Monetary Policy under Zero Reserve Requirement in Canada

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Abstract

Current development shows that financial system tends to move to the direction where controls over banking system would be very minimum. Banks are no longer required to hold a fraction of their assets as required reserve with the central bank, and deposits are not subject to interest rate regulation. Fama (1980, 1983) argues that with the absence of reserve ratio price determinacy still holds through the control over currency supply. However, recent development also indicates that the control over currency supply is not any more in the hand of central banks but determined by the demand of the people. Consequently, price level is uncontrollable. Black (1970) even goes further to conclude that the unregulated banking system will bring the traditional monetary theories to an end. This paper deals with the implications of recent development in financial system in Canada. This paper argues that even though there is no longer reserve requirement and currency supply is determined by demand side, the Bank of Canada still has control over nominal magnitude of the economy, namely interest rates, which in turn influence aggregate demand and prices.

THE DEFINITION OF RESERVE REQUIREMENT

In Canada reserve requirements - a minimum fraction of chartered banks' assets put on reserve at the Bank of Canada as a back up for various liabilities issued to finance lending activities - refer to require primary reserves (Sulfrin and Amsden, 1992). These reserves must be equal to a certain percentage of deposits (10,3, and 3 per cen for demand deposits, notice deposits, foreign currency deposits respec-

tively since 1981), excluding deposits held in mortgage subsidiaries. These primary reserves can be held as notes and coin (currencies) in bank branches and automated banking machines (ABMs) or as deposit balances with the Bank of Canada. In either case, primary reserves earn no interest.[1]

The difference between currency reserves and reserve requirement is the amount of deposit balances at the Bank of Canada that a bank has to hold over certain averaging periods. The deposit balances are

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[1] In some countries deposit balance earns interest. In New Zealand, for example, this balance earns 65 percent of the seven-day Reserve Bank bill yield. See Dotsey (1991) and Reserve Bank of New Zealand (1993).

calculated by averaging deposits on the banks' books on four consecutive Wednesdays, ending on the second Wednesday of the preceding month (Freedman, 1992). If a bank falls below the required average on one of the four Wednesdays, it must compensate it on the other Wednesday. If it is above the required average early on, it may hold less than requirement later on. This will effectively generate a demand by banks for deposits at the Bank of Canada. By adjusting the supply of such deposits relative to the demand, the Bank can put an upward or a downward pressure on overnight on interbank interest rates. This mechanism will be very useful for Canada to implement its monetary policy when reserve requirements are no longer needed.

THE ABOLITION OF RESERVE REQUIREMENTS

The decline in required reserve ratio has characterized recent development in financial system across countries. In the past three years, for example, the Federal Reserve has lowered requirements on transaction deposits and eliminated requirements on the deposits (Weiner, 1992). The central banks of Switzerland, New Zealand, Australia, and Canada have eliminated their requirements. The most dramatic decline has accurred in Canada and New Zealand. In June 1992, Canada proclaimed a provision of comprehensive financial market legislation which sets the marginal reserve requirement to zero and eliminates all reserve requirement over a two year phaseout period (Sulfrin and Amsden, 1992). In February 1985, all compulsory ratios, including reserve ratio, were removed from all financial institutions in New Zealand (Carew, 1987).

The key reason for this abolition is to reduce the burden on depository institutions and thereby allow them to become more competitive. Reserves requirements have always been like "tax" on banks and their clients, because reserve typically do not earn interests. This tax is equal to the interests the banks could have earned had they been allowed to lend out the reserves. The Bank of Canada, on the other hand, reinvest the banks' reserves in securities to earn profits (Sulfrin and Amsden, 1992). This tax is either borne directly by the banks and their shareholders or passed on to customers via lower deposit rates, higher borrowing rate, or reduced service. This is part of the reason that, like any other tax, reserve tax can distort the allocative process. Banks become less competitive and financial resources move away from them toward potentially less productive financial institutions not subject to reserve requirements.

Moreover, the new legislation initiated by the goverment of Canada which will give non-bank financial institutions, such as trust companies, more powers to make personal and corporate loans helps prompt the removal of reserve requirements (Freedman, 1992). The difference between banks and non-bank financial institutions then will become blur. They have similar lending powers. If the reserve requirement is not removed from banks, while non-bank financial institutions are not subject to reserve requirement, then one would expect that banks will not be able to compete with other financial institutions. Here, one can say that the availability of lending powers to non-bank financial institutions should rule out the reserve requirements on banks.

This is also in line with what Patinkin once predicted that there would be no difference between banks and other financial institutions when reserve requirements were removed (Fama, 1980).

ANALYTICAL FRAMEWORK

The multiplier model

The model that is usually used to examine the role of reserve requirements in influencing economy is the multiplier model of money supply. This model has been for along time considered as providing a foundation for examining monetary control issues. In this model, money supply M is defined as equal to the value of currency C, held by the non-bank private sector, plus the value of checkable deposits D that the non-bank public holds in depository institutions. Thus

$$(1)\ M = C + D$$

Another important definition is the monetary base B, which is the sum of the value of currency held by the non-bank sector plus the value of depository institutions' reserves R. In equation form, the monetary base is

$$(2)\ B = C + R$$

By manipulating these two equations we will have:[2]

$$(3)\ M = B \left(\frac{1 + C/D}{C/D + R/D} \right)$$

where C/D is the ratio of currency to transaction deposits held by the non-bank private sector, and R/D is the ratio of reserves to transaction deposits held by the non-bank private sector. This last equation says that the money supply can be controlled via the control over the base money. The term in the bracket is money multiplier whose value depends on the ratio of currency to deposits and the ratio of reserves to deposits (reserves ratio). Monetary control can be conducted by manipulating either one of these two ratios or both. The smaller the reserve ratio the greater the multiplier, hence, the greater the multiplier, hence, the greater money supply overshoot. The smaller the currency ratio to deposits the greater multiplier, hence, the greater the money supply overshoot. Therefore, abandoning just one of these two ratios does not necessarily mean the vanishing of monetary control. The abolition of reserve ratio only reduces, not eliminates, monetary control. Monetary control still can be conducted by controlling currency supply.

However, in a world where financial system is getting less regulated, this model has a serious problem. The problem lies in the heart of the model, namely the concept of money supply. To treat money supply as equal to the value of transaction deposits and the value of currency is no longer relevant. Black (1970) says that there is no such thing as money supply in such a world. In Black's world deposits issued by banks provide transaction services through an

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The first equation is divided by the second equation, thus $M/B = (C+D)/(C+R)$. If all terms on the right side are divided by D, then $M/B = (C/D+1)/(C/D+R/D)$.

access to accounting system of exchange. Transaction using this system is a matter of debiting and crediting bank accounts. Executing transaction with a check means an instruction to banks to credit as well as debit the accounts of both parties involved. The competition among banks will allow people to execute this debit-credit transaction at a lower cost and this makes currency less interesting because it bears no interest. The fact that banks must have liabilities for all their transaction deposits held by non-bank private sector does not permit to consider transaction deposits as money. An additional amount of loans made by banks must be financed by the same amount of additional deposits. Loans must be equal to deposits. One may argue that it is not impossible that an individual bank can be in a deficit position, loans made exceed deposits. However, if there is a bank running deficit there should be another bank that is running surplus. If some one is allowed to have a loan from a bank, so that this bank is in a negative position by the amount of this loan, then if this loan is used in a transaction with another person and this person deposits it in his bank, which could be a different bank, then this bank should be in a positive position by exactly the same amount of the deficit of the first bank. A transaction using checks would only mean that a person's account at his bank decreases and at the same time other person's account increases exactly by the same amount. Therefore, as a whole, banks are in zero position. If there is such thing as money supply, then, the banks' position can not change it.

Another argument that excludes deposits from money comes from Fama

(1980, 1983). Deposits are not money because they are not perfect substitutes for currency. In Fama's world where financial system is also unregulated, currency is treated as numeraire upon which the price system of the economy is based. If dollar is the unit of account of the numeraire then the price level is the prices of all other goods in terms of currency, namely dollar. Even though it always sells at face value and bears no interest, currency is generally accepted as medium of exchange due to its ability to calculate precise exchanges of currency for goods. Costs of calculating exchange values, then, are minimized.[3] This cost minimzation can be considered as a compensation for interests foregone. Thus, there exists a well-defined demand for real currency which is separable from the demands for other assets. If this demand is combined with the supply of currency, then price level is determined. Price level control, then, is a matter of controlling currency supply.[4] In contrast, interest bearing

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[3]It is always the case that a good has an exact exchange value for currency, or that every good can be stated easily in the unit of account of currency. Exchanges between goods whose values are difficult to determine against each other will generate a significantly high calculation cost.

[4]Fama prefers the argument that monopoly of currency supply by central banks is efficient. The zero marginal cost of its issuance and the non-distortionary type of tax of holding it account for this efficiency. He goes on with an assertion that the private issue of bearer securities in small denomination that have greater chance to compete with currency must be restricted. Wallace (1983) confirms this with a critical remark, that such a restriction, when it is binding, tends to misallocate resources. Hence, for him, there is a trade off in such a circumstance between achieving price level stability and achieving efficient resources allocation.

deposits which give access to accounting system of exchange, require that transactors agree that the value revealed by checks is equal to the value of wealth against which the deposits have claim. Information and calculation that the values of goods exchanged and assets represented by deposits are equal is needed. It is actually the banks, through clearing mechanism, that do these things, and hence complete the transactions which use deposits. Moreover, since deposits are heterogeneous in the sense that every deposit may represent a claim to a different set of underlying assets, it is very unlikely that a generic deposit can serve as numeraire. Therefore, even though deposits can be substituted for currency they are not perfect substitutes for each other. Consequently, deposits are not money.

Even though the above discussion implies that currency is the only component of money supply, the role of currency will be so limited that it can be omitted. As said earlier, competition amoong banks will discourage the use of currency. Transaction services provided by banks will be increasingly more convenient. So long as the interest rate on bank accounts is positive, people are likely to hold as small amount of currency as possible. Thus, the amount of currency is expected to be so small, mainly determined by the volume of small payments and by the cost and inconvenience of making payment by check or credit card, that it can hardly account for the supply of money. Furthermore, the central bank can not control currency supply because the amount of currency issued to banks depends on requests, and the amount hold by banks, in turn, is deter-

mined by the pattern of withdrawals and deposits of currency by the people and by the cost of making transaction with the government. The central bank can do nothing when people withdraw or deposit currency. All it can do is just accommodate the withdrawals and deposits. There is no reason for the central bank to fix the amount of currency outstanding. Consequently, money supply represented by currency supply, can not be determined by the demand of the people. Hence, to define money supply as currency supply is no longer appropriate. Moreover, if Fama's framework is followed, the consequence of uncontrollability of currency supply is the uncontrollability of price level. As a result, alternative instruments should be available.

Reserves requirement, then, is the only possible candidate to represent the money supply. Fama (1980, 1983) proposes reserves requirement as an alternative instrumetn for price level determination. Because required reserves bear no interest and are issued by the central bank, they can be considered, like currency, as pure nominal unit of account issued by the central bank. As in the case of currency, if the unit of account is ti be defined through reserves, reserves must also have demand and supply functions. Requiring banks to hold some fraction of deposits with the central bank as non-interest bearing reserves can create a well-defined real demand for reserves. Here, the central bank can control the nominal supply or reserves and hence, as in the case of currency, produce a well-defined real unit of account, namely the price level. Fama also indicates that a mix policy of controlling the sum of reserves and currency is sufficient for

determining price level. However, in Canada and New Zealand banks are no longer required to hold reserves, so they are simply zero on the average. Consequently, money supply is simply vanishing and non of Fama's proposals is applicable to the condition of these two countries.

If we go back to the money multiplier model, the aboliton of reserves requirement is simply ruining the model and controls over monetary· aggregates become impossible.[5]

Interest Rates Approach

Money multiplier model discussed earlier is not the only approach available to central banks. Instead of using money supply, central banks may use interest rates as their intermediate target. This intermediate target is thought to be closely related to the ultimate goal variables. In countries like Canada and New Zealand, the ultimate goal variable is price stability.[6] This approach allows central banks to eliminate reserves requirement, but requires close control over short-term interest rates (Weiner, 1992). Usually, these short-term interest rates are interbank interest rates, the rates bank and other depository institutions charge on one another for short-term market interest rates as well as exchange rates. Changes in interest rates and exchange rates in turn affect spending and inflation. Like any other market interest rate, an interbank rate is determined through the interaction of the supply and the demand for funds. In Canada, these funds are usually called deposit balances.[7] In this case, the supply ultimately comes from the central bank, while the demand

comes from the depository institutions.

There are two reasons for banks to demand interbank funds or deposit balances (Weiner, 1992). One, in financial system where there is reserve requirement, interbank funds may be needed to help meet these requirements. Banks short of reserves can raise funds in several ways. They can call in loans or sell securities out of their portfolio, for example. Alternatively, they can borrow funds in the interbank market. The second reason, interbank funds are needed to help meet ·clearing needs. A common feature regarding clearing mechanism is the maintenance of accounts at the central bank or elsewhere through which banks settle their payments with one another.

Two conditions are necessary for an interest rate targeting to be effective (Weiner, 1992). *First*, the central bank must have close control over the supply of

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[5]In fact, using a more simple model of money multiplier, the elimination of reserve requirement alone implies the collapse of monetary control. The model equates the money supply to transaction deposits held by non-bank private sector. Thus M=D, where M is money supply and D is deposits. And reserve requirement is a fraction of deposits, $RR = r D$. Therefore $M = 1/r RR$ which implies the disappearance of monetary control following the elimination of the reserve requirement. See Weiner (1992).

[6]In New Zealand, price stability was legislated in a new Bank Act, in December 1989, as the main objective of monetary policy. It is defined as 0-2 percent annual increases in Consumer Price Index. See Reserve Bank of New Zealand (1993).

[7]In New Zealand, they are called settlement cash. The Reserve Bank of New Zealand excercises monetary policy by controlling the quantity of this settlement cash used to settle interbank balances among themselves and between these banks and the Reserve Bank. This policy is also aimed ad influencing the short-term overnight interest rates.

interbank funds on a weekly or even daily basis. *Second*, the demand for interbank funds must be reasonably predictable. If these two conditions are met, the central bank will be able to anticipate and offset unwanted movements in the target interbank rate. If the conditions are not met, the interbank rate will fluctuate undesirably. It is in this context that the Bank of Canada and the Reserve Bank of New Zealand implement their monetary policy to control price level.

MONETARY POLICY UNDER ZERO RESERVE REQUIREMENT

As in the previous system, under zero reserve requirement the Bank of Canada's monetary policy is aimed at influencing the behaviour of the overnight rate of interest. Changes in this rate are expected to influence other money market rates as well as exchange rate, which in turn affect spending and inflation. Under zero reserve requirement, an examination should be made that the Bank of Canada has the same ability to influence the short-term interest rates as in the previous system (Freedman, 1992). As mentioned before, two conditions must be met in order for a policy to achieve the short-term interest rate target. The Bank of Canada feels fairly sure that these two conditions can be met because of the unique structure of Canadian payment system and its institutional framework. The Canadian financial system is highly concentrated (Weiner, 1992). More than a dozen bank, trust and mortgage loan companies, and . credit unions account for the biggest share of assets held by Canada's roughly 800 depository institutions. Within the banking sector the six largest banks controlled 90

percent of all bank assets at the end of 1991. The payments system is also highly concentrated. The payments system is operated by the Canadian Payments Association (CPA) whose members settle one another on the books of the Bank of Canada. Thirteen large depository institutions, including eight banks, have "Direct Clearer" status. Not only do they represent themselves but often also act as clearing agents for other depository institutions (indirect CPA members) as well. Through these accounts, daily net clearing gains and losses among direct clearers are settled. Hence, all payment items are settled on the books of the Bank of Canada. Consequently, the Bank of Canada can easily predict the demand for settlement balances just by contacting the direct clearers. The daily control over the supply of interbank settlement balances by the Bank is conducted by adjusting the supply relative to the demand by the direct clearers for settlement balances. In doing so the Bank of Canada transfer federal government deposit into and out of the settlement accounts of direct clearers. This control technique is called the "drawdown/ redeposit mechanism". Therefore, the two conditions necessary for an effective interest rate targeting are met.

The Demand for Settlement Balance

The elimination of reserve requirement will not eliminate a direct clearer's requirement to maintain a deposit account for check clearing purposes at the Bank of Canada. As mentioned earlier, the demand for deposits balances emerges because of two reasons : to help meet reserve requirement and to help meet clearing

needs. With the reserve requirement eliminated deposit balances are now needed by direct clearer banks to settle among themselves and between them and the Bank of Canada. Thus, the direct clearer banks will continue to keep a balance at the bank of Canada which will eventually be required to be at least zero everyday. Accordingly, their cash managers must be able to make sure that at the end of an averaging period the average deposit balance is zero.

However, it is not always easy to meet the zero average because checking behaviour is unpredictable. To know exactly during the day what checks a bank will clear to other banks, and what checks other banks will clear to it is almost impossible. It is often the case that when the clearing exchange is complete, and the bank's new closing deposit balance has been determined, this new balance is much higher or lower than projected. The clearer bank is facing clearing gains when the balance is positive, and clearing losses when the balance is negative. Regarding these two surprises there is a requirement that must be met. The requirement is that for every negative balance (fall into overdraft) on a particular day during the averaging period, the direct clearer needs to hold a positive balance on some other days in the period, or pay a penalty at the end of the period. Whether a clearer bank is in average negative or average positive balance at the end of the period is determined by calculating the cumulative settlement balance. The cumulative settlement balance refers to the difference between the sum of daily positive settlement balances and the sum of overdrafts (negative balances). This difference must be equal to or greater then

zero over a calculation period of about a month, from the third Wednesday to third Wednesday of the following month. If a clearer bank ends up with a negative cumulative settlement balance it has to take an advance from the bank of Canada at the Bank rate. Hence, the direct clearer effectively has to compensate an overdraft with a positive balance, a cumulative advance, or a fee equal to interest on advance (Freedman, 1992).

From the clearer bank's point of view the requirement that a charge at the Bank rate will be put on any shortfall and that any non-interest bearing positive balance must cover this shortfall means that they have to pay the charge twice as much costs of both excess balances and overdrafts from the Bank of Canada are about the same. Consequently, caash managers always try to attain zero balance at the beginning of the period. Since it is often the case that on a particular day they are hit by clearing surprises which make them in a negative or positive balances, adjustments of balances to compensate the surprises over the averaging period are always needed so that zero cumulative balance can be achieved. It is these adjustments that create demand for deposit balances.

The behaviour of the demand is more predictable than under the previous system. Under the previous system most clearer banks desire to hold relatively high excess reserves to meet reserve requirements because the rate on advances to cover overdrafts escalate with each overdraft. This makes them less likely to risk overdrafts. Therefore, the risk of overdrafts was not constant throughout the period. Accordingly, it is difficult for the Bank of

Canada to know when direct clearers might risk overdraft and hence determine the supply adjustment needed to affect the interest rate. On the other hand, under the new system, clearer banks are equally likely to experience negative and positive clearing surprises. Because both positive and negative clearing surprises are equally costly, the bank always try to compensate these surprises. Therefore, when the direct clearer banks are in a negative balance early on, which is very likely, they surely want to be in a positive balance later on over an averaging period. The demand for deposit balances, then, increases. The opposit is also true. Thus, the demand is highly predictable.

Supply of Deposit Balances

As mentioned earlier, the direct clearer banks need deposit balances not just to settle among themselves but also between them and the Bank of Canada. As the bank of the Federal Government of Canada as well as a market participant in its own right, clearings also happen between the Bank of Canada and the direct clearers. It is through this particular clearing that the Bank of Canada controls the supply of deposits balances. The control is conducted by transferring government deposits out of or into government accounts with direct clearers. This technique is called the "drawdown/redeposit mechanism". This is the primary way the Bank of Canada conducts monetary policy. If it wants interest rate to rise, the direct clearers' account balances at the Bank of Canada are in total made short by drawdowning (transferring) government deposits out

from their settlement accounts. This makes the direct clearers compete among themselves to borrow funds in interbank market and reduce overdrafts and hence increases interest rate. Conversely, the Bank of Canada can redeposit government deposits into the direct clearer' accounts so that these account balances at the Bank of Canada are in total in excess. They, then, try to get rid of the idle funds at the bank of Canada by competitively creating overdrafts. This will put a downward pressure on interest rates.

Therefore, despite the abolition of reserve requirement, the Bank of Canada is able to maintain its significant control over the behaviour of interest rates by influencing the output of banking-overdrafts and deposits – which in turn affects aggregate demand and prices.

Price Determinacy Issue

Following Patinkin, Fama argues that if there is a well-defined demand in real terms for an asset that sells at face value stated in units of account, controlling the supply of the asset in terms of units of account is sufficient to control the price level, that is, the real value of the unit of account. A closer look at the operation of the Bank of Canada will indicate that Fama's condition holds. The desire of the direct clearer banks to always adjust their clearing position daily to an optimal position over the averaging period, indeed creates a well-defined demand for an asset whose nominal supply is under the direct control of the Bank of Canada. This asset, called settlement funds or deposit balance at the Bank, bears no interest. Thus Fama's condition for price determinacy is satisfied.

CONCLUSION

In this paper, monetary policy under zero reserve requirement with special reference to Canada is reviewed. The elimination of reserve requirements results in the abandonment of the money multiplier analytical framework. However, this does not mean that the Bank of Canada looses complete monetary control. An alternative framework, called interest operating procedure, that uses short-term overnight interest rate as an intermediate target provides a sufficient assurance that the Bank of Canada still has a significant control over nominal magnitudes of the economy, that is, interest rates which in turn affect aggregate demand and prices.

Moreover, following Fama's rules for price determinacy, the abandonment of reserve requirement and the passive issuance of currency does not cecessarily mean that price level is indeterminate in Canada. Instead, under the new arrangement the existence of a well-defined demand for a non-interest bearing asset ensures that price level determinacy condition holds.

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