that, as Mundell states, “was not, however, what I was trying to do in my international macroeconomic model” (1999; 2001, 217; 2002, 3; emphasis in the original). Indeed, Mundell’s own treatment of balance of payments problems may have been catalyzed by Meade’s footnote in the MS. For, as Meade noted, “the Hicksian type of analysis has been applied to international trade problems in J. L. Mosak’s General Equilibrium Theory in International Trade. . . . But that work does not deal at all directly with problems of disequilibrium in the balance of payments” (Meade 1951b, 3 n. 1). What was still missing, however, in Mundell’s thought was a systematic way to enable him to approach the international economy within a general equilibrium framework; and it is this Metzler supplied, according to Mundell himself.

Metzler’s “Architectonic Paradigm”

One of the most important questions regarding Mundell’s accounts of the development of his models relates to the influence of Metzler’s models. This is because in a key paper, “Flexible Exchange Rates and Employment Policy,” Mundell based his model “on the work of Laursen and Metzler” (1961b, 510 n. 3; Laursen and Metzler 1950). This model became the basis for his subsequent analysis in perhaps his best-known paper, “Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates” (1963, 481–82 n. 5), in which he assumed “perfect capital mobility.”

But Metzler influenced Mundell some five years before he even published his 1961 Canadian Journal of Economics paper. This is seen in his 1961 Kyklos paper, “The International Disequilibrium System” (1961a, 155 n. 5), in which Mundell writes, “at this point I should like to record my indebtedness to Professor Lloyd Metzler for stimulating discussion at Chicago in 1956 on the subject of the conditions of general equilibrium in an open economy.” Indeed, as Mundell recalled, he spent the year 1956–57 as a postdoctoral fellow in political economy at the University of Chicago and, as he put it, “became especially interested in the work of Lloyd Metzler in theory and Milton Friedman in policy. Metzler’s architectonic ‘Wealth, Saving, and the Rate of Interest’ in the JPE . . . started me thinking about that model as a more suitable paradigm for macroeconomics than the Keynesian model and worth developing in an international framework. By 1955 [actually, 1956], Patinkin’s
work had appeared and the Metzler-Patinkin general equilibrium approach to the closed macroeconomy provided a more classical full-employment counterpart to the standard IS-LM framework” (Mundell 2001, 4). In his 1999 letter to one of the present authors, Mundell also wrote that reading Metzler’s “‘Wealth, Saving, and the Rate of Interest’ started me thinking about it in [an] international context. . . . This general equilibrium approach to the closed macroeconomy got me thinking about the way to write down the general equilibrium equations for the international economy. In retrospect I’m surprised I didn’t think about it earlier! . . . I remember conversations I had with Metzler in that year [1956–57] and, even though after his brain operation, he was only 50%, I’m sure that wonderful man helped me getting my thinking straight. My personal view is that if Metzler had stayed healthy . . . he would have done the work I did, in some ways better. As an architect of original economic systems, he was peerless in his generation.” Mundell (2002, 4) subsequently repeated his opinion regarding Metzler’s potential contribution by writing that “had he remained healthy, he would surely have pioneered the international macroeconomic model. His 1950 article with Laursen was an important step along the way.”

The influence of Metzler’s work of the early 1950s on Mundell is clear. The question that must be asked, however, is: Why did Mundell overlook the model presented in Metzler’s 1942 paper “Underemployment Equilibrium in International Trade” in his various accounts of the development of his own models? At this point, suffice it to say that Mundell does not refer to it at all, and in view of the fact that it is mentioned in the appendix to the Laursen-Metzler paper—the model of which is the basis for Mundell’s 1961 Canadian Journal paper—that Mundell would overlook it deliberately is surprising indeed. The most plausible explanation would be that since Metzler’s 1942 model is characterized by fixed prices, interest rates, and exchange rates (1942, 98), Mundell did not consider it to be as general as either the 1950 Laursen-Metzler model or Metzler’s 1951 model, both of which he subsequently utilized. Mundell himself (2003) has recently offered another explanation: “I fixed upon the Laursen-Metzler article because it integrated the early Metzler-Machlup works with an adjustment system (the exchange rate) to correct the balance of trade. Of course there were no monetary equations in the system so the exchange rate had to be the real exchange rate (or the terms of trade). For me to give credits to those earlier articles
[e.g., Metzler 1942] would be like hand-waving to the General Theory of Hicks' IS-LM paper.”

Samuelsonian Methods and Economic Policy Alternatives

Mundell’s approach—that is to say, the conflation of Meade’s complex three-market model, Metzler’s mechanism for general equilibrium, and Mundell’s special emphasis on the importance of capital movements—enabled Mundell to create, as Dornbusch (1980b, 5) noted, simple albeit powerful models that served as analytic frameworks, not only for thought and policy but for posing new questions. In other words, Mundell “did a Hicks” (Young 1987).

The “methods” that Mundell refers to in his 1999 letter relate to what can be called the “Stability Analysis and the Correspondence Principle” (Samuelson [1947] 1958), which enabled Mundell to “reduce” the “Central Message” of a Meade-type (static) model to five equations and then to three equations (markets) by focusing on the dynamics involved in the adjustment process (Mundell 1968, 219–21). For, as Samuelson ([1947] 1958, 262) noted,

the equations of comparative statics are . . . a special case of the general dynamic analysis. They can indeed be discussed abstracting completely from dynamical analysis. . . . But the problem of stability of equilibrium cannot be discussed except with reference to dynamical considerations. . . . in order for the comparative-statics analysis to yield fruitful results, we must first develop a theory of dynamics.

He goes on to note that

indeed, the correspondence principle, enunciating the relationship between the stability conditions of dynamics and the evaluation of displacements in comparative statics, provides the second great weapon in the arsenal of the economist interested in deriving definite, meaningful theorems. (350)

And, on Samuelson’s criterion, it was Mundell, using the methodology of the correspondence principle, and not Meade, who developed the “meaningful” models that yielded “fruitful results.”

In his 1999 letter, Mundell first gave his account of how his dynamic approach developed. As he put it,
The first and in some respects my most important international macroeconomic model was not the Hicks-Keynes IS-LM internationalized, but the QJE 1960 model “The Monetary Dynamics of International Adjustment Under Fixed and Flexible Exchange Rates.” The purpose of this article was not to introduce a new model but to find a way to analyze the difference between fixed exchange rates with flexible prices, and flexible exchange rates with fixed prices. I needed a coherent and plausible international macroeconomic model that was at least consistent with a full-employment economy or at least one in which full employment policy was being pursued by the government. There did not as yet exist such a model in the literature. The macroeconomic model I used employed an internal balance and a foreign balance schedule (for the first time in the literature) and the variables were the interest rate (representing monetary policy) and the real exchange rate (or the relative prices of home and foreign goods). These defined four zones of disequilibrium and made possible an examination of the different dynamics relevant to a fixed exchange rate system (such as the gold standard) compared to a flexible system in which monetary policy is directed at price-level stabilization.

Mundell then went into detail about how he had developed his dynamic approach, linking it with the analytic methodology of Samuelsonian dynamic stability analysis, and recalled how he discovered that the dynamic stability conditions of variant exchange rate regimes differed (1999), a “four-zone” result that he called the “principle . . . of effective market classification” (1960, 250). Mundell’s results impressed Johnson so much that Mundell (1999) received “a nice letter from Harry Johnson complimenting me on it, saying something to the effect that it carried the subject to a different level.” However, as will be seen below, Swan and Corden had also been developing a “four-zone” model from 1955 onward, which provided an alternate basis for policy analysis and pedagogy to that of Mundell’s 1960 *Quarterly Journal of Economics (QJE)* model, on the one hand, and IS-LM-BP, on the other.

**Early Alternatives to IS-LM-BP:**

**The Swan-Salter-Meade-Corden Framework**

Meade’s work inspired the development of a framework of analysis encompassing both equations (Meade 1951b; Hemming and Corden 1958; Swan 1960) and diagrams (Meade 1949; Swan [1955] 1968, [1950]...
1963; Hemming and Corden 1958; Salter 1959; Corden 1960), albeit with special emphasis on “geometrical representation” (Meade 1949; Corden 1960). “Alternative diagrams” were presented by Meade (1949), Swan ([1955] 1968, [1950] 1960), and Salter (1959), respectively (Corden 1960, 19–22). Meade’s 1949 diagrammatic system was complicated, taking “into account not only the policies in one country but in the rest of the world” (Corden 1960, 21). The original “Swan diagram” of 1955 vintage depicted “in four zones” (20) the internal-external balance approach, which had its predecessors in Harrod 1933, Nurkse 1947, and Meade 1951a. It had the level of “real expenditure” on its horizontal axis, while its vertical axis was what Swan called the “cost ratio,” that is, “the ratio of an index . . . of prices of imports and exports” to “an index of local wages” (Corden 1960, 19–20). Swan revised his approach somewhat and presented, in 1960, the core of his model in equational and diagrammatic form. Salter (1959) built on Swan’s earlier approach and also combined it with the earlier “Australian model” of Wilson on “capital imports and the terms of trade,” bringing about the development, with Corden (1960), of what Swan first called the “dependent economy” model (Wilson 1931; Swan 1960; Dornbusch 1980b, chap. 6).

In Salter’s original diagram, “the quantity of traded goods is measured on the horizontal axis; and the quantity of non-traded goods on the vertical axis.” The “total expenditure” line cuts both vertical and horizontal axes, thereby setting “the amount of traded” and “non-traded” goods that “could be purchased with this expenditure,” given their respective prices. The slope of the expenditure line, “therefore, represents the relative price of non-traded goods compared to traded goods” (Salter 1959, 227).

However, the so-called Swan-Salter diagram, based on Swan [1955] 1968, [1950] 1960, 1963, and Salter 1959 and popularized by Corden (1960), which is the major graphic tool of the “dependent economy model,” was never standardized and has appeared in numerous forms since its original presentation. For example, Dornbusch’s (1980b, 101) version of the Swan-Salter-Corden diagram has real expenditure, output, and employment on the horizontal axis, and the “relative price of traded goods in terms of home goods” on its vertical axis. But only one year afterward, in an influential *Journal of Economic Literature* article, McKinnon (1981, 534) had already given a new twist to what he called “the famous Swan diagram,” which he presented in government expenditure–price of foreign exchange space (534, fig. 1). By 1985, then, Kenen (1985, 650) had not only reversed the axes but also revised them
for his analytic purpose, with “expenditure policy (monetary or fiscal)” on the vertical axis, and nominal and real exchange rates on the horizontal axis, respectively. Salvatore (1987, 463), in his widely used textbook, also had different axes from those of Dornbusch, with “domestic expenditure” on the horizontal and “exchange rate” on the vertical axes. Thus, while Dornbusch (1980b, 100–102) tried to present the “dependent economy model” with “three schedules” (YY-BB-NN) he set out for it as a complement to the “Mundell-Fleming model” he presented in his 1980 book, *Open Economy Macroeconomics*, his approach to the “Swan-Salter diagram,” as will be seen below, simply never caught on.

The Polak-IMF and Johnsonian-Monetary Approach Frameworks

In a retrospective paper, Polak noted that he had utilized “a version” of the “IMF model” as early as 1950, although it was “first published” in 1957 (Polak 1957; 1998, 396). In his view (1998, 396–97), the “simplicity” of the model, based only on “banking and trade data,” in combination with its focus on one control variable, “domestic credit creation,” was its important characteristic. But, as Polak noted, “over the years” there had been “different formulations of the model” (Argy 1969; Polak and Argy 1971), so that there is no single “Polak-IMF” framework (Polak 1998, 398). Moreover, the fact that modern policy-relevant “extensions”—such as inclusion of “flexibility of international capital movements,” “domestic interest rate,” and variant “exchange rate policies”—would “essentially” render the model “useless” has limited its efficacy to “ad-hoc” institutional analysis (Polak 1998, 406).

What Polak has called the “Johnsonian,” or “monetary,” approach to the balance of payments framework emanates from Johnson’s 1958 paper (Polak 2002, 27; Johnson [1958] 1968). As the model is well known, it will not be described here. The formal model, which reached its apex in *The Monetary Approach to the Balance of Payments* (Frenkel and Johnson 1976), however, is limited in its usefulness, as Plessner has recently noted, because it is expressed in a fixed price–fixed exchange rate regime (Plessner 2002, 46).

Capital Mobility in Meade and Mundell

Before proceeding, one issue remains: the reason for Mundell’s emphasis on capital mobility in his best-known paper, and the one most often
cited, the 1963 *Canadian Journal* paper. Here Mundell (1963, 475, 484) stressed the importance of capital movements and capital mobility. At first glance, Mundell’s approach could be attributed to the influence of Meade (1951b, 3), who over a decade earlier had written, “Our model also allows for movements of capital in the balance of payments and not only for current payments for visible and invisible trade.” However, while capital movements had already appeared in Meade’s 1951 model, their role in his model was minimal, in comparison to the role they attained in Mundell’s models. Indeed, as Kenen (1985, 636) noted, “Meade was careful to include them, but they could be deleted without altering his argument.” The central role played by capital movements in Mundell’s approach emanated from the passage of a decade between Meade (1951a, 1951b) and Mundell, who was working in the early 1960s, when international capital movements had grown to such a significant extent that they were seen by economists as an important factor in influencing economic activity.

But there was also a “hidden agenda” in Mundell’s stress on capital mobility. This emanated from his defense of his 1962 *IMF Staff Papers* article against critics at the Federal Reserve, on the one hand, and what Mundell called the “Samuelson-Tobin ‘neo-classical synthesis’” view that he took strong issue with, on the other. As Mundell (1999; 2001, 222; 2002, 9) recalled,

I decided to reply to my critics by writing an even more extreme piece, assuming complete capital mobility, which made the Samuelson-Tobin view even more absurd, because it showed that under fixed rates and perfect capital mobility, monetary policy was completely impotent. Open market operations to buy Treasuries would result in equivalent gold losses or build-up of dollar balances. This led to the . . . 1963 paper that has been so frequently reproduced . . . [and] that is usually cited as the locus classicus of my half of the Mundell-Fleming model.

**Mundell’s Models and Fleming’s Model in Comparative Perspective**

Mundell’s 1960 Model

The importance of Mundell’s 1960 *QJE* model (Mundell 1960) cannot be overstated. Despite this, J. Flanders (1989, 329) does not deal at all
with Mundell’s 1960 *QJE* paper, preferring to focus on Mundell’s 1961 *Kyklos* paper, which she asserted “flows naturally . . . out of the Metzler headwaters, and it is an elegant statement of what the other models are about.” It should be recalled at this point that Mundell (1999) himself placed his *Kyklos* paper (1961a) in the “group of articles” of “Mundell-Fleming,” that is, “Hicks-Keynes IS-LM internationalized” vintage. Moreover, as he put it, “the first and in some respects my most important international macroeconomic model was not the [static] Hicks-Keynes IS-LM internationalized, but the [macrodynamic] 1960 *QJE* model” (1999). In light of this, specific treatment of Mundell’s 1960 model is, in our view, warranted here.

The first thing to recognize is that in his 1960 paper, Mundell separated his analysis into what he called “the static system” (229–32) and “the dynamic systems” (232–36) in order to deal with both fixed and flexible exchange rate regimes according to Samuelsonian methodology. His model consists of two markets—domestic goods and services, and foreign exchange. These markets are influenced by two factors, the domestic interest rate—determined by the central bank’s monetary policy—and what Mundell (1960, 229–30) calls the “terms of trade,” that is, the ratio of domestic to foreign prices. He assumes flexible domestic prices and also assumes foreign prices, incomes, and interest rates constant, meaning that changes in the ratio of domestic to foreign prices emanate only from changes in the rate of exchange or in the domestic price level.

Mundell (1960, 230–32) then presents a “simple geometric interpretation of the forces governing the rate of interest [r] and the terms of trade [P]” by constructing what he calls the “foreign-balance schedule” for the foreign exchange market (*FF*) and the “internal balance schedule” for the goods and services market (*XX*) accordingly. It is clear from the text of his paper that *FF* is what we now call the BP schedule with imperfect capital mobility, whereas *XX* is the IS schedule. This is illustrated in figure 1 (231).

But Mundell proceeded in a different manner from that of the conventional approach. Rather than developing the comparative statics of the model, he followed Samuelsonian methodology to develop its comparative macrodynamics, which consisted of the adjustment processes and paths of adjustment, and not only an analysis of the equilibrium states after the processes were completed. This was to answer some of the key questions he posed at the beginning of the paper (1960, 228), which related to stability conditions of fixed as against flexible exchange
rate systems and the nature of the paths to equilibrium and their relation to the extent of capital mobility, among other issues.

Mundell’s 1961 Vintage Models:
The 1961 *Kyklos* Model—the IS-LM-BP Prototype

According to Flanders (1989, 329), this one-country model flows “naturally” from Metzlerian “headwaters.” Mundell (1999), on the other hand, saw the model as what he called an “internationalized” version of “Hicks-Keynes IS-LM.” In any event, Mundell assumes general equilibrium in three markets—goods, money, and foreign exchange—and develops two systems of “excess demand” equations: a static system and a generalized system. In the static system, the excess demand for goods and services, and the balance of payments surplus, are functions of money income and rate of interest; while the excess demand for money is a function of money income, the rate of interest, and the quantity of money. In the generalized system, all three equations include money income, the rate of interest, and the quantity of money. Mundell goes on
to “assume also that the conditions of balance in each of the . . . markets depend only on the level of money, the rate of interest and the quantity of money.” He says that “for simplicity, however, and also to show that the results are not dependent on the Quantity Theory of Money, I assume that a change in the money supply affects the level of effective demand and the balance of payments only insofar as it first affects the rate of interest” (1961a, 155).

Mundell defines “F,” the balance of payments surplus, as the “trade balance + net capital imports.” He also has included a money market in his model and has excluded the quantity theory of money (1961a, 155). These are crucial distinguishing features between Mundell’s “prototype” IS-LM-BP model as it appears in his 1961 Kyklos paper and Fleming’s 1962 model, as will be seen below.

The diagrammatic representation Mundell uses in this paper is in interest rate and money income space \((r \text{-} y)\), with three markets: goods (XX), foreign exchange (FF), and money market (LL). As Mundell (1961a, 155–56) puts it,

The curve XX traces the locus of interest rates and money incomes along which there is equilibrium in the goods market. . . . The curve FF traces the locus of interest rates and money incomes along which there is equilibrium in the balance of payments; this foreign balance schedule has a positive slope because an increase in the rate of interest improves the balance of payments (by attracting capital) while an increase in money income worsens the balance of payments (by worsening the trade balance). The LL curve, on the other hand, requires a slightly different interpretation: it gives the pairs of interest rates and money incomes at which there is equilibrium in the money market for any given quantity of money, and it occupies a different position as a quantity of money varies, moving downward and to the right as the supply of money increases, and upward and to the left as the supply of money decreases. General equilibrium of the system is determined at the point Q common to both the XX and FF schedules, with a supply of money such to make the LL curve pass through Q. (emphasis in the original)

The IS-LM-BP model with imperfect capital mobility, therefore, flows directly out of Mundell’s 1961 Kyklos paper. In this model, general equilibrium is based on equilibrium in three markets: the foreign exchange and balance of payments (FF schedule), the goods and services market (XX schedule), and the money market (LL schedule), all
in income–interest rate space. Below the LL schedule there is excess demand for money; above it, excess supply. The equilibrium point is at $Q$, as illustrated in figure 2.

Mundell’s 1961 Canadian Journal Model

Mundell develops his 1961 Canadian Journal model in exchange rate ($y$) and output space ($x$). The model consists of two markets, domestic goods and services, and foreign exchange and balance of payments, represented by the XX-FF schedules of 1960 QJE vintage. In ($x$-$y$) space, the slope of the XX schedule must be larger than that of FF in order to ensure systemic equilibrium, as illustrated in figure 3.

On the basis of his 1961 Canadian Journal model, Mundell developed the comparative statics regarding fiscal and monetary policy under alternate exchange rate regimes. According to this model, expansionary
Figure 3  Mundell’s 1961 *Canadian Journal* model
fiscal policy would shift the XX schedule down and to the right (1961b, 512). The intermediate increment is that which results from the simple multiplier. The final increment is that which results from the fiscal policy itself and from the increment to domestic product that results from the devaluation fiscal policy brings about. According to Mundell, it follows from this that fiscal policy is more effective in increasing domestic product and employment under a flexible exchange regime than under a fixed rate regime (512–13).

According to the model, expansionary monetary policy increases the money supply and decreases the interest rate and thus increases investment shifting the XX curve to the right. In addition, capital inflow will decrease and thus a deficit in the balance of payments will result, that is, the FF curve will shift up and to the left accordingly, reaching a new equilibrium (513). From this, Mundell concluded that monetary policy under a flexible exchange rate regime is more effective than one under a fixed rate regime, under which the deficit in the balance of payments would bring about a loss of foreign exchange reserves, and not a change in the exchange rate (513–14).

Mundell also analyzed import restrictions and export incentives that did not have direct effects on saving or investment. Import restrictions or export incentives would shift the XX schedule downward and to the right, and the FF schedule to the right and downward, that is, both shift in the same direction (514). In this case, what exactly would happen to the domestic product could not be ascertained, as the outcome of such policies would depend on the relative movement of each schedule in relation to the other. However, it is clear that FF would have to move rightward more than XX, as the initial outcome of the simple multiplier on the level of domestic product would not be enough to eliminate the surplus in the balance of payments. For there may still be a surplus in the balance of payments, which can be eliminated only by an increase in the domestic product, and thus the exchange rate must fall. To ascertain if the domestic product has declined or increased, it is necessary to see whether XX has moved vertically more than FF (514–15).

The conclusions that Mundell draws are as follows. First, if capital mobility is imperfect, then fiscal policy is more effective under a flexible exchange rate regime than a fixed rate regime, but is not effective under a flexible rate regime when capital mobility is perfect. Second, monetary policy is more effective under a flexible rate than fixed rate regime. Third, trade policies such as import restrictions or export incentives are less effective under flexible than fixed rate regimes and may even bring
about deflationary results and have a negative impact on domestic product (515–16).

Mundell’s 1962 *IMF Staff Papers* Model

In this model, there are two markets in budget surplus ($BS$) and interest rate ($r$) space, the goods and services market and the foreign exchange market. Once again, Mundell utilizes his FF and XX schedules, but this time both slope downward from left to right as illustrated in figure 4 (1962, 72).

In his 1962 approach, Mundell also developed the notion of “the proper policy mix,” or “the assignment problem.” Mundell showed that every policy instrument should be assigned to a policy objective on which it had the greatest impact. According to his approach (1962, 76–77), this meant that monetary policy should be directed toward external targets, while fiscal policy directed toward internal targets. Interestingly enough, Meade (1951a, 108–14) had made the same points a decade earlier.
The IS-LM-BP model with perfect capital mobility flows directly out of Mundell’s 1963 *Canadian Journal* paper. In this model, general equilibrium is based on equilibrium in three markets: the foreign exchange and balance of payments (FF schedule), the goods and services market (XX schedule), and the money market (LL schedule), with all schedules in income-interest rate space. In this paper, Mundell returns to the diagrammatic exposition of his 1961 *Kyklos* paper and his 1961 *Canadian Journal* paper by presenting a combination of diagrams: one in income–interest rate space, and a mapping of the results of the comparative statics of monetary and fiscal policy under fixed and flexible exchange; that is, he also gives the results by plotting the internal (XX) and external (FF) balance lines in exchange rate and income space. However, despite its importance, the combined diagram is not the one that “caught on”;

**Figure 5**  Mundell’s 1963 *Canadian Journal* model
rather, the one illustrated in figure 5 came to “rule the roost” because of the influence of one of its main expositors, namely, Dornbusch, as we will show.

Mundell’s 1964 *Canadian Journal* Model

As Mundell noted (1999; 2001, 223; 2002, 10), it was a critical comment on his 1963 *Canadian Journal* model that “provoked” him “into extending the model to the two-country global context.” This model is perhaps the most sophisticated of his early models and, indeed, because of “complicating features,” Mundell (1964, 424) presented the model “in the form of an explicit mathematical system” only and did not use diagrammatic exposition, which limited its utilization; this was in contrast to his previous models that, for the most part, used both equations and diagrams. The main results of his analysis, however, were subsequently co-opted into the Mundell-Dornbusch-Krugman two-country model with diagrammatic exposition (Dornbusch and Krugman 1976, 543–48; Dornbusch 1980b, 199–202).

Fleming’s 1962 *IMF Staff Papers* Model versus Mundell’s 1961 *Kyklos* Model

Fleming (1962, 369) assumes “a simple Keynesian model” with fixed prices. He presents “a mathematical formulation” of the model in his appendix (377). These equations include one relating income velocity to the ratio of national income to the stock of money. The rate of interest in Fleming’s model is a function of the velocity of money, but there is no demand for money function. In other words, in Fleming’s (1962, 377) model money demand is set equal to supply, and he uses a modified quantity theory equation to determine the interest rate.

More important, however, Fleming has no balance of payments function per se. Rather, he deals with the balance of trade and net capital imports in separate equations, with the result that the adjustment in the balance of payments cannot be determined. This can be seen in the example of the impact of a change in “budgetary policy” given by Fleming (1962, 370–71), with divergent outcomes regarding the trade balance and net capital imports, and indeterminacy regarding the balance of payments as a whole.
In addition, under fixed rates, as Mundell has asserted, the money supply must be endogenous, so as to enable adjustment, and not constant, as Fleming (1962, 370) would have it. Under Fleming’s assumption, there would be no adjustment of LM, that is to say, “accommodating monetary policy,” in the case of the “budgetary expansion” he is talking about. The money stock cannot be “held constant” if adjustment is to take place. Thus, under fixed rates, according to Fleming’s model, not only would “budgetary expansion” be ineffective, it would have no effect on the outcome at all. In other words, Fleming’s 1962 model generates an outcome contrary to the conventional “Mundell-Fleming” result.

Briefly put, an attempt to analytically link Mundell’s 1961 Kyklos paper—with its IS-LM-BP prototype model and sophisticated general equilibrium equational-diagrammatic system and market adjustment processes—to Fleming’s 1962 “simple Keynesian model” is problematic, to say the least.

Fleming’s 1962 IMF Staff Papers
Model versus Mundell’s 1961 and 1963 Canadian Journal Models

To reiterate, in his 1962 paper, Fleming deals with a small country under both a fixed and flexible exchange rate regime, and tries to assess the relative efficacy of fiscal versus monetary policy. In his analysis of an increase in government expenditure under a fixed rate regime, he held the stock of money constant and then assessed under what conditions the balance of payments would improve. But, as Kuska (1978, 665–66) noted in his critique of “Keynesian balance-of-payments theory,” Fleming seemed to be “unaware that his money market assumption requires the balance of payments to be zero.” Moreover, as Kuska went on to say, in Fleming’s “consideration of the effects of an increase in the supply of money under fixed exchange rates, he continues to require equilibrium in the money market, and then deduces that the equilibrium balance of payments decreases, which is another contradiction.” Mundell (1999) later called the indeterminacy described above, and the results Kuska criticized, Fleming’s “fatal error.”

There is a problem, however, in that in his 1961 paper, Mundell also obtained an indeterminate result, while in his 1963 paper he made a similar assumption to that of Fleming regarding fiscal policy. For example, in the former paper (1961b, 512–13), the magnitude of the increase in
output resulting from expansionary fiscal policy under fixed rates is a function of the magnitude of devaluation because of the resultant balance of payments deficit, that is, if devaluation is adopted as a policy option under the “constant exchange rate” Mundell initially assumed. Moreover, in his figure illustrating “the effect of fiscal policy on employment,” Mundell (1961b, 513, fig. 3) is essentially comparing a point of flexible rate equilibrium with a situation of fixed rates, where the balance of payments is not in equilibrium (Boyer 2003); and this, without advising the reader that he has “conflated” his diagrammatic analysis, to use Hicks’s methodological terminology (Young 1987).

In his 1963 paper, Mundell made an identical assumption to that of Fleming, when he wrote, “I have defined fiscal policy as an increase in government spending financed by government bond issues with no change in the money supply” (481 n. 5; emphasis in the original). What saves Mundell’s 1963 model, however, is his more significant assumption of perfect capital mobility and the change in his definitions of both fiscal and monetary policy, so as to get around the “apparent conflict” with the results in his previous papers (481–82 n. 5). Once again, to link Mundell’s 1961 and 1963 results with Fleming’s 1962 results is problematic.

Mundell’s Models versus Fleming’s Model, 1960–64

Up to now, it has been customary to refer to the open economy equilibrium macro model as the Mundell-Fleming model. We have dealt with Mundell’s own view of Fleming’s work above. It should be stressed that Mundell’s interests were different than those of Fleming. Mundell emphasized the theory of the equilibrium open market model and the “policy-mix”; Fleming emphasized what he took to be the concerns of the central bank. Their respective methods of economic analysis and presentation differed greatly. Mundell preferred an integration of static and dynamic analysis, based on Samuelsonian Foundations methodology and, for the most part, both equational and diagrammatic representations of his models. Fleming (1962, 369) preferred the comparative statics of “a simple Keynesian model” with fixed prices, without any extraneous dynamic analysis or diagrammatic exposition.

Moreover, in his 1960 QJE paper, both Mundell’s static and dynamic models are based on flexible prices (1960, 232–33). His 1961 Kyklos
static and dynamic models are based on money income, and his stated purpose “is to show the existence of an adjustment process under both classical and Keynesian assumptions” (1961a, 158; emphasis in the original). It is only in his 1963 Canadian Journal paper that he makes the explicit assumption of fixed prices (1963, 476), enabling his model to be linked by later observers, such as Dornbusch, as will be seen below, to that of Fleming. Mundell’s 1964 extension of his analysis to the two-country case also distinguishes his approach from that of Fleming. In addition, Mundell and Fleming disagreed on several important points. In a 1963 IMF Staff Papers article, Fleming actually took issue with one cornerstone of the Mundell-Fleming model, that is, the principle of the policy-mix, which was also a basic element in Mundell’s 1962 vintage model. Mundell had asserted that monetary policy should be directed toward attaining external balance, and fiscal policy toward internal balance. But Fleming maintained that in most nations the state budget was too “rigid,” and thus it was impossible to rely on it as the “sole means” for attaining internal stability. Fleming suggested an alternative based on the following logic. If all nations set their interest rate with respect to their balance of payments position, without reference to saving and investment considerations, a situation would arise where the interest rates would be too high, and the countries would be forced to adopt expansionary deficit fiscal policies to maintain full employment. Fleming proposed a solution to the problem that differed from that of the Mundell-Fleming model when he suggested “cooperative” action on the part of the countries involved to regulate the interest rate structure.

Moreover, Fleming had always been in favor of flexible exchange rates (see Polak 1978, xxiii), in contrast to Mundell. Fleming’s (1978, 138–39) justification for his support for flexible exchange rates was twofold. First, fixed exchange rates caused speculative capital movements in periods of disequilibrium in the foreign exchange markets without bringing about actual adjustments in the exchange rates in order to attain stable equilibrium. Second, countries with balance of payments deficits chose the option of import restrictions and not devaluation in order to regain equilibrium.

To sum up, Fleming’s 1962 model was based on “a simple Keynesian representation” of the open economy, without any dynamics or diagrams. Mundell’s critique of that “fatal error” has been presented above, insofar as in Mundell’s view, Fleming examined “a system that has no mechanism of adjustment” (Mundell 1999). But this is only to be expected, as
Fleming’s 1962 model did not “flow most naturally” out of the Mundell “headwaters” of the 1960 *QJE* or 1961 *Kyklos* vintages.

The “Mundell-Fleming” Synthesis: Dornbusch “Did a Hansen”

Because Mundell attributes the coining of the term “Mundell-Fleming model” to Dornbusch (Mundell 2002, 6, 11), we must now turn to Dornbusch’s contributions to ascertain what he actually meant when he referred to the Mundell-Fleming model in his writings, and how his exposition of what he called “the Mundell-Fleming approach” developed. In addition, some possible influences on Dornbusch’s linking of Mundell and Fleming, such as the approaches of Anne Krueger (1965), Michael Michaely (1968), and J. Niehans (1975), must be taken into account.

Dornbusch without “Mundell-Fleming”: 1971–75

From Krueger to Niehans, 1965–75:
Krueger’s 1965 Model and Michaely’s 1968
“IS-LL-BP” Adaptation

In her May 1965 paper “The Impact of Alternative Government Policies under Varying Exchange Rates,” Krueger set out a “general” model to deal with the “special cases” and “apparently conflicting results” of Mundell 1961b, 1963, Fleming 1962, and Rhomberg 1964. As she put it (Krueger 1965, 195–96, 198), her object was to specify a model that “provides a satisfactory framework for analysis of all the cases” considered by Mundell, Fleming, and Rhomberg. Krueger was, therefore, the first to provide a generalized equational system linking Mundell’s “analysis” with that of Fleming and Rhomberg.

Krueger initially dealt with the special case of “fiscal policy” under fixed rates as analyzed by Fleming and Rhomberg. As she wrote (1965, 203),

The Rhomberg-Fleming result hinges on the assumption that government expenditures are not accompanied by any issuance of money. This in turn results in an increase in the interest rate. If capital flows are sufficiently responsive to interest-rate changes, and if the government did not issue any money as the level of income rose, this particular form of “fiscal policy” could generate a balance-of-payments improvement, but it is attributable to the rising interest rate, and not to government expenditures per se.

She went on to say that

by contrast, Mundell’s analysis of fiscal policy assumes no change in the interest rate. . . . In the limiting case pointed out by Mundell, if capital flows were perfectly elastic with respect to the interest-rate, it would be impossible for the monetary authority to raise the interest rate, since foreign purchasers would be willing to purchase all bonds offered at the prevailing price. (203)

Krueger then proceeded to the case of flexible exchange rates and focused on “the special case considered by Fleming and Rhomberg” under a flexible rate regime, which concerned “the utilization of fiscal policy with no money creation” (205). She wrote, “Indeed, any interest rate-expenditure policy that would lead to an improved payments position and rising incomes under fixed rates would lead to a currency
appreciation under flexible rates. . . . The ‘ineffectiveness’ of fiscal policy results from a rising interest rate, rather than from government expenditures themselves” (205).

Now, this is not the place for detailed consideration of Krueger’s significant contribution and the conclusions that she draws from her “general” model. Suffice it to say, however, that her QJE paper has, until now, been overlooked by most observers—including Dornbusch—who did not cite it in his papers or his 1980 text, Open Economy Macroeconomics. Moreover, the paper is not even cited by Isard (1995) in his ostensibly comprehensive review of the literature.

In his comment on Krueger, Michaely (1968, 508–10) was perhaps the first to make the transition from the original diagrammatic framework of earlier analyses—such as those that appeared in Mundell’s works between 1961 and 1963—to one based on what he called “the Hicksian IS-LL construct”; and this in order to analyze both Krueger’s “general” model and “the analysis advanced by Fleming and Rhomberg.” As he wrote (1968, 508), the Hicksian construct “may easily be adapted to deal with an open economy.” His IS-LL-BP diagram (1968, 509) illustrates the case of imperfect capital mobility (an upward-sloping BP cutting LL from below at the equilibrium rate of interest). Michaely (1965, 510) utilized his IS-LL-BP framework “to provide a convenient and graphic demonstration of the analyses advanced by Fleming and Rhomberg” regarding “expansionary budgetary policy” under fixed rates. It is not surprising that Michaely associated the “Hicksian IS-LL construct” with Fleming’s result, as Fleming’s 1962 model was based only on comparative statics, as we have already shown above. When Krueger’s 1965 QJE generalized model of the Mundell and Rhomberg-Fleming results is combined with Michaely’s IS-LL-BP diagram, however, we obtain exactly the same Mundell-Fleming analytic framework put forward by Dornbusch a decade later.

Takayama, Wrightsman, and Branson:

In his 1969 paper, “The Effects of Fiscal and Monetary Policies under Flexible and Fixed Exchange Rates,” Takayama first surveyed the “state of play” of the models extant that dealt with the question of the relative efficacy of alternative policies under alternative exchange rate regimes.
He placed special emphasis on what he called the “Mundellian assumption” of perfect capital mobility and its related “model” and “conclusion,” as against that of Johnson (what he called the “Johnson effect,” and Johnson’s assumption of imperfect mobility), utilizing, at the beginning of his paper, a standard IS-LM diagram without BP for the purpose of his analyses (1969, 192–93, figs. 1 and 2). Indeed, when referring to Mundell’s 1963 diagrammatic analysis, he wrote (1969, 190 n. 1), “I believe that we do not need diagrams as complicated as the ones he used, rather straightforward use of the IS and LM diagram appears to be sufficient.” Takayama goes on to say that the purpose of his “paper is to construct a general equilibrium model which will include both of the” approaches of Mundell and Johnson “as special cases and point out their special assumptions,” adding, “we shall focus on Mundell and Johnson, but shall always be aware of other works on the topic” (194). And, interestingly enough, in his 1969 paper, Takayama mentions Fleming’s 1962 paper only in a footnote (191 n. 1). But this is not surprising, in light of the fact that in the influential AEA Readings in International Economics volume edited by Caves and Johnson, and published a year before, Fleming’s 1962 paper was not mentioned at all.

Wrightsman’s 1970 AER article, “IS, LM, and External Equilibrium: A Graphical Analysis,” has been overlooked until now. He provided the following rationale for his approach: “The IS-LM exposition of general equilibrium in the domestic money and goods markets excludes the problem of balance of payments equilibrium when the economy engages in foreign trade under the conditions of fixed foreign exchange rates. This expositional shortcoming is easily rectified by superimposing an external equilibrium condition onto the IS-LM framework” (203). He proposed “a new external equilibrium curve, called the EE curve,” which he “derived geometrically” in a “four-section diagram” where the “EE curve shows” interest rate-income “combinations which generate external equilibrium” (203–4, fig. 1). Wrightsman then combined his construct with IS–LM and added a full employment line (F) to his analysis (206, fig. 2). He went on to illustrate various combinations of fiscal and monetary policy that enabled the economy to converge “at full employment with external equilibrium” (207). Wrightsman’s 1970 “IS-LM-EE” framework, however, did not “catch on” either with the profession or pedagogically. Rather, it was Branson’s 1972 textbook version of IS-LM-BP that came to “rule the roost.”
As Wrightsman did before him, Branson (1972, 305, fig. 15-2) constructed the “BP line” in four-quadrant space. He said that “to determine whether any given internal equilibrium... point determined by the intersection of the IS and LM curves will yield a balance-of-payments surplus or deficit, we can simply superimpose the BP line on the IS-LM diagram” (305–6). Branson then analyzed the price effect on balance of payments equilibrium, again using a four-quadrant diagram (307, fig. 15-4). What is important to recall here is that, again, as with Wrightsman, Branson’s 1972 IS-LM-BP diagrammatic analysis is for fixed exchange rates only. While he analyzed the case of exchange rate flexibility in equational terms, he did not deal with the case of perfect capital mobility at all. It is not surprising, therefore, that while he cited Mundell’s 1960 *QJE* paper and 1962 *IMF Staff Papers* article, he does not mention Fleming’s 1962 model or Mundell’s 1963 *Canadian Journal* paper in his textbook.

Niehans’s 1975 Critique and the Niehans-Dornbusch Nexus

In his note in the 1975 issue of the *Journal of International Economics*, Niehans challenged the results of Mundell, Krueger (1965), and E. Sohmen (1967) on the “efficacy of monetary policy in stabilizing domestic output” under flexible rates (Niehans 1975, 275). Interestingly enough, in his note, Niehans did not mention Fleming’s 1962 model. Rather, he utilized “a Keynesian model for an open economy similar to that used by Sohmen” (277) and then analyzed the implications of the dynamic assumptions of his proposed model. His primary result was “the paradox of a possible contractive effect of monetary expansion” in the case of flexible rates (279). As he put it, under certain conditions this model predicted that “monetary policy loses all of its effect on output under flexible rates, and there is even an extreme range in which its effect is perverse” (280). Niehans concluded that “the principal benefit of flexibility should not be looked for in the short-run effects of monetary policy and stabilizing output and employment, but rather in its long-term effects on price trends” (281).

The fact of the matter is that the differential efficacy of monetary versus fiscal policy under flexible rates had appeared as early as Sohmen’s MIT PhD thesis (1958, 74–82) and his 1961 book (83–90, 123–24). Sohmen’s (1958, 75) approach to the relative efficacy of fiscal and
monetary policies under alternate exchange rate regimes—that is, his assertion regarding, as he put it, the “automatic mechanism” and “forceful booster to domestic national income” emanating from expansionary monetary policy under flexible rates, and the “different leverage of monetary policy under fixed and flexible exchange rates”—was the result of his discovery of this “independently” of Mundell (1967, 521 n. 1). This was a clear case of independent multiple discovery rather than “cross-fertilization” (Patinkin 1983; Young 1987), as there was minimal contact between Sohmen and Mundell during the early stages of their respective careers, according to Mundell (1999; 2002, 13–14), who also could not recall noticing Sohmen’s early result.

A year later, in his paper “The Theory of Flexible Exchange Rate Regimes and Macroeconomic Policy,” Dornbusch (1976a, 255) took up the question raised by Niehans regarding “the effectiveness of monetary policy under flexible rates.” In this paper, Dornbusch presented a model in exchange rate–price space but did not link the works of Mundell he cited (Mundell 1964, 1968) to Fleming’s paper (1962). In other words, Dornbusch’s proposed Mundell-Fleming model does not appear in this paper at all.

Dornbusch’s next paper, published in the *Journal of International Economics* and titled “Exchange Rate Expectations and Monetary Policy” (1976b), was a direct outcome of Niehans 1975. As Dornbusch (1976b, 231) wrote,

> The purpose of this paper is to reassess the effects of monetary policy under flexible exchange rates and to give attention to the details of the short-run adjustment process. The paper is stimulated by a recent study of Niehans (1975). . . . the Niehans conclusions are of importance because they run counter to the established Mundell-Fleming view that monetary policy is most effective under flexible rates with capital mobility, and that a monetary expansion under these conditions will lead to an expansion in output and employment, and that it will cause a trade surplus and capital outflow.

This is the first time that Dornbusch puts Mundell’s analysis and Fleming’s 1962 model together, albeit in exchange rate–income space, “following,” as he puts it, “Mundell (1968)” (233). He then considers “the modification to the Mundell-Fleming model that arises from exchange rate expectations, or the endogeneity, in the short run of the domestic interest rate” (235). In this paper, the first in which Dornbusch uses the
Dornbusch on Mundell and Fleming and

In two subsequent papers published in 1976, Dornbusch further refined
his proposed “Mundell-Fleming model,” emphasizing its connection
with flexible rates and the efficacy of monetary policy. For example,
in his JPE paper titled “Expectations and Exchange Rate Dynamics,”
Dornbusch (1976c, 1170 n. 13, 1173) not only talked about the “Mundell-Fleming model” and “Mundell-Fleming results” but also coined the
term “Mundell-Fleming world.” In Dornbusch’s next article, with Krugman, titled “Flexible Exchange Rates in the Short Run” and published in Brookings Papers (1976), they define the Mundell-Fleming model as a flexible rate model. As they put it, “The Mundell-Fleming approach to macroeconomics under flexible rates emphasizes interdependence and capital mobility” (548). This definition antedates an identical one in Dornbusch’s later textbook, Open Economy Macroeconomics (1980). In their paper, Dornbusch and Krugman (1976, 542–43) formally develop a two-country Mundell-Fleming model. Interestingly enough, their model
is similar to that proposed by Metzler (1942), albeit with flexible rates,
but they only refer to the 1950 Laursen-Metzler paper.

In his survey article “Exchange Rate Economics: Where Do We Stand?” published in Brookings Papers, Dornbusch (1980a, 152) described what he called “the traditional Mundell-Fleming model,” which, as he put it, “remains, with some adaptations, the backbone of macroeconomic models of the exchange rate.” In this context, he referred to his “forthcoming” textbook, Open Economy Macroeconomics, “for an
exposition” (152). He then outlined the characteristics of what he called “an extended Mundell-Fleming model” that included “rational expectations . . . and full employment” (152–53).

In chapter 10 of Open Economy Macroeconomics (1980b), Dornbusch presented an open economy version of IS-LM with fixed exchange rates and perfect capital mobility but did not call this the “Mundell-Fleming model,” choosing instead to refer to Fleming’s 1962 paper and Mundell’s 1968 book International Economics as the “seminal work” on which the “literature . . . developed during the ’60s” (1980b, 176). He then examined, at the beginning of the next chapter (“Flexible Exchange Rates and Capital Mobility”), what he called “the Mundell-Fleming model—the flexible rate version of the standard IS-LM model with output demand determined and prices taken as given” (193; emphasis in the original). He presented the differential effects of monetary versus fiscal expansion in this model, where the latter “leads to full crowding out through a deterioration in the trade balance,” saying, “these conclusions oppose those reached for the fixed exchange rate model in Chapter 10” (193). Dornbusch then developed “the basic macroeconomic model of flexible exchange rates under conditions of perfect capital mobility. The model is a direct extension of the IS-LM model.” And it is this model, and this model alone, that Dornbusch called “the Mundell-Fleming model” (194).

Why, then, did IS-LM-BP, and its Mundell-Fleming variant, come to “rule the roost”? First, IS-LM-BP provided a mathematical and geometric framework for both policy analysis and pedagogy. Second, it presented a standardized geometric framework for policy analysis and especially teaching, which is lacking in the Swan-Salter-Meade-Corden framework. Third, IS-LM-BP is a generalized and standardized model composed of equations and a singular core diagram encompassing numerous policy prescriptions and regimes, and thus can be easily used for pedagogical purposes, in comparison to alternatives such as the Polak-IMF and Johnsonian–monetary approach frameworks. Moreover, the generalized IS-LM-BP framework, which encompasses the flexible rate Mundell-Fleming model with perfect capital mobility, exhibits similar “plasticity” to its closed economy counterpart. This has enabled it to also undergo a similar metamorphosis into augmented forms (Darity and Young 1995; Young and Zilberfarb 2000). The generality of the IS-LM-BP framework not only enabled it to encompass the opposite conclusions, as Dornbusch put it, of fixed and flexible rate models with
imperfect and perfect capital mobility, but enabled the development of two-country models (e.g., Mundell 1964; Dornbusch 1980b, 199–202) and “extended Mundell-Fleming” models that include rational expectations, long-run neoclassical features, and exchange rate dynamics of Mundell-Dornbusch vintage (Dornbusch 1980a, 152–57; 1980b, 202–13). But the development of these models is another story.

References


