First Draft
Not For Quotation

Mundell's *International Economics*: Adaptations and Debates*

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Wednesday, May 19, 2004

This paper is prepared for the conference to honor Michael Mussa on the occasion of his sixtieth birthday, to be held June 4-5/2004 at the International Monetary Fund, Washington, DC. It is the first output of a line of research that was initiated in response to the awarding of the Nobel Prize to Robert A. Mundell in 1999. We thank him for conversations and correspondence concerning the keynote address which he presented at Bar-Ilan University for the conference entitled "The Open Economy Macromodel: Past, Present and Future". Boyer would like to express his appreciation to Jim Boughton, Bob Flood, and J.J. Polak for conversations during visits to the IMF. The staff at the IMF archives was invaluable in making available some of the early drafts of papers by Fleming and Mundell. David Laidler provided important insights about the nature of exercises in the history of thought, but specifically warned of the dangers of constructing memoirs. Young would like to thank Bar-Ilan University for financial support of travel which expedited this research project. None of these individuals or organizations is responsible for conclusions which this paper contains.

Abstract: Most of the chapters in Mundell's *International Economics* are adapted from the original sources. The revisions yield important insights into the contributions made by the initial publications.

In this paper we look only at the changes which take the form of elisions of material. These outtakes are amusing, but demonstrate how Mundell was willing to either irritate or ignore his discussants. Issues raised by them are valuable enough to warrant our further consideration. In doing so we question both the validity and the interpretation of some of the conclusions in the Nobel-cited Capital Mobility Paper.

I. Introduction

The first time I heard the name J. Marcus Fleming was from Jacob Frenkel in 1969 in the corridor outside the International Economics Workshop at the University of Chicago. This occurred in the context of a discussion of the publication of Richard Cooper's [1969] volume for Penguin Books entitled *International Finance*. A remarkable aspect of the volume, Jacob pointed out, was that it did not contain a single reading by Robert A. Mundell.

Being a well-informed student of international finance, I wondered how such a volume could hide the glaring omission that resulted from leaving out Mundell's *magnum opus*, the Capital Mobility Paper (Mundell [1963c]). To my surprise Cooper had found an alternative for that paper in the form of Fleming [1962]. I was convinced at the time that this was indeed a poor substitute for the real thing, but this episode served to link in my mind the names Fleming and Mundell ever since, apparently long before the term "Mundell-Fleming model" had been coined (Boughton [2003]).

These two names are central to understanding the development of the open economy macromodel during the sixties, a period of massive upheaval in the subject. The present paper looks at these two great economists in an unorthodox way. We consider their contributions in light of the contrast in the extent to which revisions were made to their works as they were reprinted in an adapted form.

The difference in this regard is quite marked. While Fleming's famous paper went from Departmental Memorandum to publication, with reprints in two separate venues, there is a minimal amount of reworking along the way. In contrast, Mundell's papers are extensively modified as they go from their original forms (Mundell [1963a], [1963b], [1963c], [1964], [1967]) to their adaptations in *International Economics* (Mundell [1968a]).

Some of Mundell's adaptations are merely amusing, and these are the ones to which we devote most of our attention at this conference to celebrate Mike Mussa's sixtieth birthday. We do this by considering the reworking in the form of elision of material that appears in earlier versions. Even so, the comments of discussants on the original papers are worth reviewing, and we do this in the case of McLeod [1964] (discussing Mundell [1963c], and Fleming [1967] (discussing Mundell [1967]).

The further task, of dealing with revisions that add to Mundell's original publications, is left for a subsequent paper.

II. Trash, Still Worth Reading By Students

In order to begin this comparison between Fleming and Mundell, we focus first on two other important differences between them: namely their desire to create controversy and their willingness to acknowledge the originality of others' work.

Mundell has remarked of Fleming's celebrated paper:

> Marcus that year was active in the theater (literature, drama, and history were old avocations) but nevertheless managed to write a paper on the monetary-fiscal mix that built upon the subject that I had worked on, and he produced a paper that is still worth reading today by students. (Fleming [1978, xix])

Fleming is somewhat more inclined to see his own work as being a useful construct:

> The essay in Chapter 9, written in 1962, was inspired by a feeling that the Canadian experiment with a floating exchange rate had been vitiated by a failure to observe that such an arrangement called for a different mix of fiscal and monetary policies from those that were appropriate under a regime of fixed exchange rates. (Fleming [1971, 18])[1]

While the emphasis here is not on how capital mobility effects his comparative static results, Fleming does cover the polar case of perfect mobility both in the body of his paper and in a mathematical appendix. Furthermore his view of the importance of capital mobility remained steadfast throughout the rest of his life, as his research output makes clear.

Fleming was an international bureaucrat whose natural tendency was to avoid controversy if possible. In contrast, Mundell appears to relish his own ability to stir things up, and he gives as a prime example of this his first paper written as a new employee at the IMF (Mundell [1961d]):

> It is hard to imagine the consternation this paper created within the Fund in October and November 1961. It arrived at conclusions that did not exactly coincide with Fund policy….it was initially rejected by *Staff Papers*… (Mundell [1968f, 493]).

The reason that this paper was accepted for publication at the end of the day is that Fleming wrote the following statement of support:[2]

> "I understand that some members of the Committee may question the publication of this piece because they think it conflicts with established Fund policy…The S.E. quadrant of Mundell's article provides a theoretical foundation for Lord Cromer's Mansion House speech….On the other hand, I would be most concerned if I thought that *Staff Papers* would reject an article which was theoretically valid but which might conflict with accepted Fund practice…" (Mundell [1968f, 494])

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[1] Boughton [2003] has noted that Fleming [1962] was essentially in its published form (except, perhaps, for its appendix) by September or October 1961. It is therefore clear that the actual writing dates from 1961 at the latest.

[2] I have been informed by a reliable source that this writing comes from Fleming. Mundell [1968f, 494] refers to the author only as being a "…senior member of the staff…"

Mundell's complaints about the treatment of his paper may not be completely justified. By his own account this paper was written in a single week in September or October of 1961 (Mundell [2002, 9]). It was immediately approved by Fleming, so that the Departmental Memorandum (DM) appeared on November 8. If there was a fight about this paper, it did not last long: the paper was published in the *Staff Papers* in March 1962.[3]

Mundell asserts that the theoretical framework in his paper demonstrated the correct policy mix, and that President Kennedy reversed his policy mix in order to conform with the Mundell recommendation. Nonetheless he later admitted (Mundell [2002, 9]) that his view all along was that this paper is "trash".[4] Perhaps unaware of this attitude, some well-known economists, such as Flood [1999], Johnson [1967], Kemp [1972], McCallum [1996], and Tsiang [1975], have taken the paper seriously enough to give it a thorough review, or at least to cite it.[5]

Such reversals are a bit jarring to readers who first encounter them, but those who know Mundell a little are used to this aspect of his personality. Indeed, he used Walt Whitman's famous quotation about self-contradiction to preface his talk to well wishers at the AEA luncheon to honor him on his receiving the Nobel Prize.

But few economists are aware of the extent of Mundell's reversal with respect to capital mobility. In his Capital Mobility Paper, he writes that the assumption of perfect capital mobility "…will overstate the case, but it has the merit of posing a stereotype toward which international financial relations seem to be heading."(Mundell [1963c, 475]) That view set the research agenda in international finance for at least thirty years. In stark contrast, Mundell's own research moved in just the opposite direction; he assumed thereafter that the economy under analysis was in a situation of zero capital mobility.

Such an assumption is made in his Barter Theory paper (Mundell [1967]), which led to the Mundell-Dornbusch literature (Dornbusch [1973]); of his analysis of Growth and the Balance of Payments (Mundell [1971c]), which laid the groundwork for the Monetary Approach to the Balance of Payments; and of his "Uncommon Arguments for Common Currencies" (Mundell [1973]). While it may be true that the assumption does not make much difference in certain of these papers, it seems unlikely that the argument in the common currencies discussion remains intact in the case in which the countries involved

[3] In contrast Fleming's famous paper was issued as a DM also on November 8, but it was not published until twelve months later. Perhaps the title of Mundell [1961d] is a casualty of the speed with which the DM was released. That title is "The Use of Monetary and Fiscal Policy for Internal and External Stability." For Mundell [1962] the title is "The Appropriate Use of Monetary and Fiscal Policy for Internal and External Stability." The adaptation in Mundell [1968a] (Mundell [1968c]) modifies the title further to "The Appropriate Use of Monetary and Fiscal Policy under Fixed Exchange Rates."

[4] To fill in the context, I should note that Mundell says "…that I felt like Bizet after he had written the Toreador Song to *Carmen*: 'If it's trash they want, I'll give it to them!'"

[5] Perhaps the most surprising aspect of Mundell [1962] being used to justify the Kennedy tax cut is that the model explicitly assumes that the economy under analysis is small. This is hardly an accurate description of the US of that era.

have access to a non-monetary market instrument which affords the opportunity for international borrowing and lending.[6]

III. True Zen Master

We have already commented on the support that Fleming provided to Mundell's research as a fresh recruit in 1961. Approving a Departmental Memorandum was probably routine, but convincing the editorial board to accept a manuscript for *Staff Papers* was a greater challenge. Thus Mundell [1963a], the first draft of the Capital Mobility Paper,[7] was readily approved as a DM despite the fact that it has an unfinished feel about, having neither references nor footnotes.[8]

It is therefore a great surprise to find that in the spring of 1963 Fleming did not approve as a DM the first of these zero capital mobility papers. This paper in its original published form is entitled "International Disequilibrium and the Adjustment Process." (Mundell [1967]).

Even though Fleming had already reacted negatively to this paper, he was nevertheless called upon to discuss it when Mundell presented it at a World Bank conference in 1965. Of course, having seen the paper two years earlier Fleming was well prepared to express his misgivings in this public forum. The paper and the discussants' comments are published in Adler [1967].

This paper appears in an adapted form in *International Economics* as chapter 8, and its title there has been modified to "Barter Theory and the Monetary Mechanism of Adjustment". As the reader will see the introduction to the paper is substantially reworked, even if the body of the text is not. What gives these outtakes their interest is that the introductory section seems tailored to irritate the discussant, and that he responds in kind, and, in certain readers' minds, he wins the debate.

Here are the opening paragraphs of what is adapted into chapter 8 of *International Economics*. All citations are from Mundell [1967].

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[6] Dornbusch [2000, 201] has remarked on how the arguments in the original optimal currency areas paper (Mundell [1961a]) so militate against the view that Europe should have a single currency that we should not see Mundell as the godfather of the euro, but rather "Euro despite Mundell." McKinnon [2002] has noted how the discussion in Mundell [1973] does not use any of the terms which were employed in the original optimal currency area paper.

[7] There exists a still earlier draft of this paper in the form of a two-page attachment (entitled "The Implications of International Capital Mobility for Stabilization Policy and Theoretical Evaluation of Empirical Evidence," dated Jaunary 4, 1963) to a notice of seminar in the Special Studies Division of the IMF on January 9, 1963.

[8] That this version was indeed unfinished is suggested by the following evidence. In less than three months this manuscript (Mundell [1963a]) had metamorphosed into a version (Mundell [1963b]) which is in roughly its form as published (Mundell [1963c]). In the process it had more than doubled in length; tables, references, footnotes, and diagrams had been added; and the text had been completely reorganized. Within six months this new draft, with further minor changes, was published.

> *A Cup of Tea*
>
> Nan-in, a Japanese master during the Meiji era (1868-1912) received a university professor who came to inquire about Zen.
> Nan-in served tea. He poured his visitor's cup full, and then kept on pouring.
> The professor watched the overflow until he no longer could restrain himself. 'It is overfull. No more will go in!'
> 'Like this cup,' Nan-in said, 'you are full of your own opinions and speculations. How can I show you Zen unless you first empty your cup?'[1] (441)
>
> International monetary economics needs to follow Nan-in's advice. We have an abundance of theories, mechanisms and techniques for understanding it, but many of them seem to be no better rooted in theoretical understanding than the opinions and speculations of Nan-in's guest. Too many theories are almost as debilitating as too few. The subject has become so cluttered that it does seem necessary to empty our cups.(441)
> It would be a mistake, however, to empty out two hundred years of international trade theory and forget about it. We need instead to sift it of its extraneous elements, and to add a little of what appears to be missing. In un-Zen-like fashion, then, we can begin by taking a brief look at what has occurred since Hume, and in particular at the effects on the development of international monetary economics of the classical distinction between the monetary mechanism and the theory of barter.(441)
>
> The success of the dichotomy proved too overwhelming—epistemologically. In the hands of the successors of Ricardo—Mill, Marshall, Taussig, Viner, Meade, Johnson, etc.—the long-run barter theory of trade developed into a carefully tooled and highly sophisticated engine of analysis…international monetary economic analysis never received precise mathematical formulation. Restricted to the raw logic of verbal analysis, it could not and did not develop the rigorous base necessary for ordered progressive scientific accumulation.(443)

After further discussion of this sort the introductory portion of the paper finishes with the *caveat* that the assumptions of the model "…limit the direct applicability of the conclusions to a small country that is underdeveloped in the sense that it lacks an important capital market."(445) There is a noteworthy difference from the version in *International Economics* in the section entitled "The Classical Case and Devaluation." In that section is a mention of Mohamet and his mountain (455), but otherwise the body of the paper is much as we find it in Mundell [1968a].[9]

Herewith are the comments by Fleming: (All page references are to Fleming [1967].)

> Comments on Professor Mundell's Paper

[9] The conscientious reader may be surprised that the *caveat* is sufficiently elastic that the very same framework is used to analyze the case of Britain in 1964 (Mundell [1971b]).

Professor Mundell begins, with the self-confidence of a true Zen master, by telling us to empty our cups of all we thought we knew about international monetary economics in order to receive the milk—or rather the green tea—of the true doctrine. Before accepting this somewhat Messianic claim, however, and bending our heads meekly to receive the thwacks of his mathematical 'hossu', we ought, I think, to ask ourselves the question, 'What is so special about Mundell's Zen?' (462)

The paper before us, like the body of the Buddha, manifests itself at three levels—the level of disequilibrium analysis, or Sambhogakaya, the level of comparative equilibrium analysis, or Dharmakaya, and the level of policy prescriptions, or Nirmanakaya. (The meaning I attach to these terms will be explained anon.) (463)

Now, in the world of disequilibrium analysis, things are not exactly what they seem. It is a strange world, composed partly of *ex post* realities, like Imports, Exports, Prices, and Incomes, and partly of visionary entities of an *ex ante* character such as Expenditure, which is really a piece of wishful thinking, but nevertheless has magnitude and mixes happily with the real entities in Mundell's equations and diagrams. (463)

…Now I must admit to being rather allergic to this kind of disequilibrium analysis, though, I admit it has a respectable ancestry in economic thought. In Buddhist lore, this realm is called the Body of Enjoyment, or the Body of Enlightenment, but while I enjoy it I don't feel entirely enlightened. (463)

One could wish that Professor Mundell had ventured a little more deeply into what he calls 'the cluttered clouds of verbal analysis'. (464)

We are now in a position to climb out of the ambiguous half-lights of the disequilibrium process into the sunlit uplands of equilibrium analysis, the realm of Dharmakaya, or Heavenly Void. I am sure that our Zen master would admit that this blissful realm could be attained by a number of different paths. In other words, different systems of dynamic adjustment, including that followed by the ancient worthies of the classical tradition, are compatible with the same set of equilibrium relationships. It is, therefore, not surprising that the conclusions of this part of Professor Mundell's paper…are relatively uncontroversial, within the limitations imposed by their basic assumptions, of which perhaps the most crucial is the full employment assumption. (467)

However, when in the concluding section we descend from the rarefied atmosphere of equilibrium analysis to the terrestrial world of Nirmanakaya where policies have to be applied by human beings, controversial propositions come thick and fast. Most of these propositions are so impeccably conservative that it would be churlish of me, as an IMF man, to quarrel with them;…(467-8)

On the whole, what strikes me most about Mundell's Zen is its similarity to that of the Ancient Worthies, the early patriarchs, with its lesson of wu-wei, or *laissez*

> *faire*. It is clear that the tea he wants us to empty out of our cups is the tea of that un-Zen-like activist, Maynard Keynes. (468)

From an historical point of view, it would be of interest to know who had the last chance to revise his contribution. Fleming seems like a meticulous worker, and so the miscitation of the equations in the paper come as a surprise. Maybe the numbering of the equations was altered in the final copy editing of the paper, without corresponding changes to the discussants' comments. Furthermore, Fleming's quotation "…the cluttered clouds of verbal analysis…" does not appear in any version of Mundell's paper which I have seen. Perhaps it was modified to "…raw logic of verbal analysis…" And, finally, who was copying whom when both authors use the expression "un-Zen-like"? Just a coincidence?

For those readers who are wondering why all the references to Zen, I should mention that Fleming had a particular interest in Zen Buddhism. This enjoyable and literate repartee provides an unusual view of the interaction of these two economists.

IV. Mundell's Mandalas

Another way in which Fleming and Mundell differ is in their use of diagrams. It is generally agreed that Mundell is a master in their construction and deployment. We will see in a moment that Fleming was quite the opposite. In acknowledgement of the

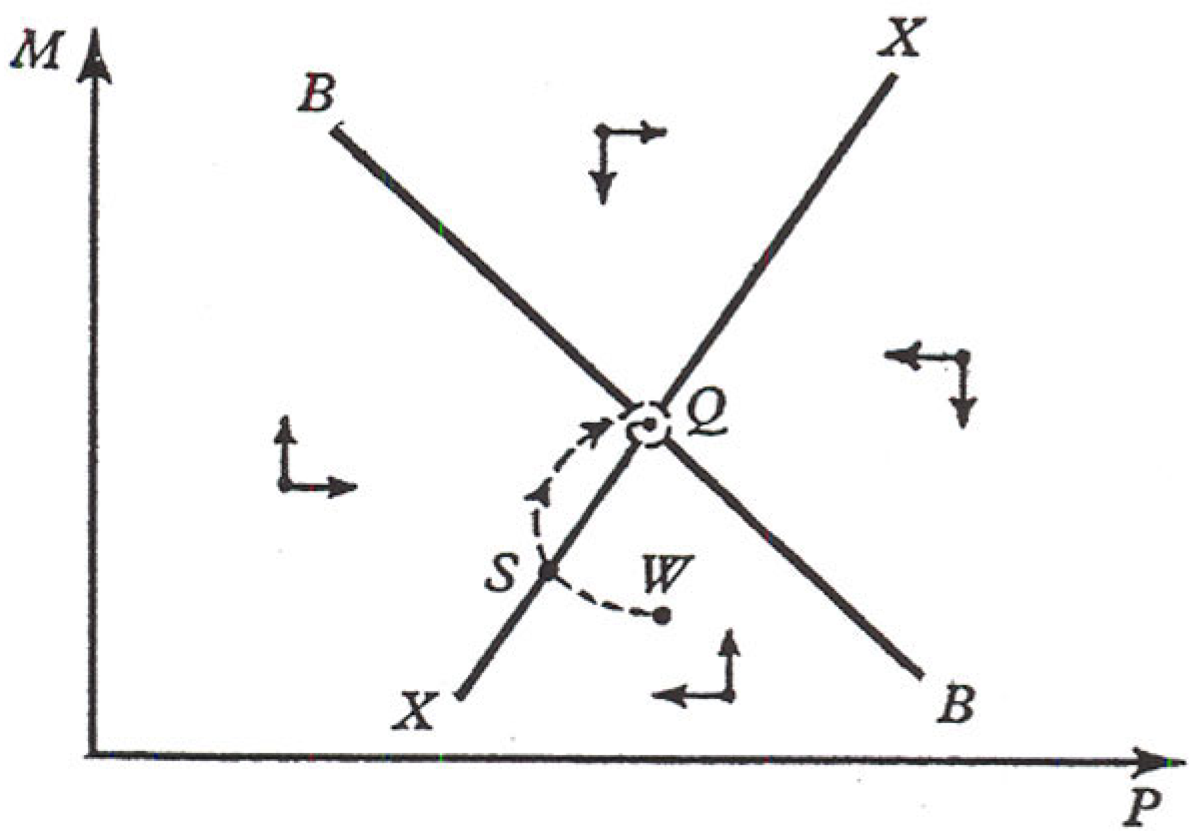
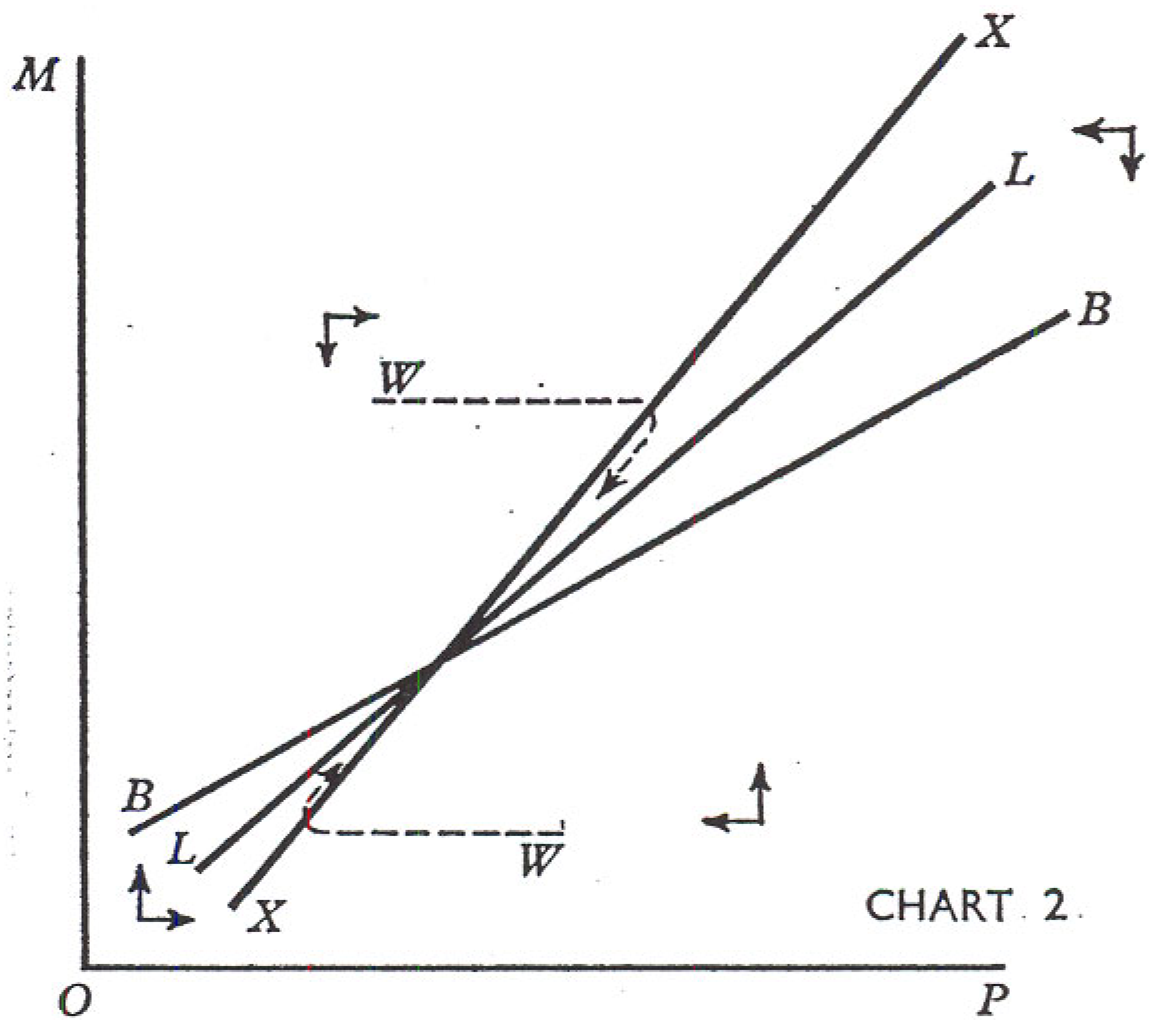


FIG. 5

elegance and impenetrability of Mundell's drawings Fleming says the following:

> At this point I would like to make an allusion to the diagrams illustrating the adjustment process. What I would like to call 'Mundell's mandalas' are always worthy objects of contemplation, and Figure 5, which illustrates the adjustment process, is no exception. (Fleming [1967, 464])

In contrast, here is an example of a diagram by Fleming (Fleming [1967, 466]):



While Mundell is a master of this art, I think we should admit that when he does not devote enough time to his creations, a few errors can creep in. This is the third figure from Mundell [1968d].

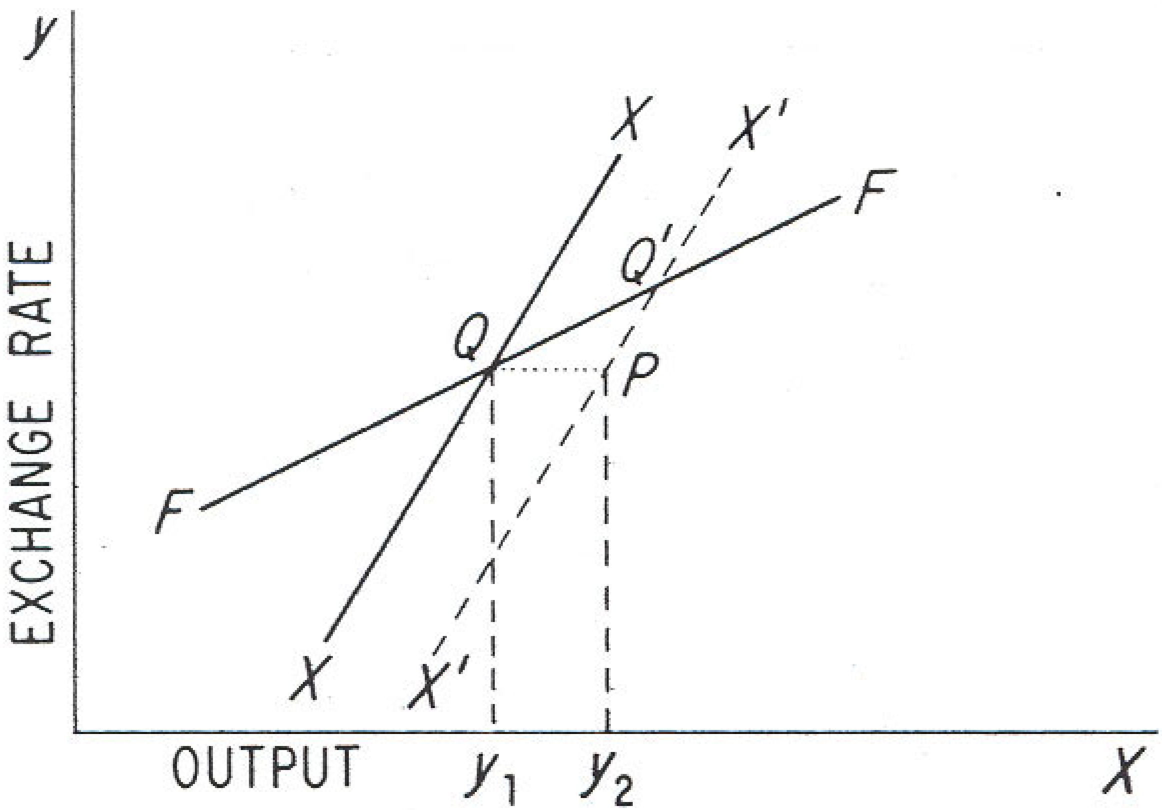


Figure 17–3. The Effect of Fiscal Policy on Employment.

Can you identify all five errors in this figure? No, you can't. The reason is that two of them are due to denotations of variables in the paper which are different from what is shown in the figure.

And finally, the Master at times makes his own diagram more obscure by including extraneous lines or arrows in them. We provide an example in the form of Figure 18-2 (the second figure in Mundell [1968e]) shown below. In this figure you can see that the FF locus in the bottom panel of this figure is unnecessary. Its many shifts merely confuse the issue, since we are bound to end up at the intersection between the relevant vertical dotted line and the related XX locus in the bottom panel.

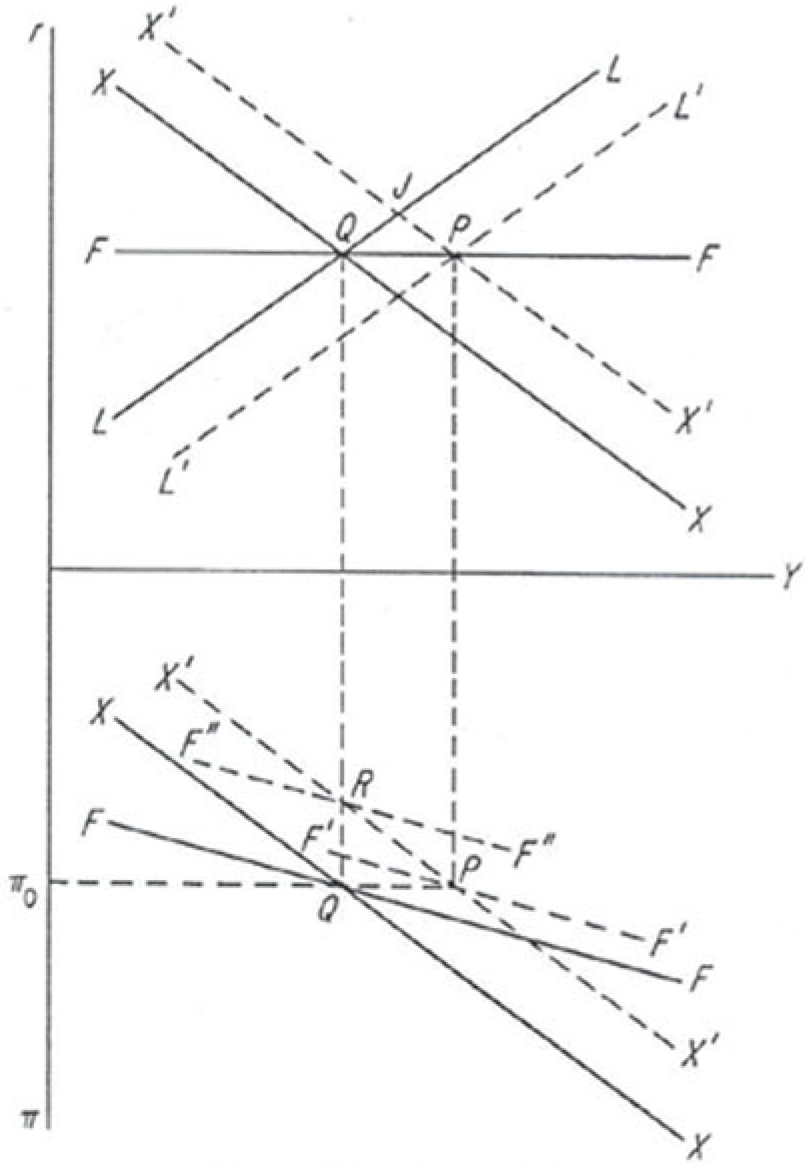


Figure 18–2. Fiscal Policy.

A further annoyance with this diagram is that the slopes of these curves are not explained. In order to obtain clarification of these matters the reader must refer to a list of Mundell's earlier publications (Mundell [1963c, 481]). Even here, the inclusion in that list of Mundell [1962] assures that all but the most stalwart of readers will continue to be stumped. Despite these foibles, I think we can all agree that Mundell is more masterful in diagrammatic analysis than is Fleming.

The next question to which we turn our attention is how do their powers compare when it comes to equations.

V. Wonderful Skill

Dornbusch [2000,199] has remarked on Mundell's "…wonderful skill to capture the story in a few equations…" Rudi himself presents the whole argument in the Capital Mobility Paper using two equations: M/P = L(i,Y); i = i* (Dornbusch [2000, 202]).

There are two problems with Rudi's demonstration. As we will see momentarily, this equation does not appear in the body of the paper. In addition, as Swoboda [1973] has argued convincingly, the ineffectiveness of expansionary monetary policy under fixed exchange rates is independent of the degree of capital mobility, so basing the argument on perfect capital mobility (as the second equation indicates) hides the fact that this assumption contributes nothing to the conclusions.

Let's see how this wonderful skill is exemplified in the Capital Mobility Paper. The only equations in the body of the text are in the form of a table, which is reproduced here (the only table in Mundell [1968e]):

Table 18–1

Sector \ Market	Goods		Securities		Money		International Reserves	
Government	$T - G$	+	Government borrowing	+	Government dishoarding	+	*1	= 0
	+		+		+		+	+
Private	$S - I$	+	Private borrowing	+	Private dishoarding	+	*2	= 0
	+		+		+		+	+
Foreign	$M - X$	+	Capital outflow	+	*3	+	Increase in reserves	= 0
	+		+		+		+	+
Banking	*4	+	Open market sales	+	Monetary expansion	+	Foreign exchange sales	= 0
	‖		‖		‖		‖	‖
	0	+	0	+	0	+	0	= 0

Now there are ten equations in this table, the majority of which are misleading as to the way the analysis is actually conducted in the text. The one equation that is of some help is familiar:

$$\begin{array}{c} T - G \\ + \\ S - I \\ + \\ M - X \\ + \\ *^{4} \\ \| \\ 0 \end{array}$$

(It isn't often that one encounters equations which are written vertically. An asterisk is used to denote a negligible magnitude which is included for completeness.) This is the equilibrium condition in the domestic goods market, and when plotted in (Y,r) or (Y,π) space (where Y is output, r is the rate of interest, and π is the exchange rate) is denoted by XX indicating internal balance. In particular, we have noted this locus in Figures 17-3 and 18-2 above. Now this line is well-known from macroeconomic analysis, and is often called the IS curve.

Usually the second curve in the macroeconomic diagram is denoted by LM, and in the Capital Mobility Paper it unexceptionally is called LL. The problems arise when one attempts to determine, from the body of this paper, what equation lies behind this locus. The paper proceeds along two lines which appear to be inconsistent. The first is that the money market is in equilibrium when "…the community is willing to accumulate the increase in the money supply offered by the banking system" (Mundell [1963c, 477]). Like the specification of the foreign exchange market, this view seems to suggest that equilibrium occurs in the money market when the rate of change of supply is equal to the rate of change of demand. This statement appears to coincide with the flow nature of the equations in the table and in particular from the equation that reads:

$$\begin{array}{c} \text{Government} \\ \text{dishoarding} \\ + \\ \text{Private} \\ \text{dishoarding} \\ + \\ *^{3} \\ + \\ \text{Monetary} \\ \text{expansion} \\ \| \\ 0 \end{array}$$

An alternative description of equilibrium in the money market is the conventional one. It states that equilibrium occurs "…when income has risen sufficiently to induce the domestic community to hold the increased stock of money created by the banking system." (Mundell [1963c, 477]). As to the demand for money, the assumption is that it "…depends only on income and the rate of interest." (Mundell [1963c, 476])

We should note that the demand for money function that that phrase describes is quite general; in fact, so much so that demand could conceivably depend negatively on income and positively on interest rates. We will not pursue such possibilities, but instead assume that these responses have their usual sign. But the key point is that nowhere does this paper state that demand for money is assumed to be unitary elastic in income. Because such an assumption is not made, we will be questioning a specific result which is repeated a number of times in the later sections of the Capital Mobility Paper.

VI. Curious Outtake

Above we presented remarks from Fleming putting in perspective the contribution which his famous paper makes to our understanding of an open economy's macro performance. What does Mundell see as the important new results in his Capital Mobility Paper?

Mundell concludes that the important mechanism that needs to be heeded in an open economy revolves around the degree of capital mobility. He states "We have demonstrated that perfect capital mobility implies different concepts of stabilization policy from those to which we have become accustomed in the post-World War II period." (Mundell [1963c, 484]) Presumably what he is referring to here is the ineffectiveness results which he derives for monetary policy under fixed exchange rates and for fiscal policy under flexible exchange rates. A more satisfactory basis for this claim would have included a demonstration that less than perfect capital mobility generates quite different results. And here is where Swoboda's conclusion is again worth noting. If monetary policy's effectiveness under fixed exchange rates is always zero, independent of the degree of capital mobility, doesn't it serve as a counterexample to Mundell's claim? In the same vein, if capital mobility is as important as is asserted, then why did Mundell assume zero capital mobility in all his subsequent research?

Similarly to Fleming, Mundell points to the Canadian situation as an example for which his analysis "…should have a high degree of relevance…" (Mundell [1963c, 475]). As does Fleming [1962, 372], Mundell [1963c, 485] cites Rhomberg's work in this regard, stating that "Perhaps the most complete verification of the applicability of the conclusions to the Canadian case is provided by an econometric paper by R. Rhomberg to be published in the *Journal of Political Economy*." In one of the more curious outtakes in the Chapter 18 adaptation, the citation to Rhomberg's work (Rhomberg [1964]) is deleted and the interested reader is pointed in the direction of a Royal Commission Report by Clarence Barber with the title "The Canadian Economy in Trouble" (Barber [1962]) and of a speech, entitled "Canada in a Changing World," that Harry Johnson delivered to the Canadian Club of Toronto in November 1962 (Johnson [1962]).

VII. Theory is the Poetry of Science

Just as the Capital Mobility Paper is supported by diagrammatic analysis from previous publications, as well it is buttressed by a subsequent publication which extends the model to a world made up of two countries. This publication, entitled "A Reply: Capital Mobility and Size"(Mundell [1964]), provides additional, better-specified equations and supplements the arguments in that paper. Now while *International Economics* includes this paper as an appendix to Chapter 18, it fails to give any indication of the comments by Alex N. McLeod which sparked the reply. The comments were apparently welcomed in that they afforded an opportunity which Mundell "exploited". But, as we will see, McLeod's comments and the responses to them are interesting on their own. They constitute the outtakes from the adaptation in *International Economics* which we look at now.

McLeod did not think highly of the Capital Mobility Paper. A few excerpts will give the reader a sense of McLeod's feeling. (All page citations are to McLeod [1964].)

> Mundell's article[1], however, is not primarily addressed to this problem; instead it is a comparative study of monetary and fiscal policies on the basis of a number of simplifying assumptions, of which the perfect mobility of capital is only one—and not necessarily the most radical. (413)
>
> Mundell's rigid demand-for-money function,[3] when coupled with the assumption that the interest rate is given, throws us back on something hardly distinguishable from one of the cruder forms of the quantity theory of money. (414-5)
>
> Even within the limitations imposed by his simplifying assumptions, however, the logic of Mundell's analysis is far from rigorous and his results are by no means definitive. His description of the outcome under the various circumstances he considers may be plausible enough, provided certain conditions (not always fully specified) are deemed to obtain, but they are not the only possible and not necessarily the most probable results. (415-6)
>
> This is inexcusable, and can only bring discredit on the economics profession if allowed to go unchallenged. (420)

Mundell's reply to this onslaught is as ethereal as it is unresponsive. (All page citations are to Mundell [1964].)

> Theory is the poetry of science. It is simplification, the essential abstraction, the exaggeration of truth. Through simplification theory creates a caricature of reality. Through deduction the premises of the caricature are translated into empirical—and therefore refutable—generalizations. The caricature itself is not the real world—it mocks it. Yet mind true things by their mockeries! The caricature mocks reality; the deductions from the caricature illuminate it. (421)

> I hope, too, that my conclusions are tautological creations of my assumptions. That means my deductions are free of logical error. (421)
>
> I shall now exploit this opportunity to extend my previous writings on the subject to cover a point which McLeod and others have raised concerning the influence of size. (423)

VIII. Classical Quantity Theory

McLeod's analysis raises three specific issues which deserve fuller discussion.

The first point which we cover is as follows:

> In summary, the real limitation on the use of monetary and fiscal policies to expand income and employment in an open economy turns out to be simply the old familiar "foreign drain" that has played such an important role in the literature for at least thirty-five years,[7] not to mention the much older version of essentially the same idea in the "external cash drain" that limits credit expansion in purely institutional money-and-banking theory going back at least to the bullionist controversies. (419)

The Mundell paper asserts the unusual nature of the equilibria generated by perfect capital mobility without proving it by making a comparison with the situation where mobility is less than perfect. Indeed, the introduction of capital mobility into the open economy model for comparative statics exercises, as in Mundell's *Kyklos* paper (Mundell [1961a]), is done without claiming that it generates substantially different results from the zero capital mobility case. The thrust of that paper is that capital mobility does not alter the essence of the adjustment mechanism with which we have been familiar since the writings of Hume. While alterations in the level of income may be part of the process determining the flow of reserves, and these can be in addition to or instead of the influences which rely on price movements, the nature of the adjustment mechanism is not fundamentally altered by the introduction of capital mobility.

In light of the contrasting results in both the *Kyklos* article and the flexible exchange rate paper (Mundell [1961c]), some readers are inclined to see the claims in the Capital Mobility Paper as somewhat exaggerated. They are wary about endorsing the argument too fully, in anticipation of further reversals in the future.[10] Mundell [1963c, 485] himself says about the results that "…my conclusions are black and white rather than dark and light grey."

A second point by McLeod is worth considering in detail:

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[10] Krueger [1965], while noting the results of Mundell [1963c], chooses to focus her attention on Mundell [1961c] instead. Swoboda [1973] is an important counterexample as we have noted above. Sohmen [1969] sees both the Fleming [1962] and the Mundell [1963c] results as valid in particular circumstances. Dornbusch [2000, 199] has mentioned Mundell's "marketing department" as an important factor in the wide recognition which his work has received.

> But is it true that under a fixed exchange rate the authorities must abandon their efforts to expand income and employment by monetary policy? No, not as long as they are able to borrow abroad, because foreign borrowing is an effective alternative to the depletion of exchange reserves. (McLeod [1964, 417])

Mundell dismisses this idea as due to "confusion" on McLeod's part (Mundell [1964, 422]), but in fact McLeod is providing a reasonable paraphrase of a logical exercise concerning a policy which is presented in the original article. In the flexible exchange rate case, Mundell says that foreign exchange market operations ("…'open market operations' in foreign exchange…") should be viewed as an "alternative form of monetary policy" (Mundell [1963c, 478]). The consequences are the same as for a standard expansionary open market operation in domestic securities, with the one exception that such an alternative operation increases the level of international reserve holdings.

Now such an operation can be carried out under fixed exchange rates as well, and upon further consideration one realizes that the conflict between internal and external balance goes away when such operations are used. The increase in the supply of money tends to increase domestic output, and the purchase of foreign currency by the central bank raises the level of international reserves. Though such reserves will be depleted over time, their level can be restored by merely repeating the foreign borrowing operation as needed.

The final point that McLeod makes returns us to the minimalist specification of the asset markets which the Capital Mobility Paper employs:

> However, this conclusion is in fact nothing but a tautological creation of his assumptions; by hypothesis income and money supply must vary in exact proportion… (McLeod [1964, 418])

The point here is that Mundell does not assume that demand for money is unitary elastic in income. It therefore does not follow that income and the money supply must vary in exact proportion. The overly-specific claim, which Mundell has called the Classical Quantity Theory conclusion (Mundell [1968d, 261]), is as follows:

> Because the interest rates are unaltered, this means that income must rise in proportion to the increase in the money supply, the factor of proportionality being the given ratio of income and money (income velocity). (Mundell [1963c, 477])

This point is one that Fleming [1962, 374, 379] makes in his discussion of monetary policy under flexible exchange rates, in the perfect capital mobility case. It is a correct deduction in that case precisely because his demand for money relation is expressed in terms of a velocity function which is assumed to depend only on the rate of interest.

The same is not true in the Mundell model, because, as we have noted above, the specification of the money demand function does not include the assumption of unitary elasticity with respect to income. This point would not be worth belaboring except that the claim is reiterated at least three times in the Capital Mobility Paper (Mundell [1963c, 477, 479, 481]). It is repeated in Mundell [1964, 431].

IX. Conclusion

This paper has taken a careful look at two of the chapters in *International Economics* in order to get a better sense of their roles in the development of the theory of open economy macro. We have done this through the process of noting the differences between those chapters, and the material that is in the original sources. But as a result we have done less than half of the job, because our focus has been entirely on the words that have been elided in the process of adaptation.

The larger task remains of identifying the material that is added in the process of revising the papers, and of explaining why those changes were made.

Since that book continues to be cited as an important source for insights about the development of the open economy macromodel, we feel that such an exercise is well worth the effort.

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