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International Capital Markets and Canadian Economic Policy under Flexible and Fixed Exchange Rates, 1952-69

Richard E. Caves

Grant L. Reuber

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ECONOMIC POLICY UNDER FLEXIBLE AND
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by

R. E. Caves and G. L. Reuber

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The advantage of a title as broad as the one heading our paper is that it allows wide scope to pick among a variety of topics. We have chosen to focus primarily on the answers to four related questions:

a) How closely were capital markets in the U.S. and Canada integrated during the period 1952 to 1969?

b) How much of a problem has arisen for Canadian economic policy because of changes in autonomous capital flows emanating from events outside Canada or fortuitous events within - the much-discussed classical transfer problem?

c) To what extent has Canadian stabilization policy been hampered or aided by mobile capital flows in the context of the Meade-Tinbergen problem of reconciling internal and external balance?

d) How did the relationships prevailing during the flexible rate period change during the subsequent fixed rate period from 1962 to 1970?

We have examined the answers to the first three of these questions for the flexible rate period in considerable detail elsewhere, and what we say on this here is a summary of this earlier work.[1] The vintage has been fortified for present purposes by further econometric analysis designed to reveal differences between the subsequent fixed rate period, 1962-70, and the flexible rate period on which our previous analysis was based.[2] In addition we explore a number of policy implications of our results to provide some sparkle for appeal to the palates of those directly concerned with practical policy applications.

Consideration of Canadian experience since the early 1950's is rewarding not only because of its direct relevance to contemporary economic policy in Canada but also because of what it may suggest about economic policy elsewhere in a world where international capital flows have become

much more important and where there is an increasing disposition to countenance greater flexibility in exchange rates. In saying this we recognize, of course, that there are important differences between the 1950s and the present and between Canada and other countries, which make it important to be cautious about extending conclusions based on Canada's historical experience to the contemporary scene in Canada and elsewhere.

1. Capital Markets Under the Flexible Exchange Rate, 1952-61

An important feature of the flexible-rate period was the high but imperfect degree of capital market integration that existed between Canada and the U.S. In quantitative terms, during this period a 1 per cent change in short-term interest rates brought forth a corresponding change in short-term capital flows in the same quarter of about 8 per cent; and a 1 per cent change in long-term interest-rate differentials called forth a change in long-term capital flows of roughly 10 per cent in the same quarter. It proved more difficult to estimate the responsiveness of direct investment to differential rates of return between the two countries. Some relatively weak estimates suggest some responsiveness to differential rates of return but substantially less than for portfolio flows and short-term flows: the estimated elasticity coefficient is 1.4. Much stronger evidence was found of a relation between direct investment and changes in Canadian GNP. In addition, direct investment flows seem to have been influenced to an important degree by developments in particular industries - such as resource industries - the degree of corporate liquidity, the level of domestic investment and competitive opportunities in other parts of the world. Contrary to what is sometimes suggested by Canadian economic nationalists no evidence was found to support the view that direct investment flows are highly inelastic with respect to rates of return and other economic variables.

Further evidence of the high degree of integration prevailing between financial markets in Canada and the U.S. was found in the effect of U.S. interest rates on Canadian interest rates. During the 1950s it appears that Canadian interest rates were more closely linked to long-term U.S. rates via

expectations than to expectations about future short-term rates in Canada.

The close but imperfect integration of financial markets in Canada
and the U.S. was also reflected in the responsiveness of capital flows to
exchange rate movements. During the 1950s investors reacted strongly to
a change in the exchange rate by assuming it would be reversed, buying
Canadian assets when the exchange rate fell and selling when it rose. As
a consequence, capital flows tended strongly to stabilize the exchange rate.
For example, a 1 per cent depreciation in the exchange rate was typically
associated with a simultaneous increase of about 70 per cent in short-term
flows and, within one quarter, of about 33 per cent in long-term flows.

A major consequence of this high degree of capital integration
was that both the level and the term structure of interest rates in Canada
were closely linked to the U.S., thereby considerably impairing the ability
of Canadian authorities to establish interest rate levels independently.
Allowing only for the effect of international capital flows on the supply of
capital, the leverage of monetary policy on long-term interest rate levels
may have been reduced by about a third. If, in addition, one allows for the
effect of expectations geared to U.S. rates, this leverage may have been
reduced by as much as 80 or 90 per cent. Much the same applies to short-term
rates. According to the evidence for the 1950s short-term capital flows
reduced the leverage of monetary policy on short-term interest rate levels by
about 50 per cent (the estimates range from 33 to 93 per cent).

Adjusting to Autonomous Capital Flows

In our research we made a conceptual distinction between endogenous
capital flows - influenced by short-term policy variables in Canada - and
autonomous flows not sensitive to ordinary shifts in short-term policy.

For our purpose this latter category can usefully be subdivided into
several subsidiary questions:

1. To what extent are flows of foreign direct investment com-
plementary to and to what extent substitutes for domestic investment, both
within and among industries?

2. To what degree are capital flows requited via the current account of the balance of payments in the absence of policy adjustments?

3. To what extent are capital inflows inflationary?

In order to answer these questions it is necessary to measure the marginal contribution of foreign investment to domestic capital formation and then trace through the consequences of the marginal change in capital formation for expenditure and the balance of payments. Two basic procedures were followed to illuminate these issues for the flexible rate period. First, the lead-lag relationships among various components of the balance of payments as well as various domestic variables were examined. Secondly, the relationship between direct investment and capital formation was explored with the aid of a simple investment model which allowed separately for the contribution of foreign direct investment. Without going into the details of these estimates, our conclusions may be summarized as follows.

First, the lead-lag patterns leave little doubt that over the period 1951-62 changes in the balance of trade preceded changes in long-term capital flows. This pattern is consistent with the notion of export-led growth, made famous in the staple theory of Canadian development, and with the notion that disturbances reflected mainly variations in domestic expenditure and investment prospects. It is not consistent with the view sometimes expressed that capital flows served as a predominant source of disturbances in Canada's balance of payments.

Secondly, our evidence indicates that a dollar of direct investment from abroad was typically associated with more than a dollar of Canadian capital formation - usually between $1.50 and $3.00. The timing of domestic capital formation did not coincide with the direct investment, however, but typically was spread out over some three quarters thereafter. When unemployment was high, less complementary domestic investment occurred and domestic capital formation was at the lower end of the indicated range; and the opposite was true when unemployment was low. The amount of complementary domestic investment also was less when the number of take-overs of Canadian firms was

high. Furthermore, it tended to be low when foreign investment was directed to the mining and petroleum industries in comparison to when it was directed to Canadian secondary manufacturing industries. No evidence whatever was found to support the view sometimes stated or implied by Canada's economic nationalists that foreign direct investment is largely a substitute for domestic investment.

Autonomous portfolio capital flows depress domestic interest rates, which in turn stimulate domestic capital formation. On the evidence we concluded that it probably took an extra $39 million of long-term portfolio capital and roughly $27 million of short-term portfolio capital inflows to depress domestic interest rates by 1/10 of a percentage point.

Applying these estimates to balance of payments and domestic expenditure multipliers we were able to estimate the extent to which capital transfers were requited without policy adjustments. Under conditions of full employment direct investment inflows were overrequited within a year and tended to produce a payments deficit; with heavy unemployment they were underrequited. Under average conditions for the period in question they were just about fully requited via income effects. Portfolio investment both long- and short-term was underrequited leaving a large balance of payments surplus. This latter conclusion is consistent with the coincidence noted during the free rate period between high rates of portfolio inflows and the high price of the Canadian dollar. On this showing portfolio investment flows posed a substantially greater adjustment problem than direct investment, which again is a point of interest in the context of the debate on Canadian economic nationalism where it is frequently suggested that the country should rely more heavily on port-folio investment than on direct investment.

In the aggregate different types of capital flows tended to be mutually stabilizing, with an above-average long-term inflow being typically associated with a below-average short-term inflow. Hence, in aggregate the different types portfolio flows compensated for each other and thus reduced the need for domestic policy adjustments. This accommodation did not operate through Canadian interest

rates but through other channels which remain obscure but probably are based in institutional practices related to the transfer of funds from abroad.

Finally there is the question of the impact of exogenous inflows on domestic expenditure levels. It is clear from the evidence that direct investment flows on balance tended to change Canadian employment in the same direction as the change in the flow - raising employment when flows increased and reducing it when flows decreased. This was true even in situations such as heavy unemployment where the transfer was underrequited. Long-term portfolio inflows likewise were inflationary when they arose due to a decline in U.S. interest rates. Where, however, they were due to other disturbances they were probably deflationary. Exogenous short-term inflows whatever their cause were nearly always deflationary.

We have not attempted to re-estimate the key relationships pertaining to exogenous investment flows for the period after 1961. Although these changed somewhat, as discussed below, we doubt that the general picture of these relationships has altered sufficiently to alter fundamentally the answers we have provided to the questions posed at the begining of this section. One reason for saying this is that our answers depend only to a limited extent on exchange rate adjustments, since a central conclusion of our analysis is that capital flows were predominantly accomplished via a combination of income adjustments and mutually accommodating capital flow adjustments. Thus, contrary to the emphasis given to adjustment of the exchange rate and terms of trade in much theoretical discussion of the transfer problem, exchange rate adjustments appear to have played an insignificant role in the transfer process during the flexible rate period.

The Impact of Capital Flows on the Effectiveness of the Instruments of Stabilization Policy

The other question to be considered is how capital flows responded to changes in domestic economic policy and how this reponse may have altered the effectiveness of the instruments of domestic stabilization policy. We concentrate on four instruments of stabilization policy - monetary, fiscal, exchange rate and debt-management policy - since these remain the principal

stabilization weapons in the policy arsenal of most market-oriented countries and, in addition, these instruments are directly linked through financial markets to international capital flows.

A summary of our evidence for the flexible rate period is presented in Table 1. These figures show a series of comparisons with counterfactual situations which exclude adjustments via capital flows and exchange rates. Such comparisons are derived from simulations based on the assumption that the relationships governing other responses remain the same whether or not adjustments via capital flows and exchange rates are permitted.

Starting with monetary policy we ask how Canada's GNP, balance of payments and exchange rate responded to a 1 per cent increase in the money supply, and what would this response have been in the absence of international capital flows. In the absence of exchange rate movements, our evidence suggests that a 1 per cent increase in the money supply would have increased GNP immediately by about $4.3 million and additional increases of about the same size might have been expected over the next year and a half. The balance of payments might have been expected to deteriorate immediately by about $74 million, virtually all of which represented capital outflows. Some small further deterioration might have been expected in subsequent quarters.[3]

In the absence of capital flows, as shown in Table 1, the impact of the assumed change in monetary policy in GNP, assuming a fixed exchange rate, would have been about twice as great as it was. This 50 per cent loss in effectiveness is mainly explained by the effect of international capital flows in ameliorating the effect of a change in the money supply on domestic interest rates.

If we assume a flexible rather than a fixed exchange rate, increasing the money supply would have resulted in an exchange rate depreciation which in turn would have evoked a response via both the current and capital accounts. Where these responses are taken into account, as shown in Table 1, the effectiveness of monetary policy is greatly enhanced, immediately and to an increased extent in subsequent quarters, both with and without foreign capital flows.

TABLE 1

SUMMARY OF ESTIMATED EFFECTS ON GNP OF CHANGES IN FISCAL, MONETARY AND DEBT-MANAGEMENT POLICIES WITH AND WITHOUT FOREIGN CAPITAL FLOWS AND WITH AND WITHOUT EXCHANGE-RATE ADJUSTMENTS

($ million)

	Without exchange-rate adjustments						With exchange-rate adjustments					
	1	2	3	4	5	6	1	2	3	4	5	6
1. Increase in government expenditure of $100 million												
(a) Without foreign capital flows	97	98	103	117	136	154	110	111	120	143	173	202
(b) With foreign capital flows	101	105	113	130	151	171	77	81	91	115	144	173
(c) b as a percentage of a	104	107	110	111	111	111	70	73	76	80	83	86
2. Decrease in personal income tax of $100 million												
(a) Without foreign capital flows	47	43	42	44	49	54	60	54	55	62	71	80
(b) With foreign capital flows	51	49	51	56	64	71	26	22	24	31	39	47
(c) b as a percentage of a	109	114	121	127	131	131	43	41	44	50	55	59
3. Increase in rate of growth in money supply of 1 per cent												
(a) Without foreign capital flows	8.6	5.6	8.7	8.5	7.9	7.8	9.7	6.4	10.1	10.4	10.3	10.8
(b) With foreign capital flows	4.3	3.3	5.0	4.9	4.5	4.4	63.8	7.1	13.1	17.1	18.8	19.0
(c) b as a percentage of a	50	59	57	58	57	56	658	111	130	164	183	176
4. Decrease in the average term of the public debt by 10 months												
(a) Without foreign capital flows	3.9	2.3	3.6	3.5	3.3	3.3	4.5	2.7	4.2	4.4	4.4	4.6
(b) With foreign capital flows	0.2	0.1	0.2	0.2	0.2	0.2	24.7	1.5	3.3	4.9	5.6	5.5
(c) b as a percentage of a	5	4	6	6	6	6	549	56	79	111	127	120

Source: Caves and Reuber, Capital Transfers, op. cit., Table 8.11.

Moreover, contrary to the situation with a fixed exchange rate, under a
flexible rate monetary policy was substantially more effective with inter-
national capital flows than without (line 3(c), Table 1).

This same general pattern is indicated for debt management policy
during the 1950s as shown in section 4 of Table 1. Under a fixed exchange
rate, capital flows would have greatly diminished - indeed would have virtually
eliminated - the effectiveness of debt management policy. Under a flexible
exchange rate, on the other hand, capital flows greatly enhanced the effective-
ness of debt management policy. Moreover, with or without capital flows,
changes in debt management policy had a substantially greater impact, immediately
and in subsequent quarters, with a flexible exchange rate than they would have
had with a fixed rate.

When we turn to fiscal policy we find quite a different pattern.
Consider first an increase of $100 million in government expenditures which
leads to an expansion in GNP via its expenditure effects. Assuming the money
supply to be given, this change also has monetary effects which increase
interest rates, thereby inducing changes in international capital flows.

How large these monetary effects are relative to the expenditure
effects depends largely on how rapidly government revenues rise in the face
of rising income to finance the increase in government expenditure. During
the 1950s the monetary effects of increased expenditure seem to have out-
weighed the expenditure effects in the short-run when the new expenditure
would have been largely financed by borrowing rather than by tax revenue
(assuming the money supply remained unchanged). In the longer term, however,
as tax revenues increased in response to increases in GNP the expenditure
effects of increased government spending gradually overtook the monetary effects.

Without exchange rate adjustments, as shown in Table 1, this would
have meant that capital flows enhanced the effectiveness of fiscal policy to
a moderate extent both immediately and in the longer term since the monetary
consequences would have been precluded from exercising an adverse effect on
domestic expenditure via exchange rate movements, and the induced inflow of

foreign capital would have constrained the increase in domestic interest rates.
Under a flexible rate, however, capital flows tended to reduce the effectiveness
of fiscal policy quite considerably, especially in the short-run when the full
brunt of the monetary effects of increased government spending was felt. None-
theless, after six quarters had elapsed and the expenditure effects of in-
creased government expenditure, both direct and indirect via induced exchange
rate adjustments, had had an opportunity to manifest themselves more fully,
the effect of the assumed change in fiscal policy on GNP was greater under a
flexible rate than under a fixed rate even with foreign capital flows (line 1(b),
Table 1).

The other instrument of fiscal policy to be considered is a reduction
in personal income taxes. As is evident from Table 1, the combination of
capital flows and exchange rate adjustments particularly impaired the effectivess
of changes in tax policy, both immediately and in subsequent quarters. The
difference in the degree of impairment sustained by expenditure and tax policy
reflects the difference in the effects on the government deficit of these two
types of policies. The cost to the government, in terms of its budget deficit,
is greater for a tax change than for an expenditure change because of the
additional leakage through savings on the first round of expenditure, as compared
to a dollar-equivalent expenditure change.

Because of this budgetary effect, under a fixed rate, capital flows
which constrain the increase in domestic interest rates considerably would have
increased the effectiveness of tax changes - in other words the offsetting
monetary consequences would have been considerably reduced relative to the
domestic expenditure effects. Under a flexible rate, on the other hand, these
offsetting monetary consequences were enhanced by increased exchange rate
variations which resulted in increased expenditure leakages from the domestic
income stream, thereby seriously undermining the domestic expenditure effects
of tax changes on GNP.

Two general conclusions are indicated by this earlier analysis.
First, given the relationships prevailing in the 1950s, international capital

flows considerably increased the leverages of some types of policy and con-
siderably reduced the leverages of other types of policy. The impact of
these flows on the effectiveness of the various instruments of policy was
affected to an important extent by fluctuations in the exchange rate in
response to market forces. Secondly, closely integrated capital markets,
judging by the experience of the 1950s did not preclude the pursuit of inde-
pendent stabilization policy goals. Rather, capital flows conditioned the
manner in which the various instruments of policy needed to be deployed,
singly and in combination, in order to achieve these goals more effectively.

In our earlier work, as already noted, we estimated the leverages
of policy instruments by a conventional procedure[4] which involves assuming
that the shift from a flexible to a fixed exchange rate alters nothing in the
system except the way in which adjustment takes place in the exchange market.
This assumption could well be false for several reasons, and so we were eager
to explore briefly the actual characteristics of the fixed-rate regime of
1962-70 to augmentoour hypothetical analysis based on the operation of the
Canadian economy in the earlier period. One reason is that the switch to
a fixed exchange rate may alter the working of markets whose adjustment pro-
perties in turn affect the leverages of policy instruments. For instance,
fixing the exchange rate should alter the supply of forward cover, making it
more elastic in times when the pegged rate is not generally expected to change,
and thus raising the extent to which short-term capital can flow as covered
interest arbitrage without prohibitively driving up the cost of forward cover.
Fixing the exchange rate could also change the way the Canadian authorities
react, forcing them to pull the levers of policy in response to signals
different from those which they heeded when the rate was free to fluctuate.
Not to be bullishly abstract about the matter, it is clear that the Canadian
authorities were forced in the mid-1960s to impose various forms of suasion
on Canadian borrowers, in order to protect Canada's exemption from the United
States' formal controls on capital outflows. In the next section we use data
for the period of the fixed rate to re-estimate and modify a number of our

regression equations and test various hypotheses of this sort. In the final section of the paper we compare the observed working of economic policy in this fixed-rate period with the hypothetical fixed rate values derived in our earlier study.

2. Capital Markets Under the Fixed Exchange Rate, 1963-1969

To explore the effect of actual conditions and events during the period when the Canadian exchange rate was pegged, we both re-estimated the relevant equations from our previous study and tested a number of modifications designed to embody various hypotheses about how the general conditions of the later period changed the operation of international capital markets and of policy formation and execution. We shall briefly describe the approach taken in our earlier study to the statistical exploration of international capital flows to Canada, then consider the subsidiary hypotheses that can be tested on the fixed-rate period.

Many attempts have been made in the last few years to estimate statistically the determinants of international capital flows.[5] Their authors are invariably driven to a set of compromises in the face of potentially complex underlying theoretical models, thorny econometric problems, and data known to be subject to serious errors of both concept and measurement. We viewed the net international capital flows to Canada conventionally, as reflecting the interaction of the Canadian excess demand and world excess supply for long-run portfolio and short-run funds. We explored the inter-dependence of the net capital flow and the Canadian interest rate, taking into account forces determining the demand for funds in Canada: net new issues of securities in the case of portfolio flows, GNP and the merchandise-trade balance in the case of short-term flows. To keep the implied model down to manageable complexity, we neglected most aspects of the external net supply of funds to Canada, in effect assuming a supply of funds that was perfectly elastic over the relevant range. This simplification was justified by the similarity of the growth rates of Canada and the United States during the relevant period, which tended to restrict the shifts in the mixes of national

securities in lenders' portfolios and made it unlikely that portfolio-substitution effects outside of Canada wielded any strong influence on the quarterly net flow of capital to Canada; we also noted that the bulk of Canadian long-term securities sold abroad were denominated in U.S. dollars, which should greatly have dampened any reluctance of U.S. lenders to shift their portfolio proportion between Canadian and U.S. securities of comparable risk.   For these and various other reasons, we eschewed emphasizing the currently modish portfolio-balance approach and concentrated instead on measuring the short-term impact of Canadian policy variables.[6]

All computations described below were performed on quarterly data using ordinary or two-stage least squares technique.   Statistical analysis of the flexible rate was confined to the period from the beginning of 1952 to the middle of 1961, to avoid distortions associated with the introduction and termination of that rate.   The operation of the fixed rate was studied from the beginning of 1963 to the end of 1969; the starting date should exclude the uncertainties associated with the pegging of the rate in mid-1962, and the closing one was dictated by the availability of data.

Before turning to our findings on specific hypotheses about the fixed-rate period, it is useful to apply equations which were estimated in our previous study to the fixed-rate period and to the two periods together. This was done in order to gain a general impression of the change in the relevant capital markets wrought by all forces at work in the fixed-rate period. Table 2 presents selected equations specified as in our earlier study and estimated both for the flexible-rate and fixed-rate periods, as defined above, and for the two together.[7]   The Chow test was employed to gauge the significance of overall changes in the relations, and all equations but 1a reveal shifts significant at the 5 per cent level.   A glance at the equations themselves renders the confirmation of the Chow test superfluous.   The explanatory power of the predetermined variables (indicated by their t statistics) is reduced in nearly every case,[8] the one conspicuous exception - the influence of average term to maturity of Government of Canada long-term debt (ATM) on Canada's

TABLE 2

DETERMINANTS OF LONG- AND SHORT-TERM CAPITAL FLOWS
AND CANADIAN INTEREST RATES IN PERIODS OF FLEXIBLE AND FIXED EXCHANGE RATES[a]

Dependant variable	Period	Predetermined variables						
		CL	USL	NNS	NNSC	RS	RS_{-1}	CTS
1. PC								
	a. Whole	252.2 (1.31)	-20.3 (0.89)		0.06 (0.89)			-221.1 (2.15)
	Flexible	755.4 (3.54)	-1023.4 (3.39)		0.14 (2.05)			-254.5 (3.53)
	Fixed	439.8 (1.13)	-315.4 (0.67)		0.05 (0.40)			-580.7 (1.34)
	b. Whole	422.4 (2.20)	-427.1 (1.79)	0.23 (4.43)		101.4 (0.10)	-453.8 (0.46)	-230.7 (2.55)
	Flexible	347.7 (2.24)	-528.2 (2.46)	0.20 (5.33)		4111.0 (4.46)	-2823.0 (3.21)	-165.0 (3.25)
	Fixed	422.1 (1.36)	-497.4 (1.37)	0.21 (2.12)		19116.0 (1.78)	1491.0 (0.93)	-682.6 (2.15)

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TABLE 2 (Continued)

2. CL

	NNSC	PCMS	ATM
Whole	.000737 (5.74)	− .0702 (3.17)	.00150 (1.19)
Flexible	.000184 (1.46)	− .0724 (4.81)	.00393 (4.91)
Fixed	− .000037 (0.49)	.0026 (0.21)	− .02173 (16.99)

3. STK

	DS	FP	BMTUS	CRS
Whole	58.19 (0.28)	− 3999.0 (0.24)	− 0.733 (2.51)	− 3712.0 (1.27)
Flexible	605.4 (7.86)	32459.0 (4.41)	− 0.447 (2.86)	− 3063.0 (3.09)
Fixed	−1618.0 (3.15)	−14440.0 (0.38)	0.307 (0.67)	−12631.0 (0.82)

4. CS

	FP	USS	PCMS	GNP
Whole	− 40.34 (4.49)	0.862 (7.33)	− 0.0253 (2.14)	0.00003 (2.78)
Flexible	− 54.35 (5.25)	0.646 (5.52)	− 0.0125 (0.88)	0.00014 (7.20)
Fixed	− 49.04 (4.32)	1.013 (6.05)	− 0.0284 (2.70)	0.00001 (0.87)

TABLE 2 (Continued)

[a]Seasonal dummies were included in each equation and were often significant; they are not reported here, however. Likewise, constant terms are omitted.

Brief definitions of the variables are given below; details of their construction appear in Capital Transfers (or in work therein cited by Lawrence H. Officer).

ATM   – Average term to maturity, Government of Canada long-term debt.

BMTUS – Canada's net imports from United States.

CL   – Interest rate on long-term Government of Canada bond bearing coupon rate 2 3/4 per cent, maturing 6/15/67-68, to 1968; subsequently, bond bearing rate 3 1/2 per cent, maturing 5/1/70.

CRS   – Quarterly change in spot exchange rate.

CS   – Tender rate on three-month Canadian Treasury bills.

DS   – Differential between Canadian and U.S. short-term interest rates.

FP   – Forward premium (discount) on the Canadian dollar.

GNP   – Gross national expenditure, excluding military pay.

NNS   – Net new issues of long-term marketable securities.

NNSC – Net new long-term issues retained in Canadian portfolios.

PC   – Net inflow of portfolio capital via net new issues and retirements of Canadian and foreign securities.

PCMS – Percentage change in money supply.

RS   – Spot exchange rate (price of Canadian dollar).

RS_{-1} – Spot exchange rate lagged one quarter.

STK   – Net inflow of short-term capital to Canada.

USL   – Interest rate on long-term U.S. government bond bearing coupon rate 2 1/2 per cent, maturing 12/15/67-72, to 1967; subsequently, bond bearing coupon rate 3 1/4 per cent, maturing 6/15/78-83.

USS   – Interest rate on three-month United States Treasury bills.

long-term interest rate (CL) - involving a shift to a perverse sign.   It
is clear that some set of forces operated powerfully to reduce the closeness
of the relation between these capital flows and interest rates and their
other market determinants, or to substitute a new and overriding set of
determinants.[9]   To these forces we now turn.

Effect of Fixed Rate on Capital Markets

Our earlier study noted a rather considerable stabilizing role
played by capital movements during the period of the flexible exchange rate.
Not only did short-term capital flows (including net unrecorded transactions
in the Canadian balance) move to reverse swings in the flexible rate, but so
did portfolio capital flows - apparently because the issuers played short-run
swings in timing their trips to the capital market.   Although the stabilizing
character of capital flows with a flexible rate has been a matter of dispute
among economists, consensus prevails on the view that they would be either
indifferent or hostile to stability when the rate is pegged, because as the
exchange rate approaches its support limits and expectation of a change in
the peg becomes general, the speculators enjoy a one-way option because they
cannot be disciplined by the authorities.   On the other hand, one should
recall that a pegged rate which is floating within its support points, without
any consensus of expectations on a change in the peg, might well fluctuate -
and affect short-term capital flows - in the same way as a freely fluctuating
rate.   Hence the relation between short-term capital flows and the exchange
rate is not formally predictable for the fixed-rate period, although by noting
the absence of serious expectations of a Canadian devaluation between 1963
and 1969 we can build a presumption for a stabilizing role.   Perhaps a purer
test for speculative pressures on a fixed exchange rate, as suggested by Miller
and Whitman, is the reaction of capital flows to recent changes in official
reserves.[10]   A recently reported rise in Canadian official reserves should
increase the rate of return expected by Canadian issuers of foreign-currency
(especially U.S. dollar) obligations, and hence cause a speculative inflow of
funds.

We explored the statistical influence of these expectational factors on both the long-term and short-term net flow of capital to Canada during 1963-69. Long-term capital flows continued to respond in a stabilizing way to swings in the exchange rate, but not to a statistically significant degree. Furthermore, long-term borrowings did not appear to be influenced by recent changes in official reserves. This is as we should expect: Canadian long-term debtors could profit greatly from a devaluation of the U.S. dollar, but changes in Canadian reserves probably fail to capture the factors governing their estimate of the likelihood of this event. The story is more interesting for short-term capital flows. We had found that during the flexible-rate period short-term capital flows were closely related to the change in the exchange rate from the preceding to the current quarter, implying that speculators bet that swings from quarter to quarter would tend to be reversed subsequently. For the fixed-rate period this form of the expectational variable would not be appropriate; one instead would expect capital flows to be influenced by the extent of the departure of the exchange rate from its official peg. As we suggested above, the weight of market opinion did not appear to expect an exchange-rate change at any time during 1963-69, although direct evidence suggests significant nervousness about possible relative reductions in the external value of the Canadian dollar (whether due to Canadian or foreign action) on several occasions, notably in 1963, 1965 and 1968; and toward the end of the period there was some expectation of a revaluation by Canada. In any case, the average behavior of short-term capital flows continued to be stabilizing, in response to departures of the spot exchange rate from its pegged value.[11] On the other hand, the statistical evidence also suggests that short-term flows were weakly sensitive to changes in Canadian official reserves in a way that was potentially destabilizing. An increase in official reserves in the previous quarter tended, after other forces were allowed for, to be associated with an increased inflow of short-term capital during the current quarter. Furthermore, this relation grew slightly stronger when we adjusted the series of reserves changes for actions taken by the Canadian authorities in 1966-67, under U.S. prodding, to conceal the increase through

purchases of IBRD bonds.[12]   The effect on short-term flows of the movement
of Canadian official reserves thus does seem to reflect the destabilizing
potential of expectations under a fixed exchange rate.

Another capital market affected by the switch to the fixed rate
was that for covered interest arbitrage, via the effect of pegging the rate
on the supply of forward cover.   For a period when an official peg is not
expected to change, one would expect to find the supply of forward cover
more elastic than for the same currency in a period when it fluctuates freely.
This hypothesis requires that the extra risk of speculation in supplying
forward cover translate itself into a shrinkage in the response of the supply
of cover to an increase in the price (i.e. premium over the going spot rate).
We found that the regression coefficient relating the flow of short-term
capital to the forward premium on the Canadian dollar (or the cost of forward
cover - they differ only trivially) approximately tripled in absolute value
between the flexible-rate and fixed-rate periods.[13]   The implied flattening
of the supply schedule for cover can be counted a gain from the removal of
uncertainty under the fixed rate.

Of course, the alleged advantages of a fixed rate in reducing the
uncertainty of international capital transactions ought to reveal themselves
in the capital markets directly.   A rigorous formal test cannot be performed
with the data at hand, but once again the elasticity of capital flows to
interest-rate changes provides a weak test of decreased uncertainty.   If
fixing the exchange rate decreases the risk inherent in international lending,
the elasticities of capital flows in response to interest-rate changes (or,
at least, the absolute values of these responses rates) should increase in
the fixed-rate period over the flexible-rate period.   (Of course, the growth
in the average level of capital formation [in current prices] and in the values
of North American portfolios would tend to produce the same result.)   On the
on the other hand, supporters of flexible rates have often pointed out that
governments regularly interfere with private capital flows in order to defend
their exchange rates - and thus destroy the very certainty for which they

justify pegging the rate in the first place. The argument for fixed exchange
rates, to reduce the uncertainty of international transactions and maximize the
worth of money as a store of value and unit of account, really applies to a
single-currency area against a world of independent currencies, and not to a
comparison of the adjustable peg with the flexible exchange rate. The
theoretical predictions thus conflict on the effects of the fixed rate on
uncertainty. There seems little doubt about the empirical results, however.
The elasticity of portfolio capital flows to changes in the U.S. and Canadian
long-term rates for the flexible-rate period fell in the range of 6.0 to 10.6.
The corresponding calculations for the fixed-rate period give elasticities of
only about 1.0 to 3.0.[14] Furthermore, the statistical reliability of the
relation was greatly reduced. There can be little doubt, if one accepts these
calculations, that the degree of integration in North American capital markets
was reduced in the years after Canada reverted to a fixed exchange rate. A
glance beyond the statistics at the history of the period suggests that this
reduced integration was due to national policies of interference with inter-
national capital flows in the name of defending the system of fixed exchange
rates. Let us consider that interference directly.

Policy Choices With a Fixed Exchange Rate

At least three times in the 1960s, Canada's international capital
markets were specifically affected by measures taken by Canada or the United
States to defend the going set of exchange parities: (1) during the second
half of 1963, the market for portfolio capital was clouded by the proposed
Interest Equalization Tax, which would tax (retroactive to the date of its
proposal) U.S. buyers of foreign bonds, including Canadian if the proposed
exemption of Canada were not confirmed; (2) in the second half of 1964, the
Interest Equalization Tax went into effect but with Canada excepted, and some
catch-up of Canadian borrowing in the U.S. market was noted; (3) at the
beginning of 1968, the President of the United States announced a general
tightening of controls on both long- and short-term capital flows, with Canada's
exemption from these (in March 1968) contingent upon certain obligations being
taken by the Canadian authorities to limit transit trade to Europe in short-term

capital and to convert Canada's reserves accumulation to long-term form.
Quite apart from these measures, and many others of definite but less marked
significance, the whole period was subject to an increasing use of suasion
and "jawbone" policies by both governments, which surely did not make tranquil
the lives of international borrowers and lenders.

We sought to use various statistical tools to shed light on the
incidence of these restrictions. The most direct was to allow by the use
of dummy variables for these periods of special interference. The proposal
of the Interest Equalization Tax apparently lowered the inflow of portfolio
capital to Canada by something over $100 million per quarter in the latter
half of 1963, and Canada's official exemption raised the inflow in the latter
half of 1964 by a slightly smaller amount. Portfolio borrowing abroad faced
increased uncertainty about official interferences from mid-1963 on to 1969,
and the sensitivity of Canadian borrowings to the price of long-term funds
in the U.S. appeared to drop by roughly one-tenth from its previous (1952-61)
level.[15] Flows of short-term capital similarly suffered. In the first
quarter of 1968, the tightened U.S. balance of payments restrictions (and
other factors) apparently lowered the net flow of short-term capital to
Canada by nearly $500 million. The sensitivity of short-term capital flows
to the differential between Canadian and United States interest rates appears
to have been greatly reduced, when we compare either 1968-69 or 1963-69 to
the earlier period.[16] Less firm evidence suggests that the Canadian
short-term interest rate was elevated by the same factors which restricted
international capital flows.[17]

Another indication of the extent of policy-makers' interference in
North American capital markets may lie in the fact that, while capital flows
became less regular in their sensitivity to Canadian and United States interest
rates, the correlation between the two countries' interest rates - especially
short-term -- was even higher in the 1960s than in the 1950s. For the same
reasons that various forms of controls and suasion were being wielded against
capital flows, Canadian monetary authorities may have felt increasingly constrained
to keep their domestic interest rates pegged to those in the United States.

This usage is consistent with a widely accepted theoretical model of policy choices, which suggests that under a fixed exchange rate monetary policy must, broadly speaking, be assigned to deal with external conditions.[18]

Increased Multilateral Capital Mobility

Although the fixed exchange rate and policies associated with it influenced net capital flows to Canada during the 1960s, another influence surely was the expansion of substantial international capital markets to include the major O.E.C.D. countries, after the return to convertibility in 1958. As other countries became likely destinations for capital outflows from the United States, Canadian borrowers lost something of an exclusive market position which they had previously enjoyed. If the O.E.C.D. countries are linked by a general network of interest-sensitive capital flows,[19] net flows to any one country become contingent on disturbances occurring anywhere in the system. The net flow of capital to Canada comes to depend on the Canadian interest rate and a vector of foreign rates - for which the U.S. rate may prove an inadequate proxy. The multilateral character of capital flows is apparent from Canada's balance-of-payments accounts. In 1968 and 1969 more than one-third of Canada's net transactions in long-term securities (including trade in outstanding securities) were with countries other than the United States, whereas this fraction had been quite small before. The data on short-term flows reveal not only large net outflows in the late 1960s, but also that these net flows reflect a balance of large gross flows (e.g., foreign acquisition of short-term Canadian assets, Canadian acquisition of Euro-dollar assets and U.S. certificates of deposit). For these reasons alone, we would expect a reduction in the 1960s in the explanatory power of the variables included in equations such as those presented in Table 2. Yet an analysis which subdivided the categories of capital flows finely might show high and increasing sensitivities to the appropriate yield variables, with these subsegments of the capital market remaining somewhat fragmented as a result of the forces discussed above.

Time did not permit an exploration of these segmented submarkets.

We did, however, try to test the effect of this diversification and
multilateral expansion of international capital markets by simple modifications
of our earlier equations. Specifically, we added variables designed to
capture the extent of competition in U.S. capital markets from other foreign
borrowers. Into our equation explaining the net flow of portfolio capital
during 1963-69 we inserted a measure of United States transactions in foreign
securities other than Canadian. The relation failed to confirm this and,
instead, weakly supported the implication that a portion (one fifth to one-third)
of the typical placement of Canadian net issues on the U.S. market is taken by
non-U.S. lenders.[20] In the case of short-term funds, net flows to Canada
must have been influenced by the rise of many new institutional forms, such as
certificates of deposit in U.S. banks and placements in the Euro-dollar market.
In the flexible-rate period we found it easier to explain net short-term flows
to Canada as an aggregate than by individual types of instruments. The
fragmentation of capital markets in the 1960s, however, due to the combined
effect of rapid institutional change and spreading governmental restrictions,
strongly suggests that individual types of short-term flows might behave
regularly even if the aggregate did not. We experimented only with a single
subdivision of net short-term flows: putting aside trade in outstanding long-
term securities, we divided the remaining flows into net transactions in
Canadian short-term instruments and net transactions in foreign short-term
instruments (including in the latter fluctuations in unrecorded transactions).
We could explain their movements only slightly better than those of the aggregate
net flow: trade in Canadian instruments appears sensitive to the Euro-dollar
interest rate and the cost of forward cover, and the perverse response to the
Canada-U.S. short-term interest differential apparent for the aggregate flow
disappears; transactions in foreign instruments could not be explained (even by
the Euro-dollar rate), except for reflecting the tendency of Canadian long-
term borrowers to keep a substantial portion of the proceeds temporarily in
foreign funds. Probably short-term capital flows in the 1960s could be

explained with greater success by further disaggregation. But the very
failure of the aggregate to behave regularly, as it did in the 1950s,
suggests some fragmentation of short-term capital markets.

Evidence of Adjustment Processes Over Time

In our earlier study we found that past levels of interest rates had
no statistically significant influence on current flows of capital. Some
evidence was, however, consistent with a lagged influence of long-term interest
rates on flows of new and outstanding long-term securities.[21] Since the policy
system of the fixed rate appears overall to have disintegrated North American
capital markets, we might wonder whether it has not also shifted the timing of
responses of capital flows to differences in their yields. A plausible reaction
of lenders and borrowers to increased uncertainty of yields is to wait longer,
after any given shift has occurred, to test its persistence before acting upon
it. Hence we might expect more delay in responses under the fixed rate. We
found this confirmed when we checked the determinants of portfolio capital
flows over the whole period 1952-69. Unlike 1952-61, portfolio flows
appear to be explained somewhat more accurately by interest rates in the
previous quarter than by unlagged rates.[22]

3. Implications of Experience with Fixed Rates

The main conclusions indicated by our tentative and exploratory
statistical analysis of the fixed rate period can be summarized as follows:

a) There was a significant shift in the fixed-rate period of the
underlying relations which we found to determine capital flows into Canada
during the period of the flexible rate (1952-61).

b) Although short-term capital flows tended to reinforce the
stability of the exchange rate during the fixed-rate period, there is some
evidence of their potentially destabilizing tendencies in their response to
recently reported changes in Canada's official reserves. The former stabiliz-
ing tendency of portfolio flows became invisible.

c) Adoption of a fixed rate reduced the degree of capital-market integration in North America, as reflected by the elasticity of response in capital flows to interest-rate changes. This implies that the adoption of the fixed rate increased uncertainty about the expected yields of international capital transactions – these yield alternatives being compounded of interest rates, exchange rate, and various rationing constraints. The result contrasts sharply to the claim sometimes made that fixed rates decrease the risk inherent in international lending.

d) Part of this increased uncertainty may have stemmed from the effect on capital and currency markets of fixing the exchange rate and thus inducing the occasional speculative flurry. Most of it, however, proximately resulted from the policies chosen by the United States and Canada to manage their fixed rates, involving the liberal use of direct interference with capital markets.

e) Clouding our statistical conclusions about the effect of Canada's fixed rate on its linkages with world capital markets is the rise during the 1960s of an increasingly complex multinational capital market, allowing more diverse opportunities for Canadian lenders and providing more competition for Canadian borrowers. These institutional changes and the broadened range of transactions undertaken by Canadian lenders surely improved capital-market efficiency in some respects, but also reduced the predictability of responses to macroeconomic policy.

f) The tentative character and uncertain results of our statistical analysis leave us unwilling to venture firm estimates of the actual leverages of Canada's short-term policy instruments under the fixed rate for comparison with the hypothetical ones estimated in our previous study. This is especially because the total observed changes in the interest sensitivities of long-term and short-term capital flows are probably in opposite directions: down for the former, up for the latter. Monetary policy's leverage on Canada's employment level was possibly even weaker in fact than was indicated by our earlier estimate (Table 1, line 3b): it was certainly decreased by the increased

elasticity of forward cover (a relatively clear change not allowed for in our simulated estimate); and the higher elasticity of short-term flows that has probably resulted from the maturing of the Euro-dollar market may have decreased it, although our computations do not confirm this. Whether the leverage of fiscal policy was strengthened is less certain, because the financing of the resultant change in the government debt could be allowed to affect the long and short ends of the capital market in varying proportions. Given the apparent disruption of long-term markets during the 1960s, changing fiscal policy and financing at the long end would probably entail reactions of GNP smaller than we estimated before (Table 1, lines 1b and 2b). Short financing, which was in fact employed in the latter 1960s, might yield increased leverages. The overriding conclusion of our statistical analysis, however, is that the uncertainty surrounding the estimation of policy leverages was greater in the fixed-rate period than before.

These conclusions suggest that, by comparison with flexible rates, fixed exchange rates are not favourable to stability and certainty in international capital markets - at least for countries with Canada's capabilities for policy management in the economic context of the 1960s. Although fixing the exchange rate is not without its statistically demonstrable advantages (e.g., increasing the elasticity of supply of forward cover), the evidence points strongly, if not decisively, to a reduction in both the sensitivity and reliability of the response of capital flows to the price of loanable funds. This change, in turn, seems hardly consistent with the virtues of financial integration which have been alleged to flow from fixed exchange rates.

The negating of these virtues and the disintegration of capital markets has clearly resulted from the efforts of both Canada and other countries - largely the United States - to maintain some sort of external balance without seriously diverting their standard instruments of internal policy to this end. The reference above to Canada's policy capabilities should not be taken to imply that Canada coped especially badly with the

problems of managing a fixed rate, once it was chosen in 1962. On the
contrary, most of the policy interference with capital markets can be traced
directly or indirectly to policies initiated by the United States. The
major point emerging from this experience, especially when we note as well
the expanding multilateral network of capital flows and its proliferation
of possible sources of disturbance, is that effective policy formation -
certainly any "fine tuning" of external balance - becomes impossible in
practice when the diversity and swiftness of external disturbances increase
so much. When the incidence of disturbances is so great, and the predicta-
bility of the economic system's responses to policy actions so poor, good
policy marksmanship in the political setting of western democracies becomes
in practice impossible. J. E. Meade's argument for flexible exchange rates
as a means of conserving scarce policy instruments appears to be as applicable
now as ever.

Several interesting paradoxes mark the 1960s. The first is that
at the same time that capital market integration in North America was
probably diminishing, capital market integration between North America and the
rest of the world was increasing considerably, especially integration in
short-term markets between North America and Europe. From an analytical
standpoint this means that partial analysis focussing on Canada - U.S.
relationships alone is subject to the important qualification that the broader
structural environment in which adjustments between the U.S. and Canadian
economies occurred was undergoing significant structural shifts. From a
policy viewpoint, this paradox implies that the environment in which it was
necessary to execute Canadian economic policy during the 1960s was subject to
greater uncertainty.

A second paradox arose out of the fragmentation of the international
capital market through a series of administrative measures emanating mainly
from the U.S. To the extent that they were effective, these measures
discriminated against some types of capital flows as compared to others.

Ambiguity about the application of these measures, their possible extension and their effects added considerably to the uncertainty surrounding both private decisions and public policy during this period. This was further enhanced by the potentially destabilizing influence of short-term capital flows on shakily pegged exchange rates. A paradox lies in the contrast between the increasing perfection of short-term capital markets for certain types of instruments (e.g., Euro-dollars) and the increasing imperfections and transactions costs in the total capital market imposed by governmental controls and suasions, which attempted to fence transactors off from particular segments of the international capital market and to keep funds from leaking from one (increasingly perfect) subsegment into another.

The third paradox is that just as these major developments in the international capital market began to evolve in the early 1960s, Canada adopted a fixed exchange rate, thereby further enhancing the uncertainty in the environment in which Canadian policy was framed and, in addition, impairing the ability of the economy to adjust easily and automatically to changing and uncertain external circumstances. In addition, adoption of a fixed rate automatically precluded the use of the exchange rate as an instrument of policy to defend the economy against external perturbations.

In May, 1970 Canada again returned to a flexible rate. Though flexible, the rate has not been left to respond freely to market demands and supplies of foreign exchange as is evident from the substantial increase in official reserves during the past year. There has been considerable official intervention to dampen the degree of exchange rate appreciation.[23] From the standpoint of the optimal policy mix, one would have expected the change to a flexible rate to imply a major concurrent change in stabilization policy strategy to take account of the change in the leverages in the various in-struments of policy because of exchange rate adjustments, as outlined above. During the latter part of the 1960s when Canada was on a fixed rate, stabilization policy relied primarily on monetary policy, aided and abetted after mid-1969 by the moral suasion variant of incomes policy.[24] Fiscal policy, though

modified somewhat, remained fairly inactive in the face of changing economic circumstances.[25]   Since May 1970 and adoption of a semi-free exchange rate, the money supply has continued to increase rapidly.[26]   Fiscal policy remained inert until June 1971 when tax reductions were introduced as part of a series of tax reforms.   Thus, we have a fourth paradox: there is little evidence of a change in stabilization policy strategy to take advantage of the shifts in policy leverage that occurred because of the adoption of a flexible exchange rate.   Executing such a shift, however, may have been deterred by the adoption of a semi-free exchange rate.   The flexibility of the rate may now be more nominal than real; so far, at least, it appears to have amounted to little more than a revaluation of the rate without reaping the advantages of either a fixed or a fully free rate.   Hence added uncertainty surrounds the leverage of policy instruments (and their absolute values may differ for changes in different directions).

F O O T N O T E S

1. Richard E. Caves and Grant L. Reuber, <u>Capital Transfers and Economic Policy: Canada, 1951-1962</u> (Cambridge: Harvard University Press, 1971).

2. This additional work was made possible through financial assistance kindly provided by the Federal Reserve Bank of Boston. We are also indebted to Miss Deborah Driscoll of the Research Department, Federal Reserve Bank of Boston, who helped to assemble data for the period after 1961 and supervised all the computations, and to Miss Pat Skene of The University of Western Ontario, who also helped to dig out additional data and assisted to ensure the consistency of various statistical series.

3. These estimates assume that the authorities sterilize changes in exchange reserves in the sense of not allowing them to feed back on the size of the money supply. To the extent that they fail to sterilize the change in reserves, the change in the money supply will be less than the assumed 1 per cent and the effects will be correspondingly less also.

4. For another example see R. R. Rhomberg, "A Model of the Canadian Economy under Fixed and Fluctuating Exchange Rates", <u>Journal of Political Economy</u>, <u>72</u> (February, 1964), 1-31.

5. For a summary, see Erich Spitäller, "A Survey of Recent Quantitative Studies of Long-Term Capital Movements", <u>IMF Staff Papers</u>, <u>18</u> (March, 1971), 189-217.

6. One reason why we expected that variations in the Canadian demand for funds would dominate international capital flows, especially long-term, was our suspicion that imperfections in capital markets locked a number of Canadian borrowers into either the U.S. or the Canadian market for funds over a relatively wide range of interest-rate differentials between the two countries. This imperfection would cause the capital flow to be related to certain measures of Canadian borrowing activity, even after variations in "market" interest rates were taken into account. This conjecture was subsequently confirmed by E. Duncan Ripley, "Some Determinants of Canadian Municipal and Provincial Bond Flotations in the United States", <u>Review of Economics and Statistics</u>, <u>52</u> (November, 1970), 417-426.

7. Results for the 1952-61 period reported here will differ slightly from those reported in Capital Transfers for two reasons: 1) a different computer program was employed, presumably with different rounding-error characteristics; 2) more important, some statistical series used in the earlier study have since been revised by their compilers, and all revisions have been incorporated in the re-estimated relations. No substantive conclusions set forth in Capital Transfers need to be changed in light of the re-estimated equations, although magnitudes are shifted modestly.

8. The same conclusion would be drawn from the other test statistics - coefficient of determination, Durbin-Watson, F-ratio - which are not reported here.

9. The shifts in equation 2 of Table 2 provide an example. For the period 1952-61 it was possible to secure a relatively good explanation of the movements of the Canadian long-term interest rate without taking price-level expectations into account. If the equation had been designed originally to explain its movement in the 1960s, this force would clearly have demanded inclusion. (Cf. M. Feldstein and O. Eckstein, "The Fundamental Determinants of the Interest Rate", Review of Economics and Statistics, 52 [November, 1970], 363-375.) Hence the equations for the whole period and the 1960s omit a fundamental determinant. At the same time, the average term to maturity of Canadian government debt fell steadily from 1963 to 1969, as the debt was shifted into short-term instruments in order to minimize its service cost. Hence the variable ATM picks up the influence of inflation and price expectations on CL, acquiring a perverse sign and concealing the operation of other forces. (The effect of this policy of reducing ATM is reflected, incidentally, in the steady rise of the Canadian short-term interest rate relative to the long).

10. Norman C. Miller and Marina V. N. Whitman, "A Mean-Variance Analysis of United States Long-Term Portfolio Foreign Investment", <u>Quarterly Journal of Economics</u>, <u>84</u> (May, 1970), 175-196.

11. Because most findings of our analysis of 1963-69 were negative, we chose not to clutter the text with regression equations; the preceding and other positive findings are documented in an appendix. See equation A.5. The statistical significance of this relation, in some formulations, falls a bit below the 5% level. Note the discussion of specification problems with this relation in <u>Capital Transfers</u>, pp. 74-76.

12. See equation A.6. This relation was usually significant at levels between 5% and 10%.

13. Albeit with some decline in the statistical significance of the relation. The difference between the flexible-period and fixed-period coefficients would not be statistically significant. See equations A.4, A.5, and A.6.

14. Cf. <u>Capital Transfers</u>, Table 2.2, and equations A.1 and A.2 below. The meaning of an elasticity in ouflow formulation involves some difficulties, but these should not affect comparisons of its value between the fixed-rate and flexible-rate periods.

15. See equation A.2. The multiplicative shift parameter used to estimate this change was significant at the 10% but not the 5% level. We tested for the corresponding effects of these disturbances on the Canadian long-term interest rate, but the effort was frustrated by more fundamental difficulties in explaining that rate after 1963. See note 9.

16. It is probably impossible, however, to unscramble the effect of these controls from the effect of the rise of the Euro-dollar market as an alternative outlet for U.S. short-term funds; this is considered in the next section. Inspection of Canadian statistics suggests that the irregularity arises mostly from the unrecorded flows, not from recorded transactions in bank balances and treasury bills.

17. We also tried to test the effects of increasing uncertainties and disruptions during the 1960s by employing the Chow test on regressions run for the subperiods 1963-65 and 1966-69. This was not generally

successful because of a lack of meaningful results for the subperiods separately; in some formulations, however, we secured significant results for 1963-65 but not 1966-69.

18. An econometric problem lies behind the inference of the decreased equili-brating role of capital flows, drawn in this paragraph. The increasingly close relation between U.S. and Canadian interest rates worsens the problem of collinearity for those regression equations in which the rates appear separately. However, the inference is also supported by equations in which they are entered only as a differential. See Capital Transfers, pp. 116-118.

19. For recent evidence, see W. H. Branson and R. D. Hill, Jr., "Capital Movements Among Major O.E.C.D. Countries: Some Preliminary Results", Journal of Finance, 26 (May, 1971), 269-286.

20. This relation is often suggested in commentary in official Canadian balance-of-payments publications. The sign and magnitude of this coefficient remained stable as we varied the specifications of the equation, but its degree of significance did not rise above 25%. See equation A.3.

21. See Capital Transfers, Table 6.4, p. 254.

22. See equations A.1, A.2. The occurrence of adjustments over time is one of the issues raised by the portfolio-balance approach to capital movements. It has been frequently confirmed in studies employing a distributed-lag formulation. On statistical grounds, our strong preference is for testing the influence of lagged predetermined variables directly, because 1) the autocorrelation usually present in economic time-series biases the test toward acceptance of the conventional distributed-lag formulation, and 2) theoretical reasoning usually suggests that the response pattern of capital flows will not be the same for disturbances to all the variables determining them.

23. From May 30, 1970 to July 31, 1971, Canada's total official gold and con-vertible foreign currency reserves increased 19 per cent. It is interesting to note, for purposes of comparison, that during the 14 months prior to May 1970, when Canada was on a fixed rate, reserves increased 23 per cent.

24. From the beginning of 1968 to the beginning of 1970; the percentage change in the money supply, on a quarterly basis, varied within a range of 18.4 to minus 2.7 per cent (at annual rates).

25. The 1968-69 budget, for example, included a 3 per cent temporary income tax surtax on individuals and corporations. The 1970-71 budget did not include any tax changes.

26. From the first quarter, 1970 to the second quarter 1971, the percentage change in the money supply on a quarterly basis varied within a range of 7.6 and 20 per cent (at annual rates).

A P P E N D I X

Here we present selected results of our statistical analysis of the 1963-69 period and of the fixed and flexible-rate periods together. The following regression equations illustrate the bases for the positive conclusions about the fixed-rate period set forth in the second section of this paper. Constant terms are omitted, and seasonal dummies are reproduced only when significant at the 10 per cent level or more. Symbols are as defined in Table 2; the definitions of additional variables are given as they appear. For test statistics we show the coefficient of determination, corrected for degrees of freedom, and the Durbin-Watson statistic.

We consider first the determinants of net flows of portfolio capital to Canada (excluding throughout trade in outstanding securities, which for the flexible-rate period we found should be treated as a short-term flow). Either for the whole period (1952I - 1961II and 1963I - 1969IV) or for the fixed-rate period (1963I - 1969IV), lagging the interest-rate variables by one quarter improves the t values of the coefficients without significantly changing their magnitudes (in most specifications). For the whole period:

$$PC = 426 \ CL_{-1} - 435 \ USL_{-1} - 288 \ CTS + 0.235 \ NNS + 56 \ Q1$$
$$(2.69) \qquad (2.29) \qquad (3.24) \qquad (4.88) \qquad (1.75)$$

$$RSQC = 0.643$$
$$DW = 1.559 \qquad (A.1)$$

The reduced sensitivity of capital flows to interest rates was tested by means of multiplicative dummy variables. Since our analysis concentrates on Canadian borrowers, the reduced sensitivity would presumably be revealed in their reactions to changes in the United States long-term interest rate. Setting the dummy variable D = 1 for 1963III through 1969IV and at zero before then, we secure for 1952-69:

$$PC = 430 \text{ CL} - 350 \text{ USL} + 84 \text{ D.USL} - 221 \text{ CTS} + 0.043 \text{ NNSC} + 87 \text{ Q1}$$
$$(1.99) \quad (1.19) \quad (1.73) \quad (2.19) \quad (0.64) \quad (2.35)$$

$$\text{RSQC} = 0.501$$
$$\text{DW} = 1.835 \qquad \text{(A.2)}$$

We tested for the effects of increased competition in the
United States for Canadian long-term borrowers by adding a measure of
United States transactions in foreign long-term securities other than
Canadian, taken from the U.S. balance of payments statistics. This variable
(USFS, defined so that an outflow from the U.S. is negative) took a sign
inconsistent with the hypothesis and consistent instead with the hypothesis
that a portion of Canadian new issues in the U.S. are purchased by non-U.S.
lenders. (It also destabilized the magnitudes of other coefficients.) For
1963-69:

$$PC = 939 \text{ CL}_{-1} - 1019 \text{ USL}_{-1} - 0.273 \text{ USFS} - 958 \text{ CTS} + 0.019 \text{ NNSC}$$
$$(2.73) \qquad (2.44) \qquad (1.09) \qquad (2.37) \qquad (0.16)$$

$$\text{RSQC} = 0.457$$
$$\text{DW} = 2.088 \qquad \text{(A.3)}$$

The increased elasticity of the speculative supply of forward cover
can be shown by the decreased sensitivity (1963-69) of the forward premium
on the Canadian dollar to the determinants of the demand for forward cover
(cf. _Captial Transfers_, p. 135, eq. 3.25):

$$FP = -0.0106 \text{ DS} + 0.00003 \text{ BMTUS} + 0.0000002 \text{ GNP} - 0.00053 \text{ PCMS}$$
$$(4.27) \qquad (0.98) \qquad (2.20) \qquad (3.45)$$

$$- 0.0011 \text{ QI}$$
$$(1.91)$$

$$\text{RSQC} = 0.431$$
$$\text{DW} = 1.383 \qquad \text{(A.4)}$$

The same conclusion can be drawn from the increased size of the regression coefficient of short-term capital flows on FP in equations A.5 and A.6.

We tested the effects of speculation regarding the exchange rate on short-term capital flows during 1963-69 by means of two variables. The deviation of the spot exchange rate from its official par value (DRSP) appears in equation A.5, where it is significant at the 10 per cent level and implies that speculative flows were on balance stabilizing. In equation A.6 we entered changes in official reserves, lagged one quarter, and adjusted for purchases of IBRD bonds undertaken by the Canadian government in 1966-67 to conceal the increase in its reserves (ORM_{-1}). This variable worked slightly better than the unadjusted series for reserves changes, and both suggest that the response of short-term flows to reported (last-quarter) changes in Canada's official reserves was destabilizing. Both equations also include the differential between the Canadian short-term interest rate and the Euro-dollar interest rate (DRS); it is always correctly signed and usually significant, as in equation A.6.

$$STK = -1250 \text{ DS} + 77866 \text{ FP} - 0.215 \text{ BMTUS} + 610 \text{ DRS} - 27210 \text{ DRSP}$$
$$\quad\quad (2.49) \quad\quad (1.38) \quad\quad\quad (0.48) \quad\quad\quad (1.92) \quad\quad\quad (1.79)$$

$$RSQC = 0.640$$
$$DW = 2.436 \quad\quad (A.5)$$

$$STK = -1063 \text{ DS} + 112243 \text{ FP} - 0.404 \text{ BMTUS} + 786 \text{ DRS} + 0.390 \text{ ORM}_{-1}$$
$$\quad\quad (2.22) \quad\quad\quad (2.16) \quad\quad\quad (0.89) \quad\quad\quad (2.61) \quad\quad\quad (1.76)$$

$$- 185 \text{ Q1} - 413 \text{ Q3}$$
$$\quad (1.79) \quad\quad (4.38)$$

$$RSQC = 0.650$$
$$DW = 2.275 \quad\quad (A.6)$$

Note the significant and perverse relation between STK and the differential between Canadian and U.S. short-term interest rates. The differential on

Treasury bill rates widened in favor of Canada from 1967 on, but Canada experienced a substantial net short-term outflow during 1967-69.

It seems clear that different interest rates and types of short-term capital flows did not move together in the 1960s, as they did in the 1950s. Time allowed us only one test of the effects of disaggregating STK. We formed a series (SKC) representing recorded transactions in Canadian short-term instruments - Treasury bills, bank deposits, commerical paper - and another (SKF) aggregating recorded transactions in foreign instruments (mainly bank deposits) and the balancing item in the Canadian payments statistics, which we thought might reflect Canadian acquisitions of foreign short-term instruments. SKC was regressed in equation A.7 on variables which have been defined previously. The regression for SKF (A.8) includes unlagged portfolio capital flows (PC), to test the hypothesis (confirmed in our earlier work) that Canadian long-term borrowers in the short term leave a significant portion of their proceeds in foreign currency.

$$SKC = -174 \ DS + 357 \ DRS + 60517 \ FP + 0.017 \ GNP - 0.038 \ BMTUS$$
$$ (0.82) \quad (1.68) \quad (2.32) \quad\quad (1.68) \quad\quad (0.22)$$

$$- \ 0.055 \ ORM_{-1} - 107 \ Q2 - 181 \ Q3$$
$$(0.66) \phantom{ORM_{-1}} (2.54) \quad (4.86)$$

$$RSQC = 0.483$$
$$DW = 2.005 \qquad (A.7)$$

$$SKF = 283 \ DRS + 44915 \ FP - 0.829 \ PC - 15110 \ DRSP_{-1}$$
$$ (0.73) \quad\quad (0.72) \quad\quad (2.52) \quad\quad (0.79)$$

$$RSQC = 0.375$$
$$DW = 1.669 \qquad (A.8)$$