Financial Innovation in Canada

Many of the same factors leading to financial innovation in this country during the 1970s—such as high interest rates and rapid inflation—have also played an important part in Canadian financial innovation. Given the distinctive financial structure of each country, however, the innovations have not taken necessarily the same form. For the United States the result has been the rapid development of highly liquid nondeposit assets both inside and outside the banking system, such as money market mutual funds and repurchase agreements (RPs). In Canada, however, financial innovation has been contained largely within the banking structure Although the channels through which innovations developed in Canada and the United States have differed, in both countries the result has been that consumers and corporations are managing their transactions balances much more efficiently and are economizing on their holdings of this money.

This consequence of recent financial innovation has created difficulties for the conduct of monetary policy in Canada, just as it has in the United States. Since 1975 the Bank of Canada has placed great importance on controlling, through monetary targeting, the growth of the narrow money stock—M-1—defined as currency plus demand deposits at chartered (commercial) banks. Financial innovation can cause problems for a monetary targeting strategy, however, because it is difficult to assess its impact on M-1 and to adjust appropriately the targeted growth rate over time. Consequently, the Bank of Canada has expressed some uneasiness about "the confidence that one can have in the stability of the relationship between M-1, national expenditures, and interest rates" and has cautioned that, given the rapid evolution of the banking system, "one cannot put uncritical reliance on this measure of the money supply as a guide to monetary policy".[1]

The most important Canadian banking innovations affecting corporate and household money holdings during the past few years are described in the following sections. Given this rapidly changing financial picture, the final section examines the impact of these financial innovations on the demand for money

Corporate sector

A large part of the explanation for the slower growth of transactions balances relative to economic activity can be found in the changing banking practices of the corporate sector. Since the last comprehensive Bank Act revision in 1967, there has been a significant redistribution in corporate banking assets.[2] The proportion of nonpersonal deposits held as interest-bearing

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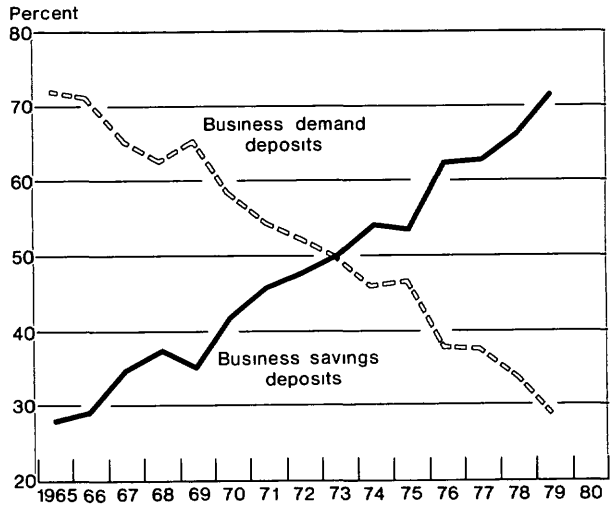
[1] Bank of Canada *Annual Report* (1979), page 25

[2] In Canada a comprehensive review of banking legislation is conducted roughly every ten years The last review took place in 1967, and a new Bank Act has been pending for over three years

Chart 1

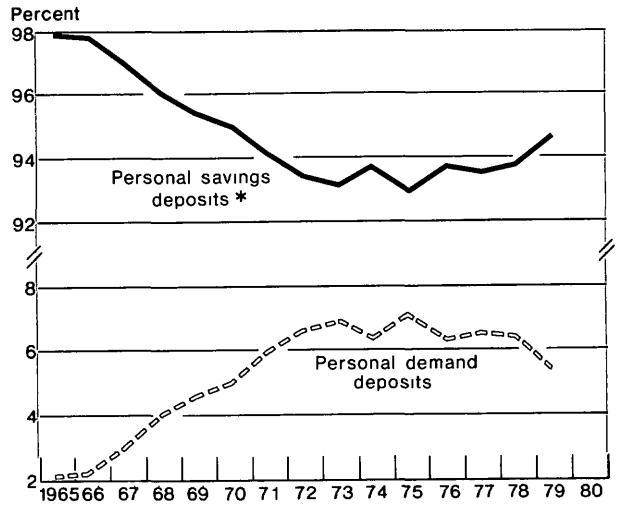
Distribution of Business Deposits at Canadian Chartered Banks



Source Bank of Canada Review

Chart 2

Distribution of Personal Deposits at Canadian Chartered Banks



*Both checkable and noncheckable deposits, including daily-interest savings accounts

Source Bank of Canada Review

Chart 3

Velocity of Canadian Monetary Aggregates

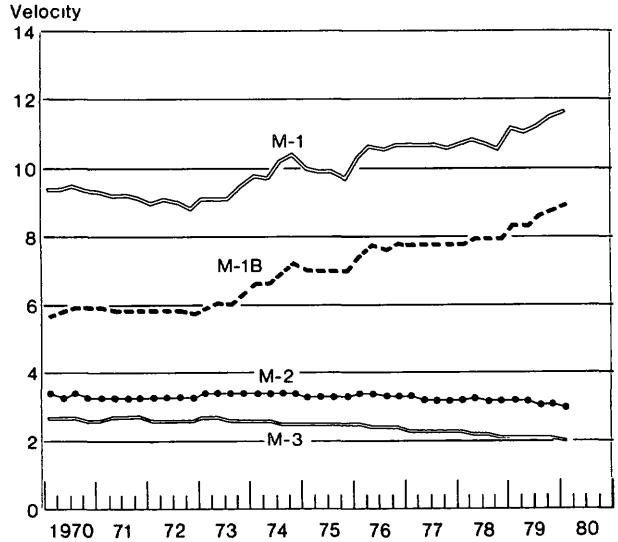
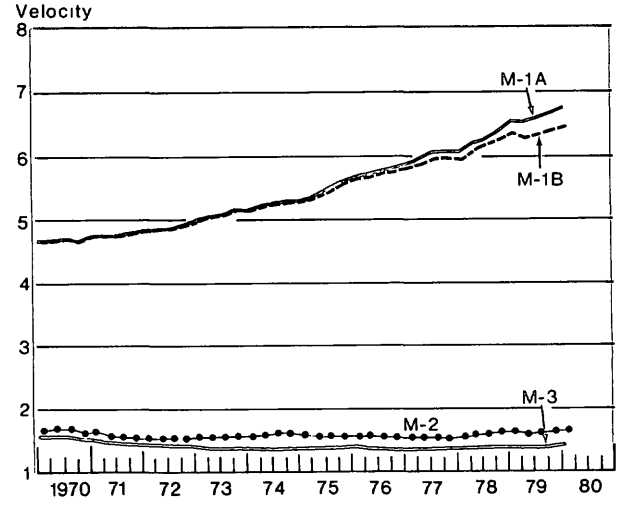


Chart 4

Velocity of United States Monetary Aggregates



assets increased from about 35 percent in 1967 to more than 70 percent last year, while the proportion held as demand deposits decreased from 65 percent to 29 percent (Chart 1). The reason for this dramatic change in the composition of corporate deposit holdings can be found largely in the 1967 Bank Act revision. Prior to the last Bank Act, Canadian chartered banks did not compete aggressively for corporate deposits. Although no legal interest rate ceiling existed on deposits, the banks were hindered from offering a competitive interest rate by a 6 percent legal ceiling on bank lending. They were also discouraged by a relatively high 8 percent reserve requirement on both demand and savings deposits.

The 1967 Bank Act eliminated the interest rate ceiling on lending and lowered to 4 percent the reserve requirement for savings deposits, while raising the demand deposit requirement to 12 percent. Also, the remaining restrictions on residential mortgage lending by the chartered banks were eased. These legislative changes gave the chartered banks incentive to solicit actively large blocks of short-term corporate funds and to channel new and existing deposits into interest-earning accounts.[3]

During the last five years the increased availability of cash management techniques in Canada has encouraged corporations to economize further on their noninterest-earning deposits. Cash management in the Canadian context takes the form of bank consolidation of dispersed corporate funds into a centralized concentration account each day. Typically, the corporate treasurer receives a report of the company's consolidated balance on the morning after deposits are made The treasurer then has the option of placing the funds in a bank deposit instrument, of investing in the money market, or of paying down bank loans. Demand accounts can thus be maintained with a zero or near-zero balance

The impetus for developing these cash concentration accounts first came from the Canadian subsidiaries of United States transnational corporations, whose parents had been pressing for similar services in their home market During the last half dozen years, concentration accounts in Canada have become widespread in the wake of protracted sharp increases in interest rates.

[3] The legislative environment remained relatively unrestricted during the 1970s with the exception of a period between mid-1972 and early 1975 when the so-called "Winnipeg Agreement" was in effect During this period the Canadian Finance Minister and the chartered banks agreed that an interest rate ceiling of 5½ percent (which was raised on subsequent occasions) would be applied to chartered bank term deposits, with maturities of less than one year, of Can $100,000 or more

Coincident with the rise in interest rates were important breakthroughs in computer technology. These computer advances made the concentration of dispersed accounts economically feasible for the banks. Also, the oligopolistic structure of Canadian banking, which is comprised of five major banks, each with a nationwide network of branches, is ideally suited for the provision of these services.

Several of the chartered banks have special commercial deposit accounts for their corporate cash management customers with minimum balances of Can $100,000 or more. These accounts are designed to provide an interest-bearing instrument for automatic investment of funds from concentration accounts. The interest rate paid on these special savings accounts is related to the prime rate and thirty-day certificate of deposit (CD) rate and is computed on a combination of the minimum and average monthly balance in the account.

In contrast to the United States, Canada does not prohibit the issue of CDs with less than a thirty-day maturity (CDs frequently are contracted for as short as one day) [4] Furthermore, as noted earlier, Canada does not have an interest rate ceiling on such deposits. As a result, interest rates for deposits at banks are fully competitive with money market alternatives Consequently, Canada has seen little, if any, growth of a market for RPs—a mechanism which in the United States developed largely in response to regulatory constraints

Over recent years, cash management techniques in Canada have spread to progressively smaller businesses What is important to the Bank of Canada's future targeting strategy is whether the innovations will continue to draw in smaller accounts over time, or whether they have already worked through the financial system, so that all customers who would benefit from these new arrangements are now included.

Household sector

The distribution of household banking assets between demand deposit accounts and savings accounts presents a very different picture from the business sector. At the time of the last Bank Act in 1967, only 3 percent of consumer accounts was held in noninterest-bearing checking accounts, so there was not much scope for household economizing on these types of transactions balances. Part of the reason why so small a percentage of total consumer banking funds was held as demand deposits is that Canadian consumers could also place their assets in a bank account which was both check-

[4] The Monetary Control Act of 1980, however, has shortened the minimum maturity for time deposits in the United States from the present thirty days to fourteen days

Box I: United States and Canadian Definitions of the Monetary Aggregates

Canada

M-1 . . . Currency plus demand deposits at chartered banks.

M-1B . . . M-1 plus personal and nonpersonal checkable interest-bearing Canadian dollar deposits at chartered banks.

M-2 . . . M-1B plus Canadian dollar personal noncheckable and fixed-term deposits at chartered banks and nonpersonal noncheckable savings deposits at chartered banks.

M-3 . . . M-2 plus Canadian dollar nonpersonal fixed-term deposits and bearer term notes at chartered banks and foreign currency deposits of Canadian residents booked at chartered banks in Canada.

*ATS = Automatic transfer account,
NOW = Negotiable order of withdrawal account,
RPs = Repurchase agreements

United States

M-1A . . . Currency plus demand deposits at commercial banks.

M-1B . . . M-1A plus NOW and ATS accounts* at banks and thrift institutions, credit union share draft accounts, and demand deposits at mutual savings banks.

M-2 . . . M-1B plus savings and small-denomination time deposits at all depository institutions, overnight RPs* at commercial banks, overnight Eurodollars held by United States residents other than banks at Caribbean branches of member banks, and money market mutual fund shares.

M-3 . . . M-2 plus large-denomination time deposits at all depository institutions, and term RPs at commercial banks and savings and loan associations.

L . . . M-3 plus other liquid assets such as term Eurodollars held by United States residents other than banks, bankers' acceptances, commercial paper, Treasury bills and other liquid Treasury securities, and United States savings bonds.

Box II: Foreign Currency Deposits in Canada

Foreign currency deposits of Canadian residents booked at the chartered banks in Canada, which are included in M-3, have no equivalent in the United States monetary definitions. Their importance in Canada reflects that country's close financial and commercial ties to the United States. Booked-in-Canada foreign currency deposits as a proportion of M-3 increased from 3.5 percent at the end of 1972 to 7.7 percent at the end of 1979. About 95 percent of these deposits is denominated in United States dollars, but no information is available on the term composition.

Resident deposits of foreign currency funds booked in Canada have come to play an important role as supplements to Canadian dollar-denominated deposits. In periods of monetary restrictiveness, these foreign-denominated deposits can afford the banks an additional source of finance for adjusting to pressure on their domestic cash and liquidity position. Monetary management is also complicated in periods of currency weakness by residents' use of unhedged foreign currency deposits for speculation on further depreciation of the Canadian dollar. In the pending Bank Act revision the government proposed for the first time a reserve requirement of 3 percent on booked-in-Canada foreign currency deposits of Canadian residents.

The monetary aggregates do not include the foreign currency deposits of Canadian residents booked outside Canada. These deposits are not thought to be significant. With the new reserve requirement on booked-in-Canada foreign currency deposits, however, there may be incentive for the chartered banks to transfer business to offshore centers, and the importance of foreign currency deposits booked outside Canada could thus increase.

able and interest bearing. This checkable savings account paid a nonmarket-related fixed-interest rate of 3 percent and bore some similarity to the negotiable order of withdrawal (NOW) account in the United States.

As in the business sector, practices introduced after the 1967 Bank Act revision played an important role in determining the way consumers held their banking assets during the last decade. Legislative changes in the 1967 Bank Act, which eliminated the lending ceiling and changed the reserve requirement, encouraged the chartered banks to introduce a new, noncheckable savings account paying a market-related interest rate.

Over the next few years the banks also introduced a number of practices to discourage consumer use of the NOW-like checkable savings account by making it less convenient to use than demand deposits. Many banks thought at that time it would be more efficient to have a two-account system, in which a part of the funds was held as demand deposits and a portion kept in the recently introduced noncheckable savings account. Thus, deposits held in checkable savings account form actually declined for several years after the 1967 Bank Act and then grew very slowly during the 1970s

Overall, the proportion of personal banking deposits held in savings accounts decreased in the years immediately following the 1967 Bank Act. A sharp fall in checkable savings accounts more than offset the movement into the new noncheckable savings accounts. The proportion held as demand deposits increased in this initial period. Over most of the 1970s, however, the distribution of personal deposits at Canadian chartered banks remained relatively stable (Chart 2).

Last year, though, when interest rates rose to historically high levels, the proportion of personal banking funds held in demand deposits declined, as consumers tended to economize on noninterest-bearing assets. During this period of very high interest rates, consumers were able to earn a market rate of return on their banking funds because there was no interest rate ceiling on personal savings accounts in Canada.

Recent innovations in banking practice could make these shifts in funds even more responsive to movements in interest rates. One new practice concerns the computation of interest on the minimum daily balance in savings accounts An important nonprice barrier to mobility between interest- and noninterest-bearing accounts in the past was the chartered banks' practice of calculating interest for personal savings accounts on the basis of the minimum amount of funds in the account each month

The Canadian government had attempted unsuccessfully on two earlier occasions during the 1970s to legislate a change in this practice. The banks argued, however, that daily-interest payment was prohibitively expensive, given their nationwide branch banking system, as long as the majority of their branches did not have computer access. In the meantime, two of the smaller chartered banks and several of the trust companies and credit unions had initiated daily-interest payment accounts. Finally, in August and September 1979, with the banks well on their way to a fully computerized network, all five of the large chartered banks introduced daily-interest noncheckable savings accounts Interest on these accounts is ¼ to ¾ percent below interest paid on minimum monthly balance accounts.

The introduction of daily-interest savings accounts can influence the distribution of personal bank deposits in two ways: (1) funds can be shifted from other interest-bearing savings accounts into daily-interest accounts and (2) individuals can economize on demand deposits by switching funds into daily-interest accounts. It is the latter course which may cause difficulties for a targeting strategy based upon the narrow money stock

One major factor presently hindering movement between demand deposit accounts and daily-interest savings accounts is a large fee charged by three of the chartered banks after more than one or two monthly withdrawals from the savings account. The fee ranges from Can.$0 50 to Can.$1.00 for each additional withdrawal To some extent, individuals may begin to avoid the fee by using credit extended through charge cards instead of drawing down savings account balances. The monthly charge card payment could then be met by a single transfer of funds from a daily-interest savings account to a demand deposit account.

Another recent innovation in the household sector is an improved version of the checkable savings account, introduced by two of the major banks in the spring of this year. Like the existing checkable savings account, this hybrid account pays a fixed 3 percent interest rate. It represents an improvement over the old version, however, because interest is computed daily, and free checking is available with a small minimum balance. Deposits in these new accounts are included in personal savings deposits and are subject to a lower reserve requirement than demand deposits. If this innovation spreads to other chartered banks, it could become a competitor with demand deposits for personal transactions balances.

A closer look at the Canadian monetary aggregates

The Canadian definitions of the monetary aggregates, although generally similar to the United States mone-

tary measures, have certain distinctive features (Box I). The Canadians in their money stock definitions include only deposits at the chartered banks, while the United States monetary aggregates now include, not only deposits at commercial banks as well as thrift institutions, but also nondeposit instruments, such as money market mutual funds and commercial bank RPs[5] Another important distinction is that the broadest Canadian monetary aggregate—M-3—includes foreign currency deposits of Canadian residents, booked at the chartered banks in Canada (Box II) There is no counterpart to these deposits in the United States financial structure.

To highlight the different growth patterns over the last decade of the Canadian monetary aggregates relative to gross national product (GNP), the velocity of each aggregate is illustrated in Chart 3. The velocities of the narrow Canadian money measures—M-1 and M-1B—have tended to rise over the time period. This is in marked contrast to the broader aggregates which include savings and term deposits The velocities of these money measures—M-2 and M-3—have been comparatively constant over the last decade

The velocity movements of the United States monetary aggregates (Chart 4) are very similar to those of Canada. The velocities of M-1A and M-1B, which are meant to comprise transactions balances, exhibited a rising trend over the 1970s, while movements in the velocities of broader aggregates—M-2 and M-3—like their Canadian counterparts remained relatively constant.

These velocity patterns suggest that over the 1970s the Canadian and United States banking public desired to hold an increasingly larger proportion of their financial assets in interest-earning instruments and had economized on their transactions balances. The sharp increases in the general level of inflation and interest rates during the 1970s were important factors behind the velocity growth patterns. When the cost of holding noninterest-bearing transactions balances rose, the public tended to economize on its demand deposits relative to the level of transactions These balances were turned over more quickly to maximize holdings of interest-bearing instruments.

[5] The most important deposit-taking institutions in Canada, in addition to the chartered banks, are trust companies, mortgage loan companies, credit unions, and caisses populaires In 1979, these nonbank institutions accounted for 19 percent of all checkable deposits (interest and noninterest bearing), while in 1975 their share of transactions and quasi-transactions balances was 17 percent

Despite their relative importance, these near-bank deposits are not, as noted above, included in the Canadian definitions of the monetary aggregates An important technical problem with doing so is that data for nonbank institutions are reported only monthly or quarterly, as opposed to the weekly reporting procedure for the liabilities of federally regulated chartered banks

The growth pattern of the narrow money stock—M-1—is of particular interest to the Bank of Canada because it has set its monetary objectives in terms of this aggregate. The authorities decided to focus exclusively on M-1 since earlier research suggested that this money measure was best suited to Bank of Canada monetary control through adjustments in the general level of short-term interest rates.

During the mid-1970s, in both Canada and the United States, there was a decided slowing for a period in the growth of their respective narrow money stocks, relative to what would be expected from past relationships with aggregate income and interest rates. Corporate banking innovations, in the form of improved cash management techniques, appear to have been important for both countries in the public's changing pattern of money holdings. According to the Bank of Canada: "In the course of 1976 and 1977 there was a considerable acceleration for a while in the rate at which banks' larger customers took advantage of new facilities provided by the banks to manage their affairs satisfactorily with lesser current account balances relative to their transactions than they had previously needed "[6]

In the United States a similar slowing in the growth of the narrow money supply had been evident for some time. The Federal Reserve Board staff describes how "In the period encompassing 1975 and 1976 the expanding use of cash management techniques was largely responsible for the paring of transactions balances relative to GNP—particularly by large businesses—and for the corresponding jump in M-1 velocity."[7]

Some rough estimates of the impact these innovations have had in the United States and Canada can be made by estimating a conventional money demand equation for each country and by calculating the out-of-sample prediction errors for the periods during which the innovations occurred. The cumulative out-of-sample errors in projecting the narrow money stock for each country as a percentage of actual levels are illustrated in Box III After allowing for the different timing in the widespread adoption of the innovations, the pattern is very similar for the two countries. In each case, the errors in predicting quarterly growth rates tended to cumulate very quickly during the initial periods. As the new practices worked through the financial systems, however, the rate of increase in the percentage errors slowed. At the end of the two years following the widespread adoption of cash manage-

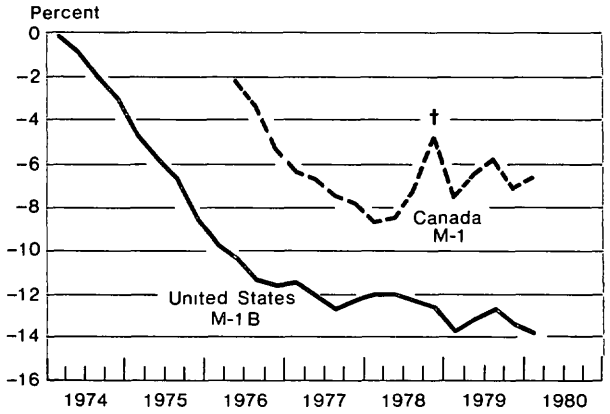
[6] Bank of Canada *Annual Report* (1979), page 24

[7] "A Proposal for Redefining the Monetary Aggregates", *Federal Reserve Bulletin* (January 1979), page 21

Box III: Comparison of Canadian and United States Money Demand Equations

Chart 5

Out-of-Sample Forecasting Errors as a Percentage of Actual Levels *



* Out-of-sample forecasting errors for the two countries are shown for different periods because widespread usage of cash management techniques in Canada occurred somewhat later than in the United States

† Postal strike

The estimated parameters of the money demand equations used to make these forecasts are shown to the right (t statistics are in parentheses beneath the coefficients).

* The disruption in the flow of payments during the Canadian postal strikes (in the spring of 1974 and last quarter of 1975) tended to inflate the level of demand deposits since checks sent through the mail were not delivered The resolution of the strikes was followed by a sharp downward adjustment in the level of demand deposits as previously undelivered checks were cleared Dummy variables were included for the postal strike quarter and the quarter immediately after the strike to account for these temporary interruptions in payments patterns

Canada:

$$M_t = \underset{(4.37)}{-1.62} + \underset{(13.63)}{0.792}M_{t-1} - \underset{(6.73)}{0.046}FP_t + \underset{(5\ 15)}{0.184}Y_t + \underset{(3.98)}{0\ 038}DUM1 - \underset{(2\ 68)}{0.026}DUM2$$

where:

- P_t: GNP price deflator
- M_t: ln ($Money_t/P_t$)
- M_{t-1}: ln ($Money_{t-1}/P_t$)
- FP_t: ln (Finance paper $rate_t$)
- Y_t: ln (GNP_t/P_t)
- DUM1: Postal strike dummy variable set equal to 1 for 1974-Q2 and 1975-Q4, zero otherwise*
- DUM2: Quarter after postal strike dummy variable set equal to 1 for 1974-Q3 and 1976-Q1, zero otherwise*

Estimation period: 1956-Q2 to 1976-Q1

United States:

$$M_t = \underset{(1.62)}{0.550} + \underset{(6.85)}{0.708}M_{t-1} - \underset{(3.24)}{0.011}R_t - \underset{(1.44)}{0\ 021}D_t + \underset{(4.11)}{0.157}Y_t$$

where:

- P_t: GNP price deflator
- M_t: ln ($Money_t/P_t$)
- M_{t-1}: ln ($Money_{t-1}/P_t$)
- R_t: ln (Commercial paper $rate_t$)
- D_t: ln (Effective passbook $rate_t$)
- Y_t: ln (GNP_t/P_t)

Estimation period: 1959-Q2 to 1973-Q4

(The United States equation was corrected for first order auto-correlation with $\rho = 0.650$.) The errors are calculated by subtracting the predicted values from the actual values without any correction for past errors

ment techniques, there was an 8.5 percent cumulative overestimation in the equation for the United States and a 7.9 percent overestimation for Canada.

The recent innovations in the household banking sector are probably too new to have worked through the banking system. Therefore it is still too early to evaluate fully the impact of these innovations on the growth of M-1 in Canada. The Bank of Canada said in its latest *Annual Report,* however, that so far the indications are that the effect is not large.[8] The Bank does, nonetheless, consider the increasing usage of the daily-interest savings account significant enough to have cited the innovation as one explanation for the relatively slow growth of M-1 during the second

[8] Bank of Canada *Annual Report* (1979), page 25

quarter of 1980.[9] No action has been taken, however, to adjust the targets for M-1 because of this development.

Conclusion

Under the stimulus of rising inflation and interest rates, important financial innovations in the United States and Canada during the last decade have altered the way the public holds its monetary assets These changing practices have implications for the conduct of monetary policy because they can make the definition and setting of monetary growth targets more difficult.

In the United States the regulatory environment for banking has been relatively more restrictive than in Canada Innovation in this country thus led, in some part, to the development of new financial instruments less subject to regulations Given the impetus of rising interest rates, the public found new nondeposit assets to manage their transactions balances more efficiently. The Federal Reserve's redefinitions of the monetary aggregates in February was partly a response to these changing practices. With the implementation of the Monetary Control Act over the next several years, some of the restrictions on the banking system will be eased.

In Canada the regulatory environment for the chartered banks' deposit-gathering activities has remained relatively constant and unrestrictive through most of the period since the 1967 Bank Act. The pending Bank Act revision largely continues this approach. Because bank deposit interest rates in Canada are fully competitive with other market alternatives, there has not been the same stimulus as in this country for investors to place funds outside the banking system. Recent bank innovation in Canada, in fact, particularly for the household sector, has been more the consequence of advances in computer technology which made certain practices feasible for the Canadian system of nationwide branch banking

The Bank of Canada, while expressing caution, remains committed to its current monetary control strategy and the existing definitions of the money supply. The monetary authorities will naturally have to monitor these recent banking innovations, and others which may follow, to evaluate their impact on the Canadian public's demand for transactions balances over the months to come.

Laurie Landy

[9] Bank of Canada *Review* (June 1980), page 9