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Implementation of Monetary Policy in Canada with Same-Day Settlement: Issues and alternatives

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ABSTRACT

The move to an electronic large value transfer system (LVTS) with same-day settlement will lead to much more certainty in the settlement positions of direct clearers at the Bank of Canada than is presently the case. Therefore the monetary policy operating systems that will be used with LVTS may have some fundamental differences from the existing system. This paper examines the two major alternative systems that were mentioned in the Bank of Canada's Discussion Paper *Implementation of Monetary Policy in the Absence of Reserve Requirements* (1987). The first of these systems is built around a borrowed funds schedule, which has some similarities to a system currently in use in Sweden. The second system involves securities sales to (and purchases from) the Bank of Canada, and is similar to the system currently in use in the United Kingdom. Other systems are also briefly reviewed.

RÉSUMÉ

Le passage à un système de transfert de paiements de gros montants avec règlement le jour même permettra aux adhérents de prévoir avec une plus grande certitude que ce n'est actuellement le cas leurs soldes de règlement à la Banque du Canada. Par conséquent, il se peut que les moyens d'action de la politique monétaire devant coexister avec un tel système diffèrent fondamentalement des mécanismes actuels. Les auteurs de la présente étude examinent les deux principaux mécanismes décrits dans le document de travail publié par la Banque du Canada en 1987 sous le titre de *La conduite de la politique monétaire dans un système sans réserves obligatoires*. Le premier reposerait sur un programme d'emprunts de fonds auprès de la banque centrale et s'apparente au système qui est appliqué en Suède. Le second mécanisme comporte des cessions (ou des achats) de titres à la Banque du Canada et ressemble au système en usage au Royaume-Uni. D'autres approches sont aussi exposées brièvement.

IMPLEMENTATION OF MONETARY POLICY IN CANADA WITH SAME-DAY SETTLEMENT: Issues and Alternatives

1 INTRODUCTION

In the 1990s there are likely to be two major institutional changes that will affect the implementation of monetary policy: the introduction of zero required reserves and the move to an electronic large-value transfer system (LVTS) with same-day settlement. Although the Bank of Canada has proposed changes to the system that it uses to implement monetary policy with the move to zero required reserves (Bank of Canada, 1991 and Longworth, 1989), policy implementation will, as it does now, depend heavily on the uncertainty of final settlement positions in the clearing system. On the other hand, the move to LVTS with same-day settlement will lead to much more certainty in the settlement positions and therefore possibly to systems of policy implementation that may have some fundamental differences from the existing system. It is in this light that we approach the issues surrounding the implementation of monetary policy in Canada in a system with same-day settlement. The two major alternative methods of policy implementation that were mentioned in *Implementation of Monetary Policy in the Absence of Reserve Requirements* (Bank of Canada, 1987) are examined in some detail.

The next section of this paper briefly lays out:

(i) the reasons why one would want to have an electronic large-value transfer system with same-day settlement;

(ii) one possible scenario for the operation of the LVTS; and

(iii) the institutional arrangements that will ensure the Bank of Canada's continued ability to influence the course of short-term interest rates.

Section 3 of the paper sets forth two major alternatives for the implementation of monetary policy with same-day settlement:

(i) a borrowed funds schedule (which has some similarities to a system currently in use in Sweden); and

(ii) a system of security sales to (and purchases from) the Bank of Canada (which has similarities to the system currently in use in the United Kingdom).

The last part of this section briefly examines a taxonomy of other methods of policy implementation used in other industrial countries and that would also serve as possible models for Canada.

Our concluding section (4) briefly compares and contrasts some of the features of the major alternatives for policy implementation and discusses some related policy issues, such as settlement for securities under the Canadian Depository for Securities. Our conclusion is that both major alternatives could work effectively in Canada.

2 A LARGE-VALUE TRANSFER SYSTEM WITH SAME-DAY SETTLEMENT

2.1 Reasons for a Large-Value Transfer System

The major reasons for wanting a large-value transfer system (LVTS) with same-day settlement are: (a) the potential reductions in transactions costs for financial institutions and their customers (including possible reductions in errors and the cost of error correction), (b) the existence of finality of payment, irrevocability of settlement and certainty of settlement, thus eliminating the risk to the recipient of the reversal of a payment after it has been made, (c) clarification (partly as a result of (b)) of who bears the risk in the event of a default of a financial institution, and (d) clarification (partly as a result of c) of the incentives for each party to avoid risk--and in particular, through

incentives or regulations, for the central bank to have financial institutions avoid the build-up of large "daylight overdrafts."

Reductions in transactions costs

As the cost of electronic computing and telecommunication falls, so does the estimated cost of electronic funds transfer. An LVTS is perceived as cost-effective for payments, especially for payments that are large in dollar value, requiring high levels of security and certainty.[1]

Finality of payment and certainty of settlement

The failures of a number of financial institutions in Canada and abroad in the first half of the 1980s made each financial institution that plays a large role in the payments system as a direct clearer[2] increasingly aware of the risks to which it was exposed upon the default of another financial institution. As a result, a number of these direct clearers expressed a desire for finality of payment and irrevocability and certainty of settlement, so that payments that had gone through the system would not be unwound after the default of a participating financial institution.

Finality of payment means that, at a well-defined point in time, payment is deemed to have been made through an irreversible credit to the account of the recipient of the payment. Two implications of the credit being irreversible are that a stop payment order cannot subsequently occur and that the payment is not returned in the event of the default of the paying party or its financial institution. Irrevocable

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[1]"...it is generally accepted that important savings in the transactions costs, measured both in terms of money and in the precious time of treasury managers, associated with the movement of funds can be achieved by electronic transmission." (Lindwall, 1988)

[2]A direct clearer is a financial institution that maintains balances for clearing purposes at the Bank of Canada. In order to be a direct clearer it must be responsible for at least 1/2 of one per cent of the number of payment items passing through the clearings. Apart from the Bank of Canada, there are presently 13 direct clearers: the six large banks, two smaller banks, and five other financial institutions.

settlement is analogous to finality of payment, but refers to the settlement of obligations among direct clearing financial institutions that affects their accounts on the books of the Bank of Canada. When irrevocable settlement is deemed to have taken place, there can be no unwinding in the event of the default of a financial institution. Certainty of settlement means that there is an assurance that final settlement on the books of the Bank of Canada will occur at the prescribed time even in the event of the default of a financial institution.[3] [4]

Clarification of who bears the risk

It became evident, upon examining the situation, that what looked like an elimination of risk (through creating finality of payment and irrevocability of settlement) was largely a clarification of who bears the risk and a possible re-assignment of the risk. When a financial institution goes into default there will be losers, including uninsured depositors, the deposit insurance corporation, and (possibly) payment recipients (for example, of paper cheques) who do not have finality of payment.[5] The share of the losses borne by particular groups of losers ex post and the determination of who bears the risk of loss ex ante both depend on the rules of the game. These rules include not only those regarding finality of payment and irrevocability of settlement, but (as will be shown below) those regarding daylight overdrafts and collateral. To the degree that the rules are clear, better ex ante assessments can

[3]Further definition of these three terms is given in Lindwall (1988).

[4]Since the Bank of Canada may not operate the electronic payments system, transactions may not be recorded on the books of the Bank of Canada during the day. Therefore, certainty of settlement on the books of the Bank of Canada is logically distinct from irrevocability of settlement.

[5]Payment recipients only lose in the end when a payer who is an uninsured depositor goes bankrupt because of the default.

be made of how to handle the risk.

Incentives to assess and minimize risk and the issue of daylight overdrafts

One major concern is the risk that comes during the course of the day (i.e., prior to the closing of the central bank's books for the day). During the day there may be greater risk than overnight since exposures of financial institutions or the central bank to other financial institutions may well be substantially in excess of their overnight exposures. Thus the most important incentives to minimize risk **in the clearing system** will come from the rules regarding daylight overdrafts. There are basically four schemes to constrain the amount of daylight overdrafts:

(1) to outlaw them and require positive balances before payments can be made (the solution chosen in Switzerland);

(2) to charge a rate of interest on the maximum or average level of daylight overdrafts (the latter has been chosen in the U.S. for their Fedwire system);

(3) to have maximum collateralized overdraft positions set by the central bank; and

(4) to have a maximum overdraft position for each institution set as a fraction of bilateral lines of credit granted to it by the other institutions in the system, with any default allocated by a rule and supported by collateral posted by all the institutions in the system (a variant of the U.S. CHIPS system).

Recent discussions in Canada have focussed on the last two alternatives.

2.2 Possible Scenario for Operation of the LVTS

Discussions within the Canadian Payments Association (CPA) have to a degree been based on using selected aspects of the Swiss Interbank Clearing (SIC)[6] real-

[6]On the SIC see Mengle et al. (1989) and Vital (1988). The SIC has been in operation since 1988.

time system as a model. In the system being envisioned, payments could be made[7] only if funds were available or if any intra-day credit constraint had not been reached. Otherwise the payment request would be delayed; the payment could be made only when the settlement balance of the direct clearer became large enough to cover the full amount of the payment. The existence of appropriate legislation or private contracts could ensure that when payment did go through there would be immediate finality of payment for the sender and receiver and irrevocability of settlement for the participating financial institutions.

2.3 The Guarantees that the Bank of Canada Will be Able to Influence the Course of Short-term Interest Rates

The so-called "legal restrictions" literature makes the point that without legal restrictions, central banks cannot carry out monetary policy and/or influence the price level (Wallace, 1983 and Harper, 1988). In Canada the legal framework that guarantees that the Bank of Canada has an effective monetary policy lever comes through By-law no. 3 (the "Clearing By-law") of the CPA that direct clearers in the clearing system must settle on the books of the Bank of Canada.[8] In this framework the Bank of Canada, through open market operations and especially the

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[7]The system is referred to as a "credit push" system since the transaction enters the payment system through the party making the payment, rather than at present whereby the recipient of the payment (cheque) initiates the payments system transaction ("debit pull").

[8]In By-law no. 3, part of Section 16 on Settlement states: "16.01 Direct Clearers -- Settlement of the clearing balances of Direct Clearers should be made at the Bank of Canada." (Canada Gazette, Part I, 15 January 1983). In Bank of Canada (1987) it is noted that, "The essential elements to ensure monetary control are: (a) that the settlement of the daily clearing of payment items be undertaken on the books of the Bank of Canada; (b) that directly clearing institutions therefore continue to need balances at the Bank in order to settle; and (c) that the Bank of Canada be able to determine the availability of such balances."

drawdown/redeposit mechanism (switches of government deposits from/to the direct clearers), can change the amount of settlement balances of the direct clearers in aggregate relative to the amount that they wish to hold at existing interest rates given the pricing schedule for overdrafts and advances. This in turn puts upward or downward pressure on one-day interest rates and therefore the whole maturity structure of interest rates.[9] [10]

3 THE IMPLEMENTATION OF MONETARY POLICY

The legal framework and that ability of the Bank of Canada to change the amount of aggregate settlement balances will continue to be present in the world with same-day settlement. In the *Implementation of Monetary Policy in the Absence of Reserve Requirements*, the Bank of Canada (1987) noted the following about possible operating procedures under same-day settlement:

> Under a borrowed funds approach, the direct clearers as a group would be continuously indebted to the Bank of Canada, and there would be an explicit published schedule of interest rates on advances. The larger the borrowing (relative to deposits) of an individual institution, the higher would be the rate charged relative to some minimum lending rate. By changing the minimum lending rate or by taking actions to increase the aggregate amount of borrowing that direct clearers had to undertake, the Bank of Canada would be able to exert an influence on very short-term market interest rates.

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[9]"The Bank of Canada, by increasing or decreasing the supply of settlement balances to financial institutions, directly influences the very shortest-term interest rates in the Canadian money market. Movements in these rates in turn influence the whole spectrum of market and administered interest rates and rates of return on a wide variety of assets and liabilities and, through them, the exchange value of the Canadian dollar. The movements of the various rates of return and of the price of foreign exchange affect over time total spending in the economy." (Crow, 1988)

[10]As well, the Bank of Canada is able to establish the time at which the clearing day ends and the final settlement balance for that clearing day is established. For monetary control each day must have a definite end point for the calculation of settlement balances, overdrafts, and the payment of interest. (Theoretically, a twenty-four hour day for payments purposes is a possibility, but monetary control would be achieved only if there were a "declared end" to each day.)

In the alternative approach involving security sales to the central bank, the direct clearers would find themselves short of funds each morning but would be able to obtain funds from the Bank of Canada by selling securities to the Bank at terms and conditions of the Bank's choosing. In this system, the Bank would influence money market interest rates by altering those terms and conditions on its securities transactions with direct clearers.

3.1 The Borrowing Schedule Alternative

The only major industrial country that uses a borrowing schedule as a key part of its operating technique is Sweden. Although its use there is only somewhat similar to the potential use in Canada, it is of some interest to explore the Swedish borrowing schedule.

Swedish banks are required to hold non-interest bearing deposits ("cash ratio" deposits) at the Riksbank, the Swedish central bank, as required reserves against their average deposit liability of two months earlier.[11] These reserve requirements have to be met on a daily basis. Under its present operating procedures (Norgren, 1986), the Riksbank keeps the banking system permanently borrowing from it. In other words, through its operations in the money market, the Riksbank forces the banks, as a group, to borrow from it to meet their daily reserve requirements.

Each bank faces a rising marginal cost schedule over which the funding costs rise in steps of 1 percentage point from a given minimum lending rate to a given maximum rate.[12] [13] Each step represents borrowing of a certain percentage of the

[11]Until recently, deposits in excess of required deposits yielded a rate of return which is 2 percentage points below the minimum rate at which the Riksbank lends to banks.

[12]The progressive scale was introduced in December 1985 and replaced a uniform penalty rate. The original interest steps of 2 per cent were reduced to 1 per cent steps in February 1988.

bank's capital base defined as the sum of shareholders' equity and 50 per cent of untaxed reserves. As of 1 April 1991, each step represents 6 per cent of the capital base, or about 3.6 billion kronor.

Through its actions, which are geared towards offsetting exogenous changes in the availability of reserves (such as those resulting from transfers of funds between the government and the private sector), or which aim at changing the banking system's overall availability of reserves, the Riksbank determines to a large extent the rate at which banks will borrow from it.

As each bank faces its own rising marginal cost schedule, the marginal rate charged tends to vary somewhat across banks, depending on the distribution of the overall level of reserves within the banking system.

The Riksbank announces each morning the overall borrowing level for the previous day and the overall marginal rate, which in fact is an average of the marginal rates paid by all the banks. Thus each bank finds out whether its own funding costs were above or below the those of its competitors.

An alternative to borrowing from the Riksbank to meet reserve requirements is provided by the market for overnight funds. However, this market can only reallocate existing reserves and cannot offset any change in the overall level of reserves. The rate on overnight funds is generally slightly higher than the rate on lending from the central bank, as the latter does require collateral and the former does not.[14] The

[13]Originally the scale applied only to borrowings. On 21 March 1991 the Riksbank announced that banks would also now have the possibility of depositing funds with it at progressively lower interest rates. It claimed that this would enable it to carry out interest rate policy when the banking system is in a net cash position.

[14]On 21 March 1991 the Riksbank announced that it had decided to reinstate during the latter half of 1991 the collateral requirement in connection with its lending.

relationship between the market interest rate on overnight funds and the marginal lending rate has been quite close since October 1985.[15]

However, the marginal rate, sometimes exceeds the overnight rate as the Riksbank does not have a very precise daily target for the system-wide marginal rate. It does not attempt to forecast very precisely all the exogenous factors affecting the level of the banking reserves. Thus at times, because of "large" forecasting errors in the exogenous factors, the banking system's overall level of reserves diverges markedly at the end of the day from the forecasted level and from market expectations which determine the overnight rate.

There are three features that one might wish to add to the Swedish schedule for its use in the Canadian setting:

a. specifying the central bank minimum lending rate as a function of market rates so that in most cases it can be defined automatically;

b. avoiding large jumps in the marginal cost of borrowing (such as arise in the Swedish system when the average cost is given by a step function); and

c. making each bank's **average** cost of borrowing approximately equal to market rates, so that the borrowing by direct clearers is not subsidized.

One possible way to get these features is:

a. To set the Bank Rate (or minimum lending rate), denoted by r^*, as the lagged one-day market rate ($r(-1)$) less x percentage points: $r^* = r(-1) - x$. (The Bank of Canada could reserve the right to override the formula, so that rates could be driven down substantially in exceptional cases such as the 1987 stock market crash. No override would be necessary to raise market rates, since this could be done by shorting the system and raising the level of borrowings.)

b. To set the marginal cost of borrowing (m) for a direct clearer equal to the Bank Rate (r^*) plus **x** times the ratio of the amount of borrowing by the clearer (B) to a designated typical borrowing level (B^*) for that clearer: $m = r^* + xB/B^*$. This would mean that the average cost of borrowing (a) would be given by:

[15]See Kneeshaw and Van den Bergh (1989), p.42.

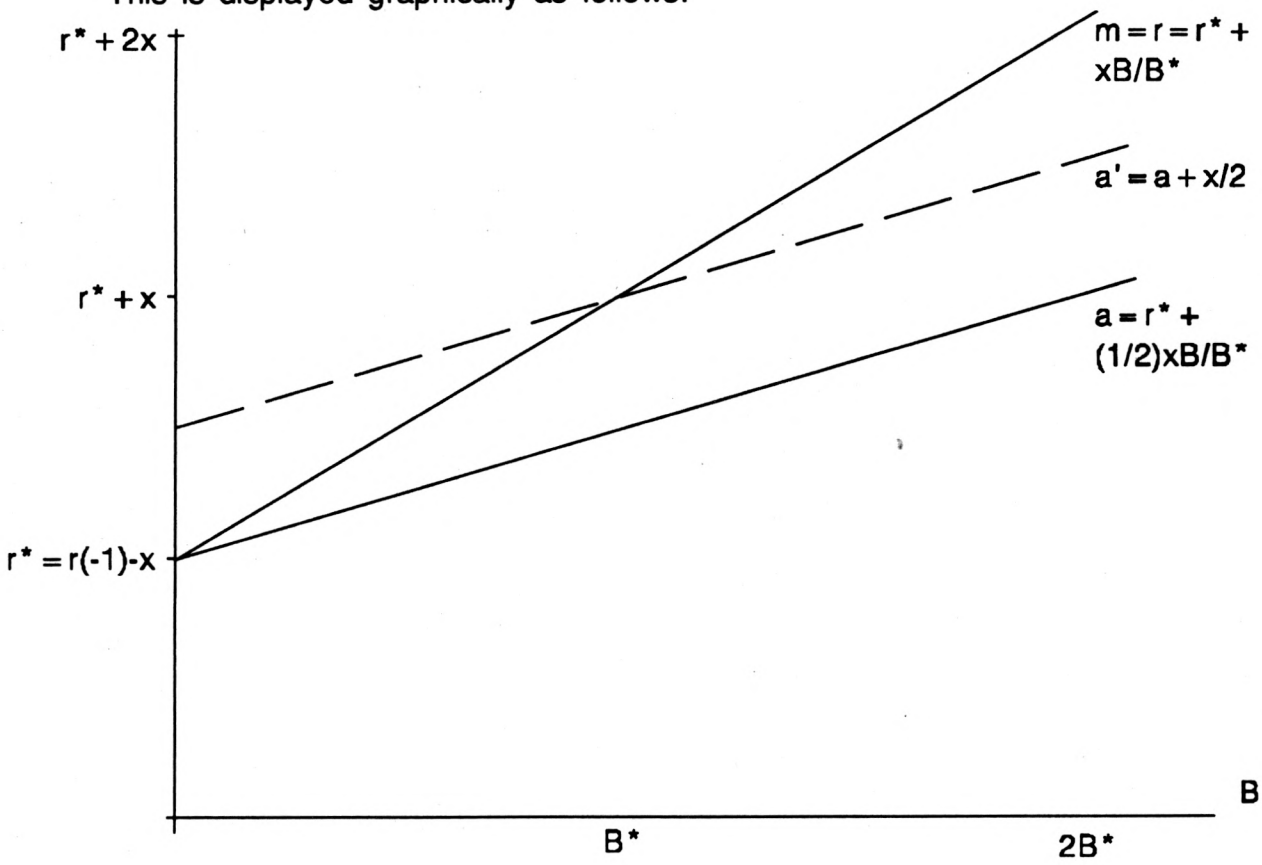
$a = r^* + (1/2)xB/B^*$. [16] Also, when actual borrowings were at their typical values, the marginal cost would be $m = r^* + x = r(-1)$.

c. To charge the direct clearers $(1/2)xB^*$ as an annual participation fee. Then, if borrowings averaged B^*, the effective annual average cost (a') to the clearer on its borrowings would be

$$a' = a + (1/2)xB^*/B^*$$
$$= r^* + (1/2)xB^*/B^* + (1/2)xB^*/B^*$$
$$= r^* + x$$

which would be the typical marginal cost when borrowings average B^*. As well, because of profit maximization by direct clearers, the marginal cost would be equated to the one-day market rate (adjusted for any risk of default): $m = r$. Thus, when the Bank wanted market rates to remain unchanged, it would set the sum over all clearers of their B's equal to the sum over all clearers of their B*'s and the effective average cost of borrowing would equal the marginal cost of borrowing, which would equal the one-day market rate: $a' = m = r$.

This is displayed graphically as follows:



[16] For a linear marginal cost curve, the average cost curve is half as steeply sloped.

Note that at B^*, $m = r = r^* + x = a' = a + x/2$.

(For illustrative purposes only, if large clearers were given a $B^* = 100$ and x were set at 1, their marginal cost of borrowing schedule would be just $m = r^* + .01B$, which means that their marginal cost would rise one basis point for each $1 million extra borrowing.)

How would this be put into practice? Here is a possible scenario (with the times given for illustrative purposes only): At 9:00 a.m. eastern time, each direct clearer would begin the LVTS day with a cap for intra-day credit. (This cap could be set by the Bank of Canada or by the other participants in the clearing system through a CHIPS-type arrangement as described in 2.i.d above.) Any payments could be submitted to the system between 9:00 a.m. and 3:00 p.m. Payments would go through automatically as long as a direct clearer did not exceed its allotted intra-day line of credit. Between 3:00 p.m. and 4:00 p.m. any backlog of commercial payments would be eliminated, facilitated if necessary by borrowing and lending among the direct clearers. At 4:00 p.m., borrowings from the previous LVTS day from the Bank of Canada would be repaid and the Bank would set the aggregate amount of settlement balances available to the system through the drawdown/redeposit mechanism and thus would determine the aggregate amount of borrowings that would eventually be made. The interbank market would remain open until 5:00 p.m. for direct clearers to adjust vis-à-vis one another. At 7:30 a.m. the next morning, the results of the clearings of paper cheques would be input and would affect the settlement balances of the direct clearers for value the preceding business day. Following this, there would be further (backdated) trading on the interbank market, finishing at 8:30 a.m. At that time (backdated) overnight borrowings would take place based on the level of settlement

balances and the LVTS day would come to an end.

3.2 The Alternative of Securities Sales to (and Purchases by) the Bank of Canada

A monetary policy operating procedure based on securities sales to (and purchases by) the central bank is presently used by the Bank of England. Although some modifications would be needed before it could be used in Canada, it is interesting to note how the system works in the U.K.

Banks in the U.K. are not required to hold reserves at the Bank of England against their deposit liabilities. However, the banks that are members of the Town Clearing (i.e., the banks through which the daily cash settlements between the commercial banking sector and the Bank of England, including the government, take place[17]) are obliged to keep their operational accounts with the Bank of England in credit every day. In contrast to the Swedish system, banks can never borrow directly from the central bank. However, there exists an intermediary between banks and the Bank of England, the system of discount houses (money market dealers)[18], which is an indirect source of liquidity to the banking system because the dealers have access to the Bank of England lending facilities.

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[17]Settlements of transactions take place through several clearing associations regrouping various banks with overlapping memberships. Chaps and Town Clearing Company Limited is responsible for the settlements, on a same-day basis, of high-value payments. In 1986 these payments accounted for 92.5 per cent of the value of all the payments. Other clearing companies are responsible for the bulk paper clearings of cheques and credits and for clearings of bulk direct debits, standing orders and other automated credit transfers (Bank of England, 1987).

[18]Prior to October 1988, only 8 discount houses had direct dealings with the Bank of England. Since October 1988, the Bank of England extended the range of counterparties with which it has a dealing relationship in the sterling money market. These additional counterparties are subject to the same obligations as discount houses (Bank of England, 1988) and perform the same functions. At the present time there are nine such money-market dealing counterparties (Bank of England, 1990). In the text, we use the terms discount houses and money market dealers interchangeably.

Banks hold deposits with discount houses. Furthermore, banks whose bills are eligible for discount[19] are required to hold a minimum stock of high quality additional liquid assets such as eligible bills and gilt-edged stock with a residual maturity of less than a year. By adjusting their deposits at discount houses (selling/buying money market instruments to/from discount houses or borrowing from discount houses) banks can meet, on a same-day settlement basis, their overall funding needs or employ their surplus funds.[20] Discount houses, in turn, can engage in money market securities transactions with the Bank of England, on terms generally set by the Bank of England[21] and can borrow, on terms at the discretion of the Bank of England, against approved collateral up to amounts related to their capital base.[22] [23]

Money market operations undertaken by the Bank of England aim to provide to, or to withdraw from, the banking system enough cash to offset the daily flows between the central bank and the commercial banks that arise largely from government

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[19]Or acceptable as security.

[20]"Generally, clearing banks are not specifically invited to offer bills to the Bank of England to relieve cash shortages. They do, however, have a general invitation to do so which they may activate, in respect to Treasury bills and local authority bills, only at times of day when the Bank of England is inviting offers from the discount houses. They may also offer bills of these types to the Bank after the Bank's normal bill operations have been concluded..". In such cases "... the Bank sets the rate at which it will buy, which is never below and will typically be above the rate at which the Bank purchased similar bills in earlier operations." (Bank of England, 1988).

In cases of excess cash, the Bank of England invites both discount houses and clearing banks to bid for Treasury bills for same-day settlement. Clearing banks are included to avoid putting them at a "disadvantage late in the trading day vis-à-vis discount houses in finding an outlet for surplus funds." (Bank of England, 1988).

[21]The Bank of England decides which offers from discount houses to accept (see below).

[22]In addition, discount houses can borrow and lend gilt-edged stock through Stock Exchange money brokers.

[23]Besides providing liquidity to the banking system when required, discount houses also collectively underwrite the weekly Treasury bill tender, regardless of size. Discount houses are obliged to tender at least for a minimum proportion of the weekly issue, the proportion being calculated on a basis agreed in advance between the Bank of England and its counterparties.

transactions. On most days, cash has to be supplied to the banking system since the U.K. government is running a budget surplus. A less-than-complete offset of a cash withdrawal would put upward pressures on short-term interest rates as discount houses provide funds to the banking system by transactions involving money market instruments.

On a daily basis, the policy is implemented as follows. The Bank of England announces, early in the morning, a forecast of the banking system's cash position and the assumptions underpinning the overall cash level forecast, such as the expected flows of government funds, the projected needs of banks for bank notes and the expected settlements of foreign transactions as well as the divergence of the clearing banks' operational balances from their previously announced target. This comprehensive cash level forecast is updated during the day and, if significantly changed, is released in the early afternoon. This provides market participants with a good knowledge of the expected system-wide purchase or sale amount. The cash positions of the individual clearing banks at the Bank of England, however, are known only late in the afternoon, after the end of the clearings.

During the day, in case of a shortage of funds, the Bank of England invites discount houses to offer eligible bills for outright sale against same-day settlement.[24] It decides at its discretion which offers to accept (amount of bills being offered, nature of bills - Treasury, local authority or eligible bank bills - maturity of bills and discount rate offered). In addition, discount houses can offer, on their own, to sell bills to the Bank of England. Again, the response to such offers is at the Bank's discretion.

[24]The Bank of England also exceptionally invites dealers to offer eligible bills for sale and subsequent repurchase on a specific date.

Finally, any late-day shortages can be met through outright borrowing by discount houses from the Bank of England. Occasionally, to further influence short-term interest rates, the Bank of England announces a specific time for borrowing by discount houses, at a rate generally published in advance, or announces a Minimum Lending Rate which for a short period ahead applies to any lending to discount houses.

There are a number of institutional differences that might prompt modifications to the Bank of England system for its potential use in Canada:

a. paper cheques clear with a lag of several days in the U.K., while they clear for (backdated) value the same day in Canada (thus there is a source of uncertainty for the direct clearers in Canada that is not present in the U.K.);

b. the U.K. does not use the drawdown/redeposit mechanism that has been traditionally used in Canada to neutralize net government payment flows (and for monetary policy purposes); and

c. the Bank of Canada is prepared to do Purchase and Resale Agreements directly with banks as well as with money market dealers (thus there is no reason why the adjustments by direct clearers have to be indirect, via the money market dealers).

Because of these differences, there are various ways of adapting the Bank of England system to Bank of Canada operating procedures. The choice would depend on:

a. whether or not residual uncertainty from the clearing of paper cheques is isolated (by various methods) from the rest of the clearing balances; and

b. whether drawdowns/redeposits, open market operations in treasury bills, or Purchase and Resale Agreements / Sale and Repurchase Agreements are chosen as the predominant operating technique.

If residual uncertainty remained (as it would if nothing were done to provide for interbank transactions after the clearing of paper cheques or to isolate the clearing of paper cheques from the settlement accounts for electronic funds transfers) there would need to be a method to discourage excessive borrowing. One way that such

discouragement could be incorporated into the Bank of Canada's *Rules Governing Advances* would be by stating that "Financial institutions which are direct clearers shall conduct their affairs in the money market in such a way that their target settlement balance at the Bank of Canada is at least zero every day" and by spelling out the penalties that would apply if the actual balances net of advances did not average zero over a certain period. If, on the other hand, residual uncertainty were eliminated, the Bank of Canada could preclude overdrafts (advances).

According to the method chosen as the predominant operating technique, the money market would concentrate on different Bank of Canada actions and different money market rates as giving the clearest signals of where the Bank would like to see short-term rates. Whatever method were chosen, the leverage of the Bank of Canada would come about from its position as the residual supplier or taker of funds as the direct clearers aimed for (approximately) zero settlement balances.

3.3 Other Possible Alternatives

Statutory reserve requirements were abolished by the United Kingdom in 1971[25] and by Australia, New Zealand and Switzerland in the 1980s. In all cases, banks are required to keep their settlement balances at the central bank in credit on a day-to-day basis and the supply of settlement balances is controlled by the central bank. In addition, in Australia and Switzerland, banks are required, for precautionary purposes,

[25]Since 1981, however, U. K. banks are required to hold 1/2 per cent of their eligible liabilities as non-operational, non-interest-bearing deposits with the Bank of England to secure the Bank's resources and income.

to keep a certain level of liquid assets.[26]

Although most industrialized countries have not abolished reserve requirements, changes in reserve ratios are, at the present time, used only very infrequently to control the banking system's cash or liquidity level. Industrialized countries generally use more market-oriented techniques to control the supply of reserves to the banking system.[27] Among the different instruments used are: (a) outright sales and purchases of government securities (United States, Japan, Germany, France, Italy, Australia, New Zealand and the Netherlands), bills issued by the central bank (Japan, Germany and New Zealand) and private bills (Japan), (b) reversed transactions in government securities (United States, Japan, Germany, France, Italy, Sweden, Australia and New Zealand) and private bills (France and Germany) (c) reversed foreign currency transactions (Germany, Netherlands and Switzerland) and (d) transfers of government deposits between the banking system and the central bank (Germany and Switzerland).[28] [29] The use of each of these instruments varies across countries and often depends on country-specific institutional arrangements.

Among the many systems, the Swiss approach, with no required reserves and

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[26]U.K. banks whose bills are eligible for money market transactions with the Bank of England also have to maintain a certain level of liquid assets.

[27]In almost instances, banks have access, either directly or indirectly, to central bank credit facilities. To limit the "abuse" of such facilities by banks, the key official rate is now set above market rates in Germany, France, Italy, Belgium and Switzerland. Penalties for frequent recourse or borrowing in excess of approved quota are also applied in the United States, Japan, Italy, the Netherlands and Belgium. In cases where the lending rate is often below the market rate, administrative controls are used to limit the access to central bank funds (United States and Japan). See J. T. Kneeshaw and P. Van den Bergh (1989) for more details.

[28]This brief overview of the various procedures is based on D. Batten and others (1989), J. T. Kneeshaw and P. Van den Bergh (1989) I. J. Macfarlane (1986), Reserve Bank of Australia (1985, 1989 and 1990) and Reserve Bank of New Zealand (1985).

[29]The Canadian and U.K. operating techniques are left out from this brief overview as they are covered more extensively in the previous sections of the paper.

greater emphasis on foreign exchange swaps, provides a clear example of a third alternative for implementing monetary policy in Canada.

Monetary authorities in Switzerland, as in most other countries, aim at influencing directly the banking system's cash level. Banks have access to the central bank's lending facilities through discount credits or collateralized loans (Lombard credit).[30] In contrast to the securities transactions of the Bank of England, foreign exchange swaps are the major instrument used by the Swiss central bank to control the banking system's cash level. However, because swaps are settled only with a two-day lag, they cannot be used to offset unforeseen developments. To fine-tune the banking system's cash level on a daily basis, the Swiss central bank shifts, on a same-day settlement basis, government deposits between its own books and the private banking system.[31] [32]

One obvious question is why the U.S. system has not been a prime candidate for adoption in Canada.[33] There are at least two major reasons. The first is that the Bank of Canada has proposed moving away from moral suasion in the implementation of monetary policy, while the U.S. system uses moral suasion against excessive use of the discount window. The second is that adjustment borrowings from the discount window are at a discount rate which is not a penalty rate and are therefore subsidized.

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[30]The Lombard rate is set at about 2 percentage points above market rates (Hoffman, 1990).

[31]The use of government deposits to influence the banking's system cash level is similar to the Canadian experience, except that in Switzerland these transactions are settled on a same-day settlement basis whereas in Canada, the Bank of Canada shifts government deposits (drawdown/redeposit mechanism) after the close of the business day, with retroactive settlement.

[32]See Birchler (1988), Hoffman (1990) and Rich (1989) for a more detailed discussion of the Swiss system.

[33]Detailed descriptions of the U.S. system are given in Thornton (1988) and Federal Reserve Bank of New York (1988).

Borrowings have never been subsidized in Canada and it is unlikely that we would want to move in that direction.

4 CONCLUSIONS

This paper was not designed to decide between the two major alternatives, as that is part of the ongoing research program at the Bank of Canada. What it has shown is that both the major alternatives for operating procedures outlined by the Bank of Canada (1987) can be made to work effectively in the Canadian context, especially when modifications are made to the ways in which they have been implemented abroad to tailor them to existing Canadian practices and institutions. The borrowing schedule system relies on setting the quantity of balances to be borrowed and letting the desired rate fall out as the implication of that quantity setting. The system of sales and purchases of securities by the central bank relies on the central bank being the marginal supplier of settlement balances to the direct clearers as they attempt to achieve a near-zero level and thus being able to influence effectively the rates of interest on the money-market instruments used by financial institutions to adjust cash positions.

It should be noted that the important times in the LVTS day will have to be co-ordinated with the settling times in the securities markets and the foreign exchange markets, particularly when these markets go to greater use of obligation netting schemes such as those planned by the Canadian Depository for Securities and the group of banks working on a foreign exchange netting scheme.[34]

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[34]These other electronic settlement schemes also raise risk and regulatory issues similar to those involved with LVTS. See Freedman (1989).

While the design of the appropriate system for the implementation of monetary policy in the same-day settlement environment is a challenging task for the central bank, in the broader scheme of things the particular details of the system ultimately chosen do not play a major role in the task of macro-economic stabilization by monetary means. The message of this paper is that there is no difficulty in achieving monetary control in a full-information environment as well as in the world of less than full certainty.

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