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Cover

African Marriage Money

Sophie Drakich, Curator, Currency Museum

Early African indigenous currencies were often modelled on everyday objects, including tools, weapons, and jewellery. The four objects depicted on the cover were durable metal currencies representing a store of wealth that denoted socio-political status. They also served a very special purpose as bride wealth and dowry payments.

The use of bride wealth (or bride price) in marriage contracts was, and still is, a common practice among many African societies. Before a marriage could take place, the prospective husband and his family paid his future wife's family a large sum of money or valuable goods, such as cowry shells, livestock, and metal currencies, to compensate for the loss of their daughter's economic services and her future children. A dowry was paid by the bride's family to the bride herself, although sometimes it was paid to the husband for safekeeping, or to the husband and wife together.

The marriage currencies shown here originated in west central Africa (Congo and the Democratic Republic of the Congo) and are generally made of iron or copper, which were associated with fertility in pre-colonial Africa. The tall spear, called blade money, or *liganda*, was used by the Turumbu and Lokele peoples. Its blade was formed from two thin sheets of fused iron and featured parallel lines chiselled along the sides. Blades varied in height from 50 to 200 cm; the example here is 173 cm. The hoe-shaped blade money used by the Ngbaka people was made of forged iron. Supported on a cylindrical shaft, it features a finial at the top and wing-like extensions at the sides and is a good example of currency modelled on an agricultural implement.

The anchor-shaped money, or *mandjong*, used by the Kwélé people reflects a colonial European influence. The pre-colonial form of this currency was modelled on local crossbows, but with the arrival of European traders in the early twentieth century, the shape was adapted to resemble the anchors of their boats.

Some women wore their dowries. The copper anklet, or *konga*, worn by wealthy women of the Ekonda was so heavy (7 kg) that it was lined with a padding of vegetable fibre to protect the woman's skin. Like the other marriage currencies shown here, it is a striking object, demonstrating the technical skills and beauty that justify these items as works of art.

The metal marriage currencies pictured on the cover are part of the National Currency Collection, Bank of Canada.

Photography by Gord Carter, Ottawa.

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Changes in the Indicator Properties of Narrow Monetary Aggregates

Tracy Chan, Ramdane Djoudad, and Jackson Loi, Department of Monetary and Financial Analysis

- *Past research has shown that, compared with other monetary aggregates and expressed in real terms, net M1 and gross M1 have traditionally provided superior leading information for output growth.*
- *Financial innovations and the removal of reserve requirements have made it increasingly difficult to differentiate between demand and notice deposits. This suggests the need to re-examine the information content of narrow monetary aggregates (such as net M1 and gross M1) that depend on this distinction.*
- *Evidence examined in this article shows that, since 1993, real M1+* has become a better indicator of future output growth than real gross and net M1.*

While many countries have abandoned monetary targeting[1] over the past two decades, monetary aggregates are still useful indicators of future economic activity. This is true even though growth in these aggregates has at times been affected by shifts in the demand for money. As suggested in Longworth (2003), there are several reasons to believe money can provide leading information for output growth, including its role in the transmission of monetary policy. In Canada, the relationship with output growth is shown in the literature to be the strongest for narrow monetary aggregates (Hostland, Poloz, and Storer 1987; Muller 1992; Maclean 2001; Siklos and Burton 2001; Hassapis 2003). However, some authors have found that the link between real economic activity and monetary aggregates has weakened over the past two decades (Siklos and Burton 2001).

Past studies have found that narrow monetary aggregates, particularly real net M1 and gross M1, contain explanatory power for real output growth one to two quarters ahead.

At the Bank of Canada, narrow monetary aggregates expressed in real terms (i.e., deflated by a price index)

* M1+ consists of gross M1 plus chequable notice deposits plus adjustments.

1. The goal of monetary targeting is to keep the money supply growing at a specific rate.

BOX 1

Definitions of Narrow Monetary Aggregates

Gross M1 (hereafter GM1): currency outside banks *plus* demand deposits *plus* adjustments[1]

Float: funds in transition for settlement

Net M1 (hereafter M1): gross M1 *minus* float

M1+: gross M1 *plus* chequable notice deposits *plus* adjustments

M1++: M1+ *plus* all non-chequable notice deposits *plus* adjustments

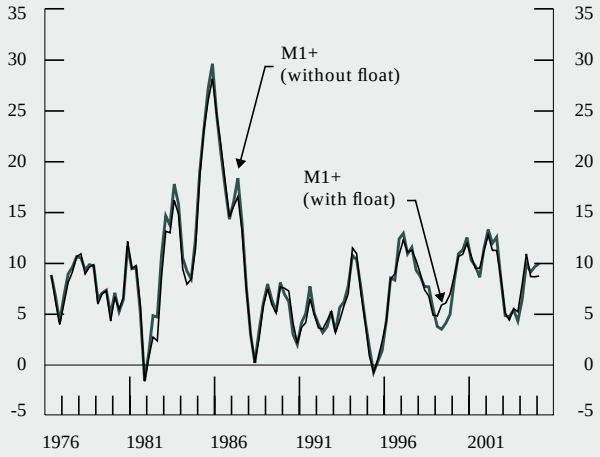
The Difference between Gross and Net Aggregates

Float consists of the amount of funds in transition between the time a cheque is deposited or a payment is sent and the time the payment is settled. For example, before a cheque is settled, the funds are subject to double counting.[2] Unlike gross monetary aggregates, net aggregates are adjusted for float to accommodate the issue of double counting. While the adjustment for float is what differentiates gross M1 from net M1, float is an insignificant portion of M1+ and M1++; as shown in Chart B1, the year-over-year growth of M1+ is little affected by whether an adjustment is made for float.[3] Given this consideration, the analysis of M1+ and M1++ in this article is restricted to measures on a gross basis.

Chart B1

M1+ (with and without float)

Year-over-year percentage change



1. "The Bank of Canada adjusts its monetary aggregates each time one of the following four events takes place: (i) the acquisition of a trust company by a bank (ii) the acquisition of an entity in a sector that was not previously included in the monetary aggregates (e.g., investment dealer) (iii) the formation of a bank from a trust company or companies (iv) the acquisition of a bank by a trust company." In addition, "the monetary aggregates were also adjusted in the past to (i) eliminate a number of discontinuities related to changes associated with the 1980 Bank Act revision, and (ii) introduce a new reporting system for the banks" (Kottaras 2003, 2).

2. For more details, see Cozier (1993).

3. The same conclusion applies to M1++.

continue to be monitored to assess their information content for real output. Past studies have found that narrow monetary aggregates, particularly real net M1 and gross M1, contain explanatory power for real output growth one to two quarters ahead. But no study compares how the leading-indicator properties of various narrow aggregates (net M1, gross M1, M1+, and M1++) for output growth have evolved over the recent period. (See Box 1 for definitions of narrow monetary aggregates.)

Financial innovations in banking products over the years have made it increasingly difficult to differentiate between demand and notice deposit accounts. For example, both types of account now offer similar interest rates and comparable accessibility to funds. The elimination, between 1992 and 1994, of reserve requirements on all bank accounts in Canada has removed the need for banks to discriminate between demand and notice deposit accounts (Aubry and Nott 2000).[2] As a result, the classification of accounts by financial institutions between demand or notice deposits has become increasingly arbitrary.

The blurred distinction between the two types of deposit raises questions about the value of those monetary

2. The reserve requirements were 10 per cent on demand deposits and 3 per cent on notice deposits. These requirements were imposed only on the chartered banks.

aggregates whose very definition is based on such a distinction. Specifically, M1 and GM1, which include currency and demand deposit accounts, are directly affected by this classification issue. The broader measures of narrow money, namely M1+ and M1++, capture both demand and notice deposits and, hence, should not be affected. Since this classification has become somewhat artificial, it is possible that the narrower aggregates (GM1 and M1) no longer contain superior information to that of M1+ and M1++. It is therefore interesting to compare the various narrow monetary aggregates with respect to their properties as leading indicators for output growth.

Creation of the Narrow Monetary Aggregates in Canada

There are many ways to aggregate various financial assets and money stocks to represent the supply of money. Economists generally aggregate money using two approaches (Laidler 1969). The first approach is to group those monetary assets that most closely represent some underlying definition of money, such as a medium of exchange or a store of value. The second approach is to define money as an aggregation of financial assets that have the most significant empirical relationship with certain macroeconomic variables, such as real output and inflation. However, no single method of monetary aggregation has been universally accepted, because there is no simple "one size fits all" approach to deal with the numerous economic concepts of money (Laidler 1999). As White (1976, 49) remarked, "the answer to . . . the related choice between alternative money definitions [is] based on the usefulness of the various aggregates for policy purposes."

The Bank of Canada began publishing monthly data for monetary components well before 1970. It was not until the 1970s, however, that the monetary aggregate M1 was reported. During the 1980s, the Bank also began reporting M1A, which is defined as the sum of M1 plus daily-interest chequing accounts and non-personal notice deposits. This aggregation comprised the most liquid monetary accounts and was intended to represent money for transactions purposes and purchasing power.

Financial Innovations and Money Distortions

In the past 20 years, financial innovations have played a significant role in the way economic agents have managed their money and financial assets. These innovations have caused important shifts among the monetary accounts, ultimately blurring the distinction between the various narrow monetary aggregates. The first wave of innovations in banking products, which took place from 1978 to 1986, significantly reduced the demand for M1 in both the corporate and household sectors in Canada (Aubry and Nott 2000). On the corporate side, a number of new cash-management packages allowed businesses to consolidate several accounts into one centralized account. As a result, firms were able to reduce their total working cash balances. For households, the introduction of daily-interest savings accounts (chequable and non-chequable) boosted incentives to deposit and transfer money into these accounts, which were not included in the measurement of M1 because they were unlikely to have been used for transactions purposes before the adoption of such financial innovations. Throughout this period, new financial products introduced by deposit-taking institutions continued to offer households and firms increasing flexibility in the type of account in which to hold deposits.

The second major wave of financial innovations began around 1993. Mutual fund products gained popularity relative to notice deposits as a saving vehicle, and free credit balances (cash or margin accounts intended for trading financial assets) grew rapidly. More importantly, as mentioned earlier, the removal of reserve requirements in the mid-1990s eliminated the need for banks to differentiate between demand (transactions) and notice (savings) deposits for reserve purposes. Indeed, many banks can no longer distinguish "demand" deposits from some types of notice deposit. As well, interest payments on some types of demand deposit became more common. In addition, the innovations in business accounts also made a significant contribution to the boost in the growth of GM1. A sizable share of GM1 was thus allotted to the sale and purchase of financial assets rather than to transactions for purchasing goods and services (Aubry and Nott 2000). Lastly, the development of Internet banking during the late 1990s enabled bank clients to easily transfer money between non-savings and savings accounts. This allows bank clients to deposit money in accounts that yield higher interest, while still being able to transfer money for transactions purposes without first having to give notice to the bank.

Towards M1+ and M1++

Thus, over the years, it has become increasingly difficult to differentiate between money held for transac-

tions purposes and money held as savings. This has ultimately led to concerns about whether M1 and GM1 are adequate measures of transactions balances. Financial institutions are also experiencing difficulties in classifying and reporting their deposit accounts as either demand or notice, raising concerns about the quality of M1 and GM1 data. In an effort to capture a broader notion of transactions money and to internalize the shifts occurring in some of the components, two alternative measures of narrow money, M1+ and M1++, have been published and monitored by the Bank since 1999. M1+ and M1++ are not affected by the distinction between demand and notice deposits because they incorporate both account categories. As such, they capture the components related to transactions purposes, as well as to savings purposes. For all of these reasons, the Bank of Canada has been motivated to explore new ways to define measures of transactions money (Gilbert and Pichette 2003).

Over the years, it has become increasingly difficult to differentiate between money held for transactions purposes and money held as savings.

Evolution of the Information Content of Narrow Monetary Aggregates

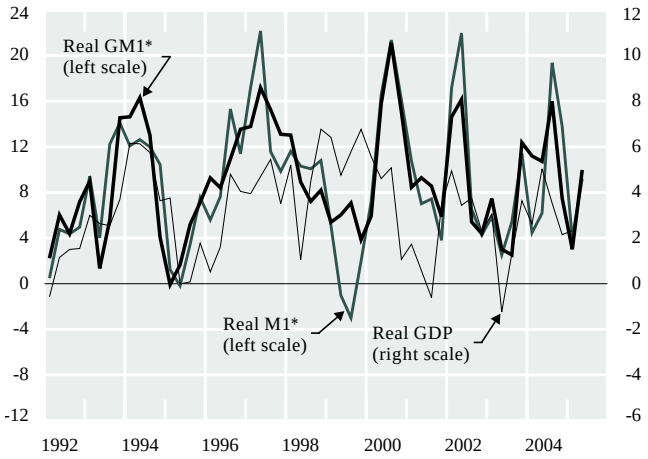
It has been generally determined that the growth of narrow money tends to precede growth in real output. Early research has verified the significance of this relationship over long historical samples (Hostland, Poloz, and Storer 1987; Muller 1992). Given the changes in the financial and regulatory environment over the 1990s, it is essential to examine how this relationship between narrow money and output has evolved over time.

Charts 1 and 2, which are similar to a chart published in the Bank of Canada's semi-annual *Monetary Policy Report*,[3] plot the quarterly growth of real gross domestic product (GDP) and the two-quarter moving average[4] of the growth of various real narrow monetary aggregates (lagged one quarter). The charts suggest that movements in the real monetary aggregates have usually preceded movements in real output growth, indicating that the movements in money growth have some leading information for future output growth. In

Chart 1

Growth of Real GDP, Real GM1, and Real M1

Quarter-over-quarter percentage change at annual rates

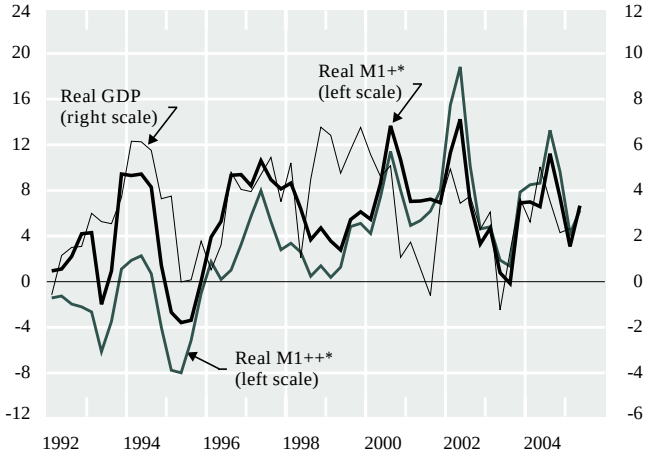


* Two-quarter moving average of growth in GM1 and M1 (deflated by core CPI), one quarter earlier. Core CPI is the consumer price index excluding the eight most volatile components and the effect of changes in indirect taxes on the remaining components.

Chart 2

Growth of Real GDP, Real M1+, and Real M1++

Quarter-over-quarter percentage change at annual rates



* Two-quarter moving average of growth in M1+ and M1++ (deflated by core CPI), one quarter earlier. Core CPI is the consumer price index excluding the eight most volatile components and the effect of changes in indirect taxes on the remaining components.

3. Many studies have shown that the first and second lag of money growth are the only significant lags in explaining real output growth. For example, see Hostland, Poloz, and Storer (1987) and Longworth (2003).

4. A two-quarter moving average is the average of a variable in this period and in the preceding one (i.e., $mx_t = (x_t + x_{t-1}) / 2$).

the literature, this lag effect is traditionally shown to be the strongest between output growth and the growth of GM1 and M1.

To quantitatively assess how this lead-lag relationship has evolved over time, a simple empirical exercise is performed to calculate the rolling correlations between the lagged two-quarter moving average of real narrow money growth and real output growth. The total sample is derived from the period 1975Q1 to 2005Q1. A 10-year correlation for the period 1975Q4 to 1985Q3[5] is calculated for each of the combinations considered (GM1, GDP), (M1+, GDP), and (M1++, GDP). The start and end dates are then rolled forward (1976Q1 to 1985Q4), and the 10-year correlations are calculated again. The start and end dates continue to be rolled forward, and the same exercise is performed until 2005Q1. For simplicity, the results using real M1 are not presented, since they are broadly consistent with those using real GM1.

During the period from 1975 to 1991, real GM1 had better leading information for output growth. But real M1+ has become the more relevant indicator since 1993.

Chart 3 shows the results of the rolling exercise for the 10-year correlations between output growth and the lagged two-quarter moving average of real money growth.[6] The following conclusions can be drawn from this chart:

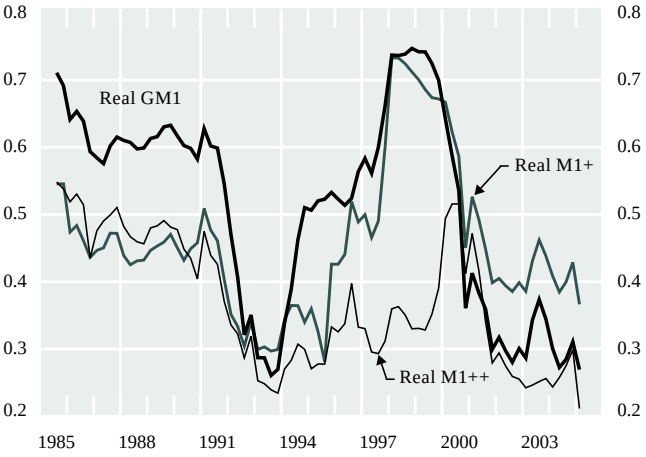
1) Over the period 1985 to 1996, the correlations using real GM1 were generally higher than those using real M1+ and real M1++. Over the period 2000 to 2005, however, there has been a clear deterioration in the correlations using real GM1. In the more recent period, the correlation using real GM1 has fallen to about 0.30, which is close to the lowest value over the entire sample.

2) Since 2000, the correlations using real M1+ outperformed the ones using real GM1.

Chart 3

10-Year Rolling-Window Correlations for the Growth of Real GDP and Real Lagged Monetary Aggregates (two-quarter moving average)

Quarter-over-quarter percentage change at annual rates



* Each observation shows the correlation for a 10-year period ending at the corresponding date.

3) The correlations pertaining to real M1+ have been fairly stable over the whole sample and have generally been around 0.45, on average.

These results suggest that a shift has likely occurred in the information content of real narrow monetary aggregates for output growth. While GM1 had higher correlations over the first part of our sample period, M1+ had stronger correlations in more recent years. Thus, the information content of real GM1 has deteriorated over time, while the information coming from real M1+ has been stable.

On a more formal basis, the results described in Box 2 support this view and determine that 1992 was the year when a shift occurred.[7] During the period from 1975 to 1991, real GM1 had better leading information for output growth. But real M1+ has become the more relevant indicator since 1993. This new regime is likely to persist, since the developments that made it difficult to distinguish between demand and notice deposits are permanent. This finding is consistent with the existence of a shift in the estimated parameters of the

5. This correlation corresponds to the 1985Q3 observation.

6. Correlations using the lagged two-quarter moving average are higher than those using only the first lag.

7. The correlations in Chart 3 cannot be used to isolate the date of the change in regime because they will include observations from both regimes for a period of 10 years following the change. Thus, we use the methodology in Box 2 to identify the period of regime change.

Box 2

Regime Shift in the Information Content of Narrow Monetary Aggregates

The correlations analysis provides evidence of changes in the relationship between output growth and the various narrow monetary aggregates. The exercise does not indicate, however, when these changes might have occurred, nor does it identify which narrow monetary aggregate has been the most informative over a certain period of time. In order to address these issues, a two-state regime-switching model for real GDP growth was estimated, using quarterly data from 1975Q1 to 2005Q1. For consistency with other parts of this article, the results are reported using the two-quarter moving average growth rate of money variables.[1, 2]

In regime 1, the monetary variable related to real GDP growth is real GM1, while in regime 2, the monetary aggregate of interest is real M1+. In addition to providing estimates of the parameters in these relationships, the model provides estimates of the probability of being in regime 1 (p_{1t}) or regime 2 (p_{2t}), with $p_{1t} + p_{2t} = 1$ in each quarter. If real GM1 were better at explaining output growth than real M1+ at observation t, p_{1t} would be higher than p_{2t}.

The estimated model is as follows:[3]

Regime 1

$$\Delta(GDP)_t = \underset{(4.67)}{2.86} + \underset{(1.52)}{0.18}*\Delta(GDP)_{t-1} + \underset{(4.33)}{0.27}*\Delta(GM1)_{t-1}$$

Regime 2

$$\Delta(GDP)_t = \underset{(1.47)}{0.52} + \underset{(4.36)}{0.48}*\Delta(GDP)_{t-1} + \underset{(2.97)}{0.20}*\Delta(M1+)_{t-1}$$

where Δ is the growth rate and t denotes time. In both regimes, the coefficients on money growth are positive and significantly different from zero. This suggests that monetary aggregates are useful for predicting output growth over the two regimes. Results in Chart B2 show that, over the period 1975 to 1991, the probability that output is best explained by regime 1 is near 1.0, on average. In comparison, over the period 1993 to 2005, the probability that output is best explained by regime 2 is near 1.0, on average. These results imply that real GM1 is better at explaining output growth up to 1991, while real M1+ has become the better indicator since 1993. They suggest that a shift to a new regime occurred around 1992.

We have also conducted the same exercise using other combinations of real narrow monetary aggregates (GM1 vs. M1++, M1 vs. M1+, and M1 vs. M1++); all results lead to the same general conclusion. That is, narrow monetary aggregates not affected by the distinction between demand and notice deposits (M1+ and M1++) have become more informative in predicting future output growth since 1993. The year 1992 represents a transition period when the model using GM1 became less informative than the one using M1+. This transition period corresponds to the time when the reserve requirements were being phased out.

1975Q4–1991Q4[4]

$$\Delta(GDP)_t = \underset{(4.61)}{2.25} + \underset{(2.46)}{0.26}*\Delta(GDP)_{t-1} + \underset{(4.28)}{0.27}*\Delta(GM1)_{t-1} \quad \bar{R}^2 = 0.38$$

$$\Delta(GDP)_t = \underset{(2.74)}{1.32} + \underset{(3.40)}{0.37}*\Delta(GDP)_{t-1} + \underset{(2.73)}{0.14}*\Delta(M1+)_{t-1} \quad \bar{R}^2 = 0.28$$

1993Q1–2005Q1

$$\Delta(GDP)_t = \underset{(1.60)}{0.89} + \underset{(3.77)}{0.46}*\Delta(GDP)_{t-1} + \underset{(2.05)}{0.10}*\Delta(GM1)_{t-1} \quad \bar{R}^2 = 0.32$$

$$\Delta(GDP)_t = \underset{(2.27)}{1.09} + \underset{(3.53)}{0.43}*\Delta(GDP)_{t-1} + \underset{(2.54)}{0.14}*\Delta(M1+)_{t-1} \quad \bar{R}^2 = 0.35$$

We also regress simple linear equations for the two subperiods, 1975Q4 to 1991Q4 and 1993Q1 to 2005Q1. As shown in the equations above, in the first period (1975Q4–1991Q4), the explanatory power ($\bar{R}^2$) of the equation using GM1 is higher than that using M1+. In the second period, however, the equation using M1+ is shown to have a higher explanatory power.[5] In addition, the coefficient on real GM1 is much higher in the first period than in the second. These results confirm our findings using regime-switching models.

1. For more details, see the forthcoming Bank of Canada Working Paper by Chan, Djoudad, and Loi, "Changes in the Indicator Properties of Narrow Monetary Aggregates."

2. Using one-quarter lagged money growth (instead of the two-quarter moving average) would not change the qualitative results presented here.

3. Bracketed terms are *t*-statistics.

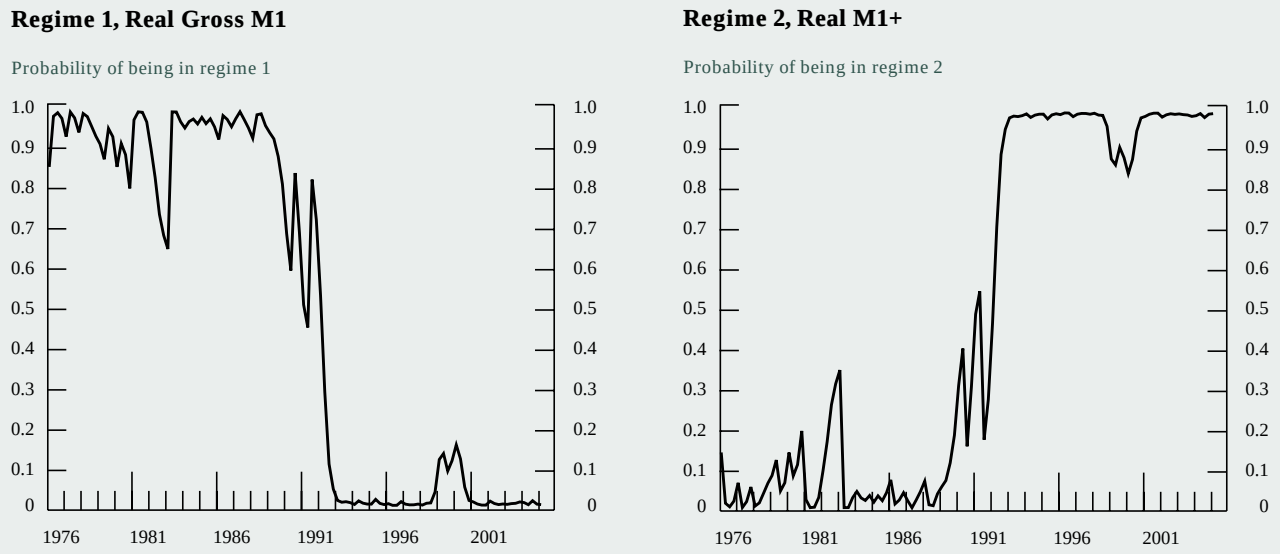
4. Bracketed terms are *t*-statistics.

5. The higher explanatory power of M1+ compared with GM1 is even more noticeable if we consider alternative specifications. For more details, see Chan, Djoudad, and Loi (forthcoming).

Box 2 (cont'd)

Chart B2

Real Gross M1 vs. Real M1+ as an Indicator of Real Output Growth



money demand equation that occurred over that period (Hendry 1995; Maclean 2001).

Conclusion

Financial innovations and the removal of reserve requirements have made the distinction between demand and notice deposits artificial. As a result, financial institutions are finding it increasingly difficult to allocate new accounts between these two categories. Thus, there are growing concerns that this change may have eroded the leading information of M1 and GM1 for future GDP growth. Consequently, M1 and GM1 may no longer provide more information than M1+ and M1++.

Our findings suggest that the leading-indicator properties of M1, GM1, M1+, and M1++ for GDP growth have shifted over time. Previous empirical results had suggested that real M1 and real GM1 were traditionally better indicators for future output growth. More recently, however, real M1+ has become more informative. Thus, we find evidence in favour of the existence of a regime shift in the indicator properties of narrow money for output growth. This regime change occurred in 1992 and is likely to persist.

When constructing the narrow monetary aggregates, the primary goal was to capture the supply of transactions money. Given institutional changes and financial innovations, the concept of transactions money is no longer likely to be adequately captured by GM1 or M1. We argue that the broader measure M1+ now better defines transactions money. Indeed, today there is less need for agents to carefully consider their holding of cash, since many non-term assets are easily converted into cash. This renders the distinction between demand and notice deposits less relevant for money demand.

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Estimating the Impact of Monetary Policy Surprises on Fixed-Income Markets*

Jason Andreou, Financial Markets Department

- *The Bank of Canada has a keen interest in understanding the impact of changes to its key policy rate on the prices of financial assets.*
- *The impact of policy surprises on asset prices can be used to infer financial markets' interpretation of policy decisions.*
- *A significant movement in yields at the short end suggests that markets are responding to the timing of policy actions, while the absence of a marked change at the long end suggests that markets do not detect a shift in the policy objectives of the Bank.*
- *Measuring the response of asset prices to policy surprises in the periods before and after the introduction of a fixed schedule for announcing interest rate decisions provides some evidence that using fixed announcement dates has enhanced the credibility of the Bank.*

Understanding how its policy actions[1] affect the prices of financial assets is a subject of ongoing importance to the Bank of Canada. In this article, the first to measure the impact of policy surprises on fixed-income markets from a Canadian perspective, three questions are explored: What is the impact of policy actions on bond and bill yields; what is the impact on bond and bill yields when policy actions are decomposed into expected and surprise components; and what, if any, effect did the introduction of fixed announcement dates (FADs)[2] have on these responses. Specifically, we asked whether the greater transparency flowing from the Bank's introduction of the FADs increased the ability of market participants to anticipate changes to the policy rate. To assess the impact of the Bank's shift to the FAD regime, the sample used in this study is split into the pre-FAD and post-FAD periods. To provide an additional perspective, the results are compared with work done in the United States.

Previous Studies

This article examines the impact of monetary policy surprises on fixed-income markets in Canada before and after the introduction of the FADs. In their study

* Thanks to Éric Chouinard, Christine Fay, Scott Hendry, Grahame Johnson, Marianne Johnson, Chris Ragan, and Eric Santor, for comments, and to Sofia Assaf and François Bélanger for research assistance. This short version of a longer paper on the same topic was presented to the Bank's Governing Council on 12 November 2004.

1. Policy actions are decisions by the Bank that affect its key policy rate, the target for the overnight rate, which is the midpoint of the Bank's operating band for overnight financing.

2. In December 2000, the Bank of Canada implemented a new procedure in which policy actions would typically be considered only on eight pre-announced dates each year. To date, only one change has been made between FADs: on 17 September 2001, the Bank lowered the target for the overnight rate by 50 basis points (bps) following the 11 September 2001 terrorist attacks. That policy action was not included in this study.

of the reaction of U.S. markets to monetary policy actions, Cook and Hahn (1989) find a response that is positive and significant at all maturities, but smaller at the long end of the yield curve. Kuttner (2000) revisits the Cook and Hahn methodology and records responses that are smaller and less notable across the entire curve. Kuttner then decomposes policy-rate changes into surprise and expected components and finds that the response from surprises is significant and uniformly prevalent across the yield curve. This work will be compared with the results presented below.

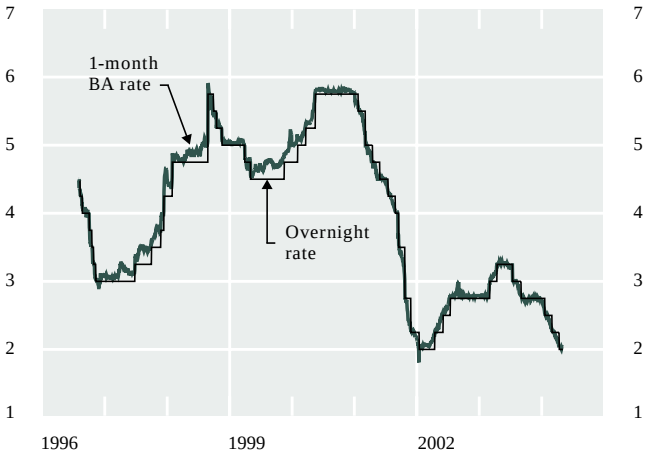
Specifically, we asked whether the increased transparency flowing from the Bank's introduction of the FADs increased the ability of market participants to anticipate changes to the policy rate.

Kohn and Sack (2003) examine whether certain central bank communications have an impact on financial variables. Beyond the empirical work, which demonstrates that statements from members of the Federal Open Market Committee (FOMC), as well as congressional testimony, have an impact on short- and medium-term interest rates, they offer a framework for analyzing these effects that differentiates between surprises resulting from the timing of policy changes and more fundamental surprises concerning the direction of monetary policy, with specific reference to the goals and credibility of the central bank. Movements in shorter-term interest rates are generally classified as responses to the *timing* (i.e., as happening this month vs. next month) of policy changes (independent of the near-term economic outlook).[3] Movements in longer-term rates are classified as responses to the longer-term *economic outlook* of monetary policy and reflect expectations about changes to the direction of policy or, more fundamentally, changes to the goals or credibility of the central bank. Although Kohn and Sack's study includes policy actions, testimony, and speeches, in this article their framework will be used to better understand only the information content of policy actions.

3. Kohn and Sack refer to these changes as policy-inclination changes, but in this article we will describe them as policy-timing changes.

Chart 1

One-Month Banker's Acceptance Rate



Methodology

Work in the United States (Kuttner 2000; Bernanke and Kuttner 2003) typically uses movements in the federal funds futures contract to measure market expectations of future changes in the federal funds rate. This instrument is generally preferred because it is valued at the expected average federal funds rate over the holding period.[4] Since a similar market-based proxy of interest rate expectations is not available for Canadian markets, [5] the 1-month banker's acceptance (BA) rate is used in our study. The 1-month BA is a tradable corporate obligation that is backed by a line of credit and is guaranteed by the accepting banks. Johnson (2003) finds that it is the 1-month instrument that best correlates with movements in the overnight rate;[6] as Chart 1 shows, the yield on the 1-month BA closely tracks the overnight rate.

4. Rigobon and Sack (2002) and Poole and Rasche (2003), among others, use eurodollar futures as market-based measures of expectations of changes to the policy rate.

5. The overnight repo rate futures contract (ONX) is modelled after the U.S. federal funds futures contract. Pricing of this instrument is based on the expected average overnight rate during the contract period as measured by CORRA (the Canadian overnight repo rate average), which is based on inter-dealer broker data. The ONX contract is relatively new, and trading is not as liquid as it is with other money market instruments.

6. Johnson tested six different money market instruments and found that the 1-month BA is the best instrument for measuring implied expectations. Based on his model of the expectations hypothesis, a theory of interest rates that states that a longer-term single-yield interest rate is the geometric average of expected future short-term rates plus a risk premium (see Johnson 2003), Johnson found that, in the 1-month sector, BAs had the highest adjusted R^2 and the lowest term premium (in absolute values).

Although the 1-month BA is not directly linked to the overnight rate in the same way that the federal funds futures contract is to the federal funds target rate, 1-day changes to the 1-month BA can be used to decompose changes in the policy rate into expected and surprise components. We follow Kuttner's methodology and assume that the 1-day change in the 1-month BA rate that occurs on the day when the policy rate is moved reflects the surprise component of the move. This is based on the assumption that a portion of the policy move is anticipated by market participants and is priced into the BAs before the policy change occurs. In equation (1), $\Delta\tilde{r}_t$ is the actual policy change, and Δr_t^s is the surprise component. The difference between the actual move and the surprise component is the expected move:

$$\Delta\tilde{r}_t^e = \Delta\tilde{r}_t - \Delta r_t^s \qquad (1)$$

However, two considerations influence the results that follow. First, the analysis is limited to the 1-day changes in asset prices that accompany a policy action, and it is assumed that market participants are aware of all policy actions as they occur. During the pre-FAD period, policy rates could change on any date, and thus there was no clear means of distinguishing between true surprises (i.e., actual changes to the policy rate) and the absence of a policy change on a specific date. Therefore, in the pre-FAD period, only actual changes in the overnight rate are considered to be policy actions. In the post-FAD period, every FAD date is considered a policy action, whether or not the policy rate was changed.[7]

During the pre-FAD period, policy rates could change on any date . . . and thus there was no clear means of distinguishing between true surprises and the absence of a policy change on a specific date.

The second consideration is that the simple equation used to explain the 1-day movement in asset prices assumes that the policy-rate change was the significant factor affecting the 1-day movement on that date. That is, other factors, such as a data release or other market events, are subsumed into the error term of equation (2) (below). A possible concern with this approach is that there may be a shock to the 1-day change in the 1-month BA rate that is correlated with the change in market yields—the dependent variable in equation (2). This is unlikely, given the nature of the BA and the fact that the policy-rate decision is likely to be the dominant event on the days examined.[8] (FADs are planned so as not to occur on the same day as the release of major economic data or other known important events.)

The sample period for the study, August 1996 until May 2004, includes 49 days when announcements about the policy rate were made. Throughout this period, the Bank used the target for the overnight rate as the monetary policy instrument. The sample is divided into two subsets: the 21 announcements that occurred before the FADs were introduced and the 28 announcements made on FADs. The 28 post-FAD observations include all announcements, whether the policy rate was changed or not. Table 1 shows the dates of the policy-rate announcements, along with the actual policy actions, as well as the expected and surprise components, as defined by equation (1).

Results

Full sample

The format employed by Kuttner (2000), which applied the methodology of Cook and Hahn (1989), was used to estimate the following linear equation in order to examine the 1-day response of market rates to policy actions.[9] The 1-day change in yields, ΔR_i, was regressed using ordinary least squares on the change in the target for the overnight rate, $\Delta\tilde{r}$, such that

$$\Delta R_i = \alpha^i + \beta^i \Delta\tilde{r}_t + \varepsilon_t^i \qquad (2)$$

where the market rates are 1-day changes in yields of Government of Canada treasury bills and benchmark

7. For example, on 4 September 2002, markets had expected an increase of 21 bps, but the Bank kept the key policy rate constant. This resulted in a surprise of -21 bps—the Δr_t^s component in equation (1).

8. One means of reducing the likelihood of this coincidence of events would be to shorten the event window. Bauer and Vega (2004) use intraday data to estimate high-frequency monetary policy shocks in the United States and then show that these shocks have an effect on the cross-section of international equity returns.

9. The full sample of policy decisions is shown in Table 1.

Table 1

Actual Policy Actions Decomposed into Expected and Surprise Components (bps)

Date	Actual	Expected	Surprise
09 Aug 96	-22	-18	-4
22 Aug 96	-25	-19	-6
02 Oct 96	-25	-10	-15
17 Oct 96	-25	-24	-1
28 Oct 96	-25	-24	-1
08 Nov 96	-25	-24	-1
26 Jun 97	25	7	18
01 Oct 97	25	24	1
25 Nov 97	25	12	13
12 Dec 97	50	21	29
30 Jan 98	50	15	35
27 Aug 98	100	15	85
29 Sep 98	-25	-32	7
16 Oct 98	-25	-30	5
18 Nov 98	-25	-23	-2
31 Mar 99	-25	-7	-18
04 May 99	-25	-6	-19
17 Nov 99	25	19	6
03 Feb 00	25	26	-1
22 Mar 00	25	24	1
17 May 00	50	48	2
05 Dec 00	0	0	0
23 Jan 01	-25	-22	-3
06 Mar 01	-50	-33	-17
17 Apr 01	-25	-28	3
29 May 01	-25	-28	3
17 Jul 01	-25	-23	-2
28 Aug 01	-25	-25	0
23 Oct 01	-75	-49	-26
27 Nov 01	-50	-47	-3
15 Jan 02	-25	-48	23
5 Mar 02	0	0	0
16 Apr 02	25	20	5
04 Jun 02	25	24	1
16 Jul 02	25	25	0
4 Sep 02	0	21	-21
16 Oct 02	0	0	0
3 Dec 02	0	0	0
21 Jan 03	0	1	-1
04 Mar 03	25	20	5
15 Apr 03	25	23	2
3 Jun 03	0	3	-3
15 Jul 03	-25	0	-25
3 Sep 03	-25	-26	1
15 Oct 03	0	-1	1
2 Dec 03	0	-2	2
20 Jan 04	-25	-24	-1
02 Mar 04	-25	-25	0
13 Apr 04	-25	-25	0

bonds. The results reported in Table 2a show the relationship between changes in the market rates and policy actions over the sample period. Table 2b shows the results for the United States, which are taken from Kuttner (2000).

The coefficients decline in magnitude as the maturity increases for both countries. This result is consistent with the expectations hypothesis of interest rates (see footnote 6), considering that policy-rate changes would

Table 2a

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Policy Actions*

Maturity	Intercept	Response	R^2
3-month	2.5 (1.0)	36.5 (3.2)	0.50
6-month	2.4 (1.1)	29.7 (3.4)	0.46
1-year	2.1 (1.2)	26.5 (3.9)	0.42
2-year	2.1 (1.5)	21.2 (4.8)	0.33
5-year	1.2 (0.9)	10.3 (2.6)	0.13
10-year	-0.2 (-0.2)	5.9 (2.0)	0.09
30-year	-0.4 (-0.5)	2.4 (1.1)	0.02

* Bracketed terms are *t*-statistics.

Table 2b

The One-Day Response of Yields on U.S. Bonds and Treasury Bills to Changes in the Target for the Federal Funds Rate*

Maturity	Intercept	Response	R^2
3-month	-3.0 (2.4)	23.8 (6.2)	0.49
6-month	-5.0 (3.5)	18.4 (4.0)	0.29
1-year	-5.5 (3.4)	21.6 (4.3)	0.32
2-year	-5.2 (3.4)	18.2 (3.7)	0.26
5-year	-4.5 (2.9)	10.4 (2.1)	0.10
10-year	-4.0 (2.9)	4.3 (1.0)	0.02
30-year	-3.6 (3.2)	0.1 (0.0)	0.00

* Bracketed terms are *t*-statistics.
Source: Kuttner (2000)

be expected to have their strongest impact at the shortest maturity. The coefficients on the Canadian results are generally higher than those reported by Kuttner for U.S. market rates.

In the U.S. study, the shortest maturities present something of an anomaly: the response of the American 6-month Treasury bill is less than that of the 1-year bill. In addition, the response of the 3-month Canadian treasury bill was substantially higher than that of its U.S. counterpart. A possible explanation may be found in the institutional structure of the U.S. Treasury bill market, where many of the large participants in the market, particularly foreign central banks, use these short-term bills as cash-management tools, thus rendering them relatively price insensitive.

We can interpret this lack of response in longer rates as a signal that market participants are reacting to policy-timing changes . . . and not to policy-direction changes.

The results for both countries suggest that, beyond the 5-year maturity, the response of market rates to changes in the policy rate is not significant. Following Kohn and Sack (2003), we can interpret this lack of response in longer rates as a signal that market participants are reacting to *policy-timing* changes (i.e., information about the timing of interest rate moves; in the Canadian case in particular, those seen as necessary to achieve the inflation target), and not to *policy-direction* changes (i.e., information about the economic outlook—specifically the central bank's long-term policy goals). Policy-timing changes affect short-term rates, while policy-direction (or economic-outlook) changes affect longer-term rates. Nevertheless, it is worth noting the general direction of monetary policy over the sample period. For the Canadian study, 25 of the 49 policy actions were decreases in the policy rate, and in fact, the overall period can be considered one of policy easing.[10] From the beginning to the end of the sample, the policy rate declined from 4.5 per cent to 2.25 per cent. To the extent that market participants were aware of the economic outlook and of the general direction of monetary policy, one would not expect to see a reaction at longer maturities. Although the sample used in the U.S. study contains periods of both easing and tightening of policy rates, the easing is more pronounced, since 30 of the 42 rate changes were decreases in the policy rate.

Split sample

Beginning in December 2000, the Bank of Canada adopted a policy of announcing decisions concerning the target overnight rate on eight pre-announced dates each year. One of the purposes of this article is to examine whether the increased transparency resulting from the Bank's introduction of the FADs has increased the ability of market participants to anticipate changes to the policy rate. A caveat is that the two samples (21 and 28 observations, respectively) are small and suffer from the possible biases associated with small samples. The results of the split sample are presented in Tables 3 and 4.

The response of market rates is greater in the pre-FAD period (Table 3) for all maturities, compared with the results for the full sample (Table 2a) and those for the post-FAD period (Table 4). As well, the coefficient on the response to a policy-rate change is significant in the pre-FAD sample through all maturities except the 30-year bond. For the post-FAD sample, the coefficient is significant only until the 1-year maturity, after which the response is not significantly different from zero.[11]

A possible explanation for this result is that policy-rate changes have become more widely anticipated in the post-FAD sample than in the pre-FAD sample, for two reasons. First, the introduction of the FADs removed much of the timing uncertainty associated with rate changes. Second, research at the Bank (Gravelle and Moessner 2002; Muller and Zelmer 1999) suggests that, before the FADs, the goals of monetary policy may not have been clearly understood. For example, although the Bank has had an inflation target since 1991, there were occasions during the mid-to-late 1990s when the Bank appeared to increase policy rates to support the currency when the Canadian dollar was falling relative to the U.S. dollar. Thus, it seems that, in the pre-FAD period, market participants interpreted policy-rate changes as signifying both the policy

10. There were 25 incidents of decreases in the overnight rate, 15 increases, and 9 dates on which the target did not change.

11. Despite the apparent differences when the sample is split, a Chow test for a structural break is not significant for any maturity. The result is the same if we run the full sample regressions with a dummy variable for the post-FAD period.

Table 3

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Changes in the Overnight Rate (pre-FAD sample, 21 observations)*

Maturity	Intercept	Response	R^2
3-month	2.2	45.9	0.59
	(0.63)	(3.30)	
6-month	2.5	35.6	0.54
	(0.78)	(3.17)	
1-year	2.3	30.9	0.57
	(1.02)	(4.97)	
2-year	2.5	26.0	0.46
	(1.05)	(4.05)	
5-year	-0.1	16.1	0.39
	(-0.05)	(3.46)	
10-year	-1.5	10.0	0.24
	(-1.03)	(2.47)	
30-year	-2.0	5.8	0.12
	(-1.56)	(1.63)	

* Bracketed terms are *t*-statistics.

Table 4

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Policy Actions (post-FAD sample, 28 observations)*

Maturity	Intercept	Response	R^2
3-month	0.5	20.6	0.29
	(0.27)	(3.25)	
6-month	0.8	19.3	0.27
	(0.49)	(3.07)	
1-year	0.8	18.4	0.19
	(0.40)	(2.48)	
2-year	0.5	12.0	0.10
	(0.25)	(1.73)	
5-year	0.9	3.0	0.01
	(0.50)	(0.42)	
10-year	0.2	1.6	0.01
	(0.18)	(0.41)	
30-year	0.5	0.2	0.00
	(0.64)	(0.06)	

* Bracketed terms are *t*-statistics.

timing and the policy goals of Canadian monetary policy (since there was significant movement in both short- and long-term rates).

The results for the post-FAD sample indicate that monetary policy appears to have been better anticipated during this period. The magnitude of the response is lower than in both the full sample and the pre-FAD sample, and the coefficient on the response to a change in the overnight rate is not statistically significant at the 2-year maturity and beyond. These results are consistent with those from Parent, Munro, and Parker (2003) with respect to the increasing transparency surrounding the Bank's policy-rate decisions. Interpreting this within the Kohn and Sack (2003) framework, this may imply that, post-FAD, financial markets now interpret policy-rate decisions as containing information only about the timing of policy actions and not as signals of changes to policy goals.

These results are also similar to those of Kuttner (2000) and Roley and Sellon (1995), who observe that, for the United States, the response of market rates to policy-rate changes has diminished relative to those observed in earlier studies. This is consistent with changes made by the U.S. Federal Reserve to increase the transparency of their monetary policy actions.[12]

Expected and surprise components of policy-rate actions (full sample)

Using the 1-month BA rate to measure expectations, and using these expectations to decompose policy-rate changes into expected and surprise components, a test is performed to determine whether the response of interest rates to the two components differs and what differences arise compared with our initial results. Following the methodology of Cook and Hahn (1989), the 1-day change in the yields was regressed on the two components of the policy-rate change,

$$\Delta R_i = \alpha^i + \beta_1^i \Delta \tilde{r}_t^e + \beta_2^i \Delta \tilde{r}_t^s + \varepsilon_t^i . \qquad (3)$$

The Canadian results are shown in Table 5a, while Kuttner's results for the United States are shown in Table 5b.[13]

Isolating the expected and surprise components alters the results significantly. As would be expected, the coefficient on the expected portion of the policy-rate change is statistically insignificant from zero for all maturities in the Canadian sample, while the surprise component is significant for all maturities except the 30-year bond. This is consistent with the notion that

12. For more information on these changes in the United States, see Poole and Rasche (2003).

13. Equation (3) introduces a problem concerning an error in the variables, since the decomposition is inferred rather than measured. An examination of the residuals from equation (3) suggests that this problem is minor and can be assumed away.

Table 5a

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Expected and Surprise Components of Policy Actions*

Maturity	Intercept	Expected	Surprise	R^2
3-month	-0.2	3.7	92.1	0.92
	(-0.25)	(0.96)	(24.81)	
6-month	0.1	1.7	77.3	0.89
	(0.10)	(0.57)	(18.86)	
1-year	0.1	2.7	66.8	0.78
	(0.14)	(0.69)	(12.23)	
2-year	0.2	-1.0	59.0	0.70
	(0.21)	(-0.25)	(10.13)	
5-year	0.1	-2.2	31.7	0.33
	(0.11)	(-0.49)	(9.53)	
10-year	-0.6	0.9	14.3	0.16
	(-0.66)	(0.25)	(2.78)	
30-year	-0.4	1.8	3.4	0.03
	(-0.55)	(0.58)	(0.78)	

* Bracketed terms are *t*-statistics.

Table 5b

The One-Day Response of Yields on U.S. Bonds and Treasury Bills to Expected and Surprise Components of Changes in the Target for the Federal Funds Rate*

Maturity	Intercept	Expected	Surprise	R^2
3-month	-1.5	12.3	50.4	0.60
	(1.2)	(2.5)	(5.7)	
6-month	-2.9	2.1	56.3	0.51
	(2.2)	(0.4)	(5.7)	
1-year	-2.6	-0.3	72.7	0.63
	(2.0)	(0.1)	(7.6)	
2-year	-2.8	-0.4	61.4	0.52
	(2.0)	(0.1)	(6.0)	
5-year	-2.4	-5.8	48.1	0.33
	(1.6)	(0.9)	(4.3)	
10-year	-2.4	-7.4	31.5	0.19
	(1.8)	(1.3)	(3.1)	
30-year	-2.5	-8.2	19.4	0.13
	(2.2)	(1.7)	(2.3)	

* Bracketed terms are *t*-statistics.
Source: Kuttner (2000)

market rates react only to new information that comes available on the date of an event.

Another key result is that, for each maturity, the coefficient of the surprise component is larger than the coefficient on the actual change (see Table 1). This is to be expected, since the initial regression results are contaminated by the inclusion of the expected component, whose coefficient is not significantly different from zero. As well, the responses are larger than the results obtained by Kuttner for the United States.[14]

The difference between the response estimated by Kuttner and our results is evident. At the shortest maturity, the results suggest that a surprise increase of 100 basis points (bps) in the overnight rate is associated with an increase of 92 bps in the yield on the 3-month treasury bill, while the same change in the federal funds target rate would lead to an increase of only 50 bps in the yield on the U.S. 3-month Treasury bill. As well, 92 per cent of the variation in the 3-month bill that is observed on days when the policy rate moves are explained by the expected and surprise components of the policy-rate change. This is considerably larger than the U.S. results.

The results support the notion that the Bank's policy goals are well understood by market participants, since policy-rate surprises do not have much impact on the yields of longer maturities.

The results suggest that Canadian long yields are less sensitive to surprises than U.S. long yields. This finding supports the notion that the Bank's policy goals are well understood by market participants, since policy-rate surprises do not have much impact on the yields of longer maturities.

Expected and surprise components of policy-rate actions (split sample)

The impact of the FADs is again examined by splitting the sample into pre- and post-FAD periods. Tables 6 and 7 display the results. The magnitudes of the coefficients are not noticeably different from the full sample results, and the pattern of responses is similar to what was seen when the initial regression was divided

14. Before making a comparison between the Canadian and U.S. studies, the caveat must be noted that each study uses a different measure of expectations. However, the patterns are still similar to what was observed in the previous section. At the short end, greater magnitude of response is seen in the Canadian data, but this declines sharply as the maturity of the market instrument increases. As before, we see an anomaly in the U.S. data, in that the surprise component initially increases as the maturity increases, up to one year.

Table 6

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Expected and Surprise Components of Changes in the Overnight Rate (pre-FAD sample, 21 observations)*

Maturity	Intercept	Expected	Surprise	R^2
3-month	-1.0	-0.8	94.8	0.92
	(-0.69)	(-0.12)	(14.12)	
6-month	-0.3	-4.9	78.0	0.93
	(-0.28)	(-0.95)	(14.56)	
1-year	0.1	-0.5	63.7	0.88
	(0.10)	(-0.10)	(11.02)	
2-year	0.2	-6.1	59.6	0.85
	(0.17)	(-1.03)	(9.71)	
5-year	-1.4	-2.7	35.8	0.67
	(-1.05)	(-0.46)	(5.88)	
10-year	-2.2	0.2	20.3	0.37
	(-1.54)	(0.03)	(3.08)	
30-year	-2.2	3.5	8.2	0.13
	(-1.60)	(0.57)	(1.30)	

* Bracketed terms are *t*-statistics.

Table 7

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Expected and Surprise Components of Policy Actions (post-FAD sample, 28 observations)*

Maturity	Intercept	Expected	Surprise	R^2
3-month	0.6	7.4	91.6	0.90
	(0.94)	(2.81)	(14.88)	
6-month	1.0	6.9	85.3	0.82
	(1.15)	(2.03)	(10.62)	
1-year	0.9	6.0	84.5	0.64
	(0.69)	(1.09)	(6.51)	
2-year	0.6	2.5	62.8	0.43
	(0.43)	(0.42)	(14.68)	
5-year	1.0	-1.1	24.6	0.07
	(0.76)	(-0.16)	(4.34)	
10-year	0.2	1.9	0.2	0.01
	(0.17)	(0.43)	(0.02)	
30-year	0.5	1.5	-7.3	0.05
	(0.62)	(0.51)	(-1.03)	

* Bracketed terms are *t*-statistics.

into two samples. The coefficients on the pre-FAD surprise components are significant at all maturities except the 30-year bond, while the coefficients on the post-FAD surprise components lose significance after the 5-year bond. Conclusions similar to those noted for the full sample are derived on this divided sample.[15] In the pre-FAD sample, the fact that the surprise component remains significant as maturities increase may suggest that, in this period, the reaction of market participants to policy-rate changes reflected an understanding of both the policy-timing decisions and the policy goals of the Bank. In the post-FAD sample, the results suggest that market participants are reacting only to the timing aspect of a policy action, such that surprises may be more a question of timing than of direction. Again, it is worth noting that, in the post-FAD period, the majority of policy actions were decreases in policy rates, and the period can be considered one of policy easing. Thus, the direction may have been more apparent to market participants even without the introduction of the FADs.

Conclusion

The purpose of this article was threefold: to estimate the impact of raw policy-rate actions on fixed-income markets; to estimate the impact of surprise policy-rate actions on fixed-income markets; and to assess whether the introduction of the FADs has affected these results, including markets' perceptions. The main finding is that unexpected policy actions by the Bank of Canada have a significant effect on market rates at the shorter end of the yield curve, with the effect dissipating as the maturity increases. This finding implies that policy actions signal only the timing of interest rate changes necessary to achieve the Bank's inflation target and do not signal its longer-term policy goals. A second finding is that the impact on longer-term interest rates of a surprise action by the Bank has diminished since the introduction of the FADs. This suggests that the Bank's long-term policy goals are well understood and credible, since the lack of movement in the long end indicates that market participants do not view surprises as inconsistent with the Bank's inflation target.

15. As with the full sample, a Chow test for a structural break between the two periods is rejected at the 5 per cent level for all maturities.

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Recent Trends in Canadian Defined-Benefit Pension Sector Investment and Risk Management

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- *Defined-benefit (DB) pension funds continue to account for the largest share of the assets of employer pension funds.[1] In recent years, many DB pension plans have become underfunded, prompting a reassessment of investment and risk-management practices.*
- *In Canada, as in other industrialized countries,[2] funding deficits have highlighted the challenges of managing the financial risks of older DB pension plans that have a high ratio of retired to active employees. There has been substantial growth in pension assets and liabilities as the workforce has aged and benefit obligations have accrued. Consequently, short-term volatility in pension fund returns can have an increasingly large effect on the financial status of the plan sponsor.*
- *In light of these challenges, there is a broader interest in liability-driven approaches to investment and risk management. This has not yet resulted in a significant reallocation of assets, but as funding improves and the workforce continues to age, pension funds could shift an increasing share of portfolio assets into fixed-income securities that provide a better match to plan liabilities.*
- *Low interest rates and reduced expectations for returns on publicly traded equities are also influencing pension sector investment, prompting many plan sponsors to invest in alternative assets and to shift more resources into active management.*

Many Canadian defined-benefit (DB) pension funds[3] have become underfunded in recent years, in sharp contrast to the late 1990s, when numerous pension funds had large actuarial surpluses.[4] A severe downturn in global equity markets from 2000 to 2002 reduced the value of pension assets substantially because many pension funds had large allocations to equities. At the same time, a decline in long-term interest rates increased the present value of accrued pension liabilities.

Over the short term, continued improvement in pension fund returns[5] and an increase in interest rates would help to alleviate pension underfunding. However, the deterioration in the financial health of DB pension plans has underlined various longer-term structural issues that could make it increasingly difficult for plan sponsors to manage the financial risks of DB plans.[6] For example, improved longevity and generous benefits, such as an early-retirement

1. DB and defined contribution (DC) are the two basic types of benefit associated with employer pension plans. At the end of 2002, DB plans accounted for 92 per cent ($512 billion) of the assets of trusteed pension plans, compared with 7 per cent ($42 billion) for DC and combined DC/DB. The focus of this review is on the DB pension sector, but it should be noted that there has been an increasing trend towards DC plans over the past 15 years.

2. DB pension sector underfunding is not unique to Canada. Beginning in about 2002, the DB pension sector became underfunded in other countries, including the United Kingdom and the United States.

3. We examine both public (PS) and corporate (private) sector (CS) pension funds. PS plans are subject to somewhat different regulation, accounting, and incentive structures; however, they are generally funded similarly to CS plans and face common investment and risk-management issues. A key difference is that taxpayers assume the role of shareholders and could ultimately bear the cost of PS pension deficits.

4. The funded status of DB plans in the Canadian private sector is explored in Armstrong (2004). Note that many PS pension funds are underfunded as well.

5. Median nominal pension fund returns for a typical balanced fund were 13.5 per cent in 2003 and 10.1 per cent in 2004 (RBC Global Services).

6. A number of these issues pertain to weaknesses in the design and regulation of DB plans, a topic which is generally beyond the scope of this article. For a discussion of these issues, see Ambachtsheer (2004), Bonnar and Service (2004), and CGA Canada (2004). Note also that public consultations on the regulation of DB pension plans were launched this year by the federal government (for federally regulated pension plans) and by the Régie des rentes du Québec. See the respective websites for more details (http://www.fin.gc.ca/activty/consult/PPBnfts_e.html and http://www.rrq.gouv.qc.ca/en/programmes/rcr/consultation_financement.ht).

option, have increased the cost of providing a DB plan by lengthening the period for paying out the pension benefit. At the same time, the assets and liabilities of DB plans have grown substantially as the workforce has aged, sometimes equalling or exceeding the market capitalization of the firm. As we have seen in recent years, swings in pension fund performance can cause increasingly large unexpected cash contributions and adjustments to the financial results of plan sponsors.[7]

Investment strategies focused mainly on asset returns are giving way to a liability-driven approach to investment and risk management.

To better address these risks, a number of plan sponsors appear to be directing more time and effort towards aligning the funding of pension plans with investment policy. Investment strategies focused mainly on asset returns are giving way to a liability-driven approach to investment and risk management. The broad interest in this type of approach is tempered, however, by such factors as the need to eliminate funding deficits, a low yield environment, and changing investment beliefs. With regard to the latter, most fund managers expect that traditional asset classes will produce modest returns, at best, over the next decade or more, presenting a considerable challenge for returning pension funds to financial health.

Objectives and Scope

In this article, we examine how funding deficits, a greater focus on plan liabilities, a low yield environment, and changing investment beliefs are influencing investment decisions in the Canadian DB pension sector, which includes both public sector (PS) and private (corporate) sector (CS) funds. We focus on the main emerging trends and consider the implications for domestic financial markets. Over the past two decades, the assets of Canadian trusteed pension funds, which include both DB and DC plans, have grown considerably, to a market value of $688 billion,[8] equivalent to about 50 per cent of gross domestic product (GDP). Even a small reallocation of sector assets, for example, from publicly traded equities to long-term bonds, has implications for the efficiency and stability of financial markets and government borrowing programs.

Our findings draw heavily on interviews with industry professionals, since the existing data sources are limited, particularly with regard to investment policy and risk management. The information acquired in interviews complements that obtained from a literature review, selected PS pension fund annual reports, and an analysis of the available data sources.[9] Interviews were conducted with representatives of selected public and private sector DB pension plans, multi-fund asset managers, the Canada Pension Plan (CPP), and consultants.[10] The selection of interviewees was biased towards mid- to large-sized pension funds,[11] since these funds represent a large share of overall sector assets and tend to be innovative in investment strategy and risk management. Interviews were held with managers of PS pension funds and assets[12] that collectively totalled over $280 billion at the end of 2003. CS pension funds were selected both on the basis of size and to include a broad cross-section of industry groups; these funds managed assets of nearly $50 billion.

We begin by describing how DB pension plans are funded. This leads into a discussion of changing views regarding the equity-risk premium (ERP). We then examine the shift towards liability-centred approaches to investment and how these developments are beginning to influence pension sector investment in three related areas: a reduced exposure to publicly traded

7. For example, off-balance-sheet debt, such as pension fund liabilities, is beginning to be reflected in the firms' credit rating. In 2002, Standard and Poor's downgraded the ratings of General Motors Corporation (GM) and Ford Motor Credit Company (Ford), citing pension deficits as the primary reason.

8. As of 1 December 2004 (Statistics Canada). Trusteed pension plans (see De Leon 1995–1996) are the main type of employer pension plan, accounting for 70 per cent of assets. The figures do not include the assets of the Canada and Quebec pension plans.

9. The available data on actual sector investment is typically highly aggregated, unweighted to adjust for the size of the pension fund, and may not adequately reflect the pension sector's use of derivatives to gain exposure to various assets.

10. Interviews were held in December 2004 and early 2005 with staff of the three largest actuarial/investment consulting firms: Mercer Investment Consulting, Watson Wyatt, and Towers Perrin. Consultants at Greenwich Associates were also interviewed.

11. The funds were selected from the *Benefits Canada* list of top 100 pension funds, which represent about 85 per cent of the assets of trusteed pension funds. Mid- to large-sized pension funds include those with assets above $900 million.

12. Including the Caisse de dépôt et placement du Québec, which manages the assets of the Quebec Pension Plan (QPP) and provincial PS plans.

equities in the policy asset mix, an increased role for active management, and greater attention to asset-liability (A/L) matching. We then consider additional influences on the pension sector: the limited supply of long-term bonds, the elimination of the foreign-property rule, and the movement towards fair-value pension accounting and a financial-economics approach to actuarial valuation. We conclude with a brief discussion of how these developments could influence financial markets over the longer term.

DB Pension Funding

In a DB plan, the retirement benefit is typically based on a formula that can be linked to an employee's wages or salary and years of employment. Pension regulation generally requires that the employer set aside assets to pre-fund the obligations as they accrue, with a view to ensuring that plan contributions and investment returns are sufficient to cover future benefit payments. The financial and longevity risks are largely borne by the employer.[13]

Plan contributions are typically pooled as a fund.[14] Plan sponsors aim to have their plan assets in the fund at least equal the present value of accrued liabilities, in accordance with regulatory requirements (see Box). It should be noted that plan liabilities are uncertain future obligations, linked to the specific terms of the plan and workforce demographics. Liabilities are estimated using several assumptions, including projected retirement age, expected longevity upon retirement, and wage and salary increases prior to retirement. In addition, liabilities are sensitive over time to emerging inflation, since the benefits of active employees are typically linked (directly or indirectly) to their wages, and retiree benefits are increased in line with some portion of price inflation by many plan sponsors. In effect, the plan liabilities are a stream of future cash flows that have similar characteristics to bonds. The values of both liabilities and fixed-income securities move inversely to changes in interest rates through the discount rate used to determine their present value.[15]

It is the plan sponsor's fiduciary responsibility to select a mix of assets that, combined with the desired level of plan contributions, will generate sufficient returns to ensure that liabilities are funded. There is a linkage between the overall level of investment risk taken and the expected level of contributions. Riskier assets can generate a higher return, reducing plan contributions over the long term. At the same time, investing in riskier assets exposes the plan to a greater risk of a shortfall, which could require special plan contributions over the near term. Historically, plan sponsors believed that the expected incremental return from investing in equities instead of bonds more than compensated them for accepting the additional volatility of equities, since it would reduce plan costs in the long run.

The persistence of funding deficits in recent years is largely attributable to the interest rate sensitivity of pension liabilities.

During the 1990s, many pension funds increased their stock allocations. As a result, the decline in global equity markets at the beginning of the decade contributed to poor performance of the asset portfolio and DB plan underfunding. The persistence of funding deficits in recent years, however, is largely attributable to the interest rate sensitivity of pension liabilities. In 2003 and 2004, pension assets grew, mainly as a result of a recovery in global equity markets and an increase in plan contributions. But liability growth kept pace, owing in part to a continued decline in long-term interest rates (Chart 1).[16] Consequently, the funded status of DB pension plans did not improve (Purcell 2005),

13. Longevity risk is the risk that plan beneficiaries will live longer, on average, than originally expected, increasing the time period for paying the benefit. Note that the employer is able to transfer some risks to the employees through increased contributions in a contributory plan or a reduction in pension or other types of benefit.

14. The term "pension fund" refers to total assets accumulated from plan contributions and the investment earnings on those contributions less benefit payments. "Pension plan" refers to the contractual arrangement that specifies the terms of the retirement benefits. A pension fund may manage the assets of one or more pension plans.

15. As a rule of thumb, consultants estimate that, for the average pension fund, a 1 per cent decrease in interest rates leads to a 10 per cent increase in the present value of plan liabilities.

16. Chart 1 shows the components of the Watson Wyatt Pension Barometer, constructed to provide a timely estimate (monthly) of the effects of expected asset and liability movements on the expected funding status of DB pension funds. The calculation is based on an index of DB pension plan liabilities, assets, and the funded ratio (asset/liability index) for a representative pension fund with an asset mix of 60 per cent equities and 40 percent fixed-income securities and with retirees representing half of the liabilities.

Box

Key Regulatory Influences on DB Pension Funding

The sponsor of a DB pension plan must set aside assets to fund uncertain future obligations that will require payouts over several decades. The funding of plan liabilities is mainly influenced by pension regulations specifying minimum funding rules and by tax policy.[1] Typically, regulators require an actuarial valuation of assets and liabilities to be completed at a minimum of once every three years.[2] The actuarial values of assets and liabilities are compared to determine the funded status of the plan, which is typically expressed as a ratio. A pension plan is considered to be in surplus if the funded ratio of assets to liabilities, in percentage terms, is greater than 100, in deficit if the ratio is less than 100, and fully funded if the ratio is equal to 100.

Two types of valuation are required for regulatory purposes: a going-concern (funding) valuation and a solvency valuation.[3] In the latter, assets are valued at market or fair value (with smoothing generally permitted over a period of up to five years) and wind-up values used for plan liabilities (i.e., there is no salary growth and the retirement age is assumed to be the age that maximizes the liabilities). Liabilities are usually discounted based on current market interest rates for Government of Canada bonds. Under existing provincial and federal legislation, plan sponsors must make special payments to eliminate any solvency deficiency within five years.[4]

A going-concern valuation assumes that the plan will continue indefinitely. It is based on long-run values for plan assets that typically incorporate the ERP expected over the long term. This assumption of a long-term return on assets (ROA) may also be used to discount plan liabilities, since a market interest rate is not required. A going-concern deficit must be funded by the employer within 15 years.

If pension plans have a funding deficit, as many currently do, the shortfall must generally be made up with an increase in employer contributions. However, plan sponsors may also have the option of reducing benefits, increasing employees' required contribution rates (in contributory plans), or closing the plan.

For the plan sponsor, one of the most contentious issues in the regulation of DB pension plans pertains to surplus ownership and risk sharing. Under current pension legislation and trust law (absent specific language in the instrument creating the plan), surpluses generated beyond statutory requirements are shared with plan members, while deficits are seen as the sponsor's responsibility.[5] This asymmetry of risk creates a disincentive for plan sponsors to build a surplus cushion[6] as protection against a period of adverse market conditions and ultimately makes it more challenging for plan sponsors to offer DB plans.[7]

The recent Supreme Court of Canada ruling in the *Monsanto* case involving the interpretation of Ontario's pension legislation has further highlighted the issue of surplus ownership. The ruling requires an immediate distribution of a portion of any actuarial surplus on partial plan wind-up. In the past, legislation had been assumed to mean that

1. At the federal level, pension funds are regulated under the Pension Benefits and Standards Act (PBSA) 1985, administered by the Office of the Superintendent of Financial Institutions (OSFI). The majority of pension plans are administered by provincial regulatory authorities. All provinces except Prince Edward Island have enacted pension benefits legislation with provisions similar to those of the PBSA.

2. Pension legislation is somewhat variable across jurisdictions. The discussion here is intended to present the most common practices.

3. Another type of valuation, an accounting valuation, is used to determine the pension expense reported in financial statements.

4. In 2004, the Government of Canada extended Air Canada's payment schedule for solvency deficiencies from five to ten years. Although that change applied only to Air Canada, the government intends to review ways to provide similar flexibility to all federal pension plans of companies under the protection of the Companies' Creditors Arrangement Act or the Bankruptcy and Insolvency Act. In 2003, New Brunswick amended the province's legislation to allow companies that meet certain conditions to make special payments to restore any solvency deficiency over a period not exceeding 15 years.

5. The asymmetry of risk is a complex issue and is not consistent across plans or regulatory jurisdictions.

6. There may be accounting incentives for doing so. See Wiedman and Goldberg (2002) and Zion (2002).

7. From the employee's perspective, there is a risk that promised pension benefits, which are a form of deferred compensation, may not be fully obtained. If there is a deficit in the future, the employee may be exposed to increased contributions, reduced benefits, or wage concessions as a result of the employer being forced to fund its pension deficit.

Box (cont'd)

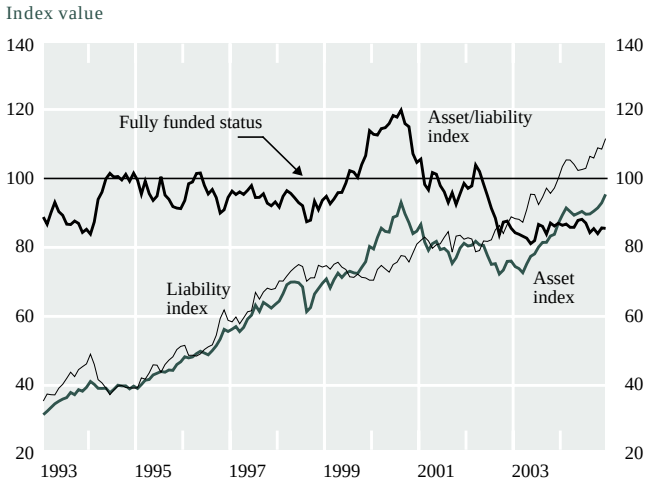
Key Regulatory Influences on DB Pension Funding

surplus distribution would occur at full wind-up when the final value of the plan assets and liabilities are known with certainty. Industry experts argue that plan sponsors affected by the recent *Monsanto* ruling will have even less incentive to target a surplus cushion in the future.

Another issue relates to the Income Tax Act (ITA) and the tax-exempt status of pension fund income. Under the ITA, if a plan has a surplus of assets over liabilities exceeding a specified regulatory threshold, sponsors may face a tax penalty if they do not cease making contributions. During the 1990s, this situation occurred often, and surpluses that could have provided a buffer in later years were distributed to current employees and pensioners. However, until surplus ownership rules provide more certainty for employers, an increase in the regulatory threshold limit is unlikely to result in higher employer pension contributions and higher surplus levels for most medium- and large-sized CS pension plans.

Chart 1

Estimated Funded Status of a Typical DB Plan



Source: Watson Wyatt

and plan sponsors faced higher contributions.[17] An increase in interest rates would reduce the present value of accrued liabilities, but the impact on funded status would also depend on the effect of higher interest rates on asset values.

Drivers of Change

Equity-risk premium[18] (ERP)

Plan sponsors have come to expect a substantial risk premium for investing in equities.[19] This belief has been supported by accepted actuarial practices that assume the use of a long-term, stable ERP to value assets and, in many cases, liabilities as well. In recent years, these views have been challenged, particularly the desirability of using a static, long-term ERP. Research has suggested that the ERP is time varying across a wide range of values and that expected returns in future time periods vary, depending on the starting point (e.g., Arnott and Bernstein 2002). Nonetheless, considerable debate regarding the value and behaviour of the ERP continues.

From a practical point of view, many pension funds have reduced their ERP assumptions in recent years; those of the pension funds that we interviewed ranged from 2 per cent to 3.5 per cent over long-term bonds. More broadly, consultants commented that their clients are using an ERP of, on average, about 3 per cent.

Several interviewees commented that they expect real pension fund returns over the next several years to be quite volatile and considerably lower than during the

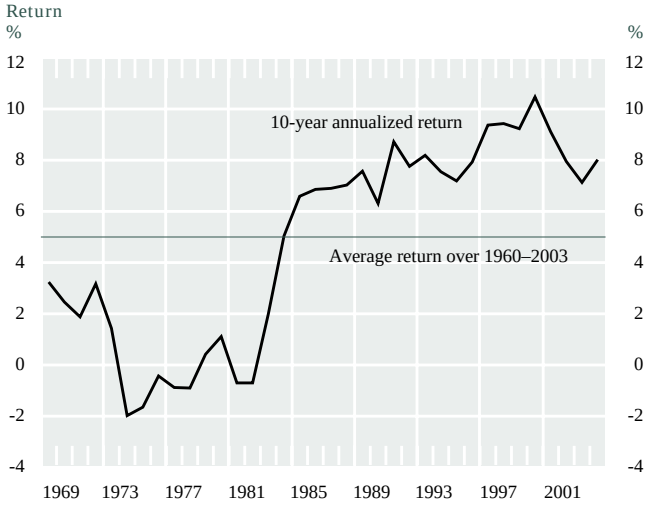
17. Trusteed pension plan contributions more than doubled between 2000 and 2004, from $12.4 to $30.3 billion, following the resumption of regular contributions by many plans that had been taking contribution holidays because of previous funding surpluses and special payments to eliminate funding deficits (Statistics Canada).

18. The ERP is the expected excess return earned on equities relative to the risk-free interest rate. For a pension fund, the relevant risk-free rate is that of an instrument with the same duration as plan liabilities, typically proxied using the rate on long-term (>10 years) bonds.

19. As a result, the allocation to equities has tended to rise over time, exceeding 60 per cent for a number of pension funds during the 1990s stock market bubble.

Chart 2

Median Real Pension Fund Returns



Source: Canadian Institute of Actuaries

1980s and 1990s, perhaps in line with those of the 1960s and 1970s[20] (Chart 2). Equity returns will likely depend on single-digit growth in earnings and dividends, since further expansion of the price-earnings ratio is unlikely. Given that yields are currently near historic lows, returns on fixed-income securities (nominal and real) are also expected to be modest.

Liability-focused investment

Historically, pension fund investment has tended to focus on asset returns.[21] Interviewees indicated that, until recently, many plan sponsors did not fully appreciate the interest rate sensitivity of plan liabilities and the risks of a large mismatch in the characteristics of the plan's assets and liabilities.[22] Investment tended to be asset-driven, with performance measured on a relative basis by comparing returns with those of the appropriate asset-class benchmark.[23] An acceptable return for the overall pension fund was typically defined by comparing the plan's performance against the median of a universe of pension plan returns. Recently, liabilities have been driving pension fund investment and risk management to an increasing extent.

In a liability-focused investment framework,[24] the objective of the policy asset allocation[25] is the maximization of the surplus (assets-liabilities) at a given level of surplus risk (standard deviation of surplus). Conceptually, a minimum-risk portfolio (MRP) provides a starting point for a plan sponsor seeking to reduce the size and possibility of unanticipated swings in the surplus. This portfolio is composed primarily of fixed-income securities that respond to changes in interest rates and inflation, much like the present value of the liabilities. Using this portfolio as a base, the policy asset mix is then developed relative to this minimum-risk position, with the risks of deviating from the MRP clearly articulated. Performance is measured relative to plan liabilities rather than to the market. A key benefit is that this approach provides the plan sponsor with a much better framework for understanding how long-term funding and contribution rates are linked to strategic-asset allocation—in other words, how funding policy is linked to investment policy.

A handful of pension funds have adopted a risk-budgeting framework that applies the techniques of financial risk management to pension funds.[26] Since the systems for measuring and monitoring risk are quite complex and resource intensive, few pension funds have implemented a pure risk-budgeting system. However, many funds are taking a risk-budgeting approach in A/L studies, where plan sponsors determine the risk budget[27]—the amount of risk that they want to take, typically defined as the maximum amount of surplus that could be lost in a year. The policy asset allocation is determined within the context

20. Over the 20-year period from 1964 to 1983, the median real return for a balanced fund averaged 1.2 per cent, based on data for a sample of pension funds.

21. Even though many pension funds engaged consultants to complete A/L studies, where both the assets and the liability cash flows are modelled to determine the appropriate policy asset mix.

22. Note that, at times, the focus on asset returns is a result of poorly designed governance and incentive structures, which, according to some industry experts (e.g., Ambachtsheer 2004), encourage the use of risky assets.

23. Managing risk relative to liabilities is somewhat more challenging, because liabilities are not market-based and are typically valued infrequently. For more detail regarding a liability-focused approach, see Waring (2004).

24. We use the term liability-focused investment as an alternative to A/L management to avoid a narrow interpretation. A/L (surplus-risk) management was applied to pension finance during the 1980s but was typically used in the restrictive sense of duration and cash-flow matching.

25. The principal tool used to manage risk. It determines the mix of assets that provide the greatest return for a given level of risk within the context of choosing the appropriate trade-off between expected contributions, pension expense, and long-term cost.

26. Risk budgeting is best suited to managing market and credit risk. See McCarthy (2000), de Bever (2003), and Urwin et al. (2001).

27. The risk budget, or surplus-at-risk (SAR), is defined in terms of the liabilities and is measured using value-at-risk (VAR). SAR is the amount by which the pension plan assets (policy asset allocation) might underperform the liabilities over a given period, at a specific confidence level (e.g., 95 per cent).

of the risk budget, that is, where best to undertake the risk, and in what amount.

Key Developments in Pension Investment and Risk Management

A greater focus on plan liabilities and reduced expectations for returns is affecting pension sector investment and risk management in three ways. First, a handful of large PS pension funds are beginning to modify their policy asset mix, reducing exposure to publicly traded equities in favour of alternative assets that enhance returns, reduce risk, and/or better match the long duration of plan liabilities. Second, limited A/L matching is being implemented in fixed-income portfolios to better manage funding risk. Finally, the passive management strategies that dominated pension investment in the 1990s are giving way to a renewed focus on active management. A related trend is towards freeing managers from benchmarks and specifying performance requirements in absolute rather than relative terms.[28]

The policy asset mix

The emergence of funding deficits has prompted considerable debate regarding the appropriate asset mix. The policy asset allocation of the majority of Canadian DB plans has been close to a 60/40 (equity/fixed-income) split since about the mid-1990s.[29] While there is no apparent consensus regarding the "optimal" asset mix,[30] some interviewees believe that current equity allocations are excessive, particularly given changing beliefs regarding the ERP. That said, pension funds that stayed the course in 2003 and 2004 were rewarded by the recovery in equity markets, particularly in 2003.

Some pension funds are considering a change in the policy asset mix to reduce exposure to the volatility of returns on publicly traded equities. However, given low yields on fixed-income securities, they are implementing the change through an increased allocation to alternative assets, including real estate, private equity, hedge funds, infrastructure, commodities, and timberland.[31] For strategic purposes, alternative assets are increasingly viewed as a third distinct asset class, based on properties that distinguish them from publicly traded equities and fixed-income securities.[32] They are incorporated into the asset portfolio as return enhancers, risk reducers, or both. Hedge funds, for example, have historically offered high returns but also provide diversification benefits, owing to the low or negative correlation of certain hedge-fund strategies with publicly traded securities. Alternative assets can also provide a better match to the long duration of pension liabilities.

Some pension funds are considering a change in the policy asset mix to reduce exposure to the volatility of returns on publicly traded equities.

Changing asset mix of selected large PS funds

For a handful of industry leaders, the asset mix has changed considerably over the past several years. Some large PS pension funds have reduced their exposure to publicly traded equities (and often to fixed-income securities as well) in favour of investments in alternative assets. To determine the extent of the shift, we reviewed the annual reports of the PS pension funds represented by the industry members that we interviewed.[33] We also included the CPP and the Quebec Pension Plan (QPP),[34] considering the large size of the assets under their management.[35] In aggregate, these entities managed assets of $341.8 billion at the end of 2003 ($259.3 billion if the CPP and QPP assets are excluded), or just under half of the assets of the

28. These trends are influencing the asset-management industry overall. See, for example, Bernstein (2003).

29. It should be noted that the 60/40 (equity/fixed-income) split is a simplification that is used mainly at the policy level. Many pension funds also had small allocations to other assets, such as real estate, cash, and private equity.

30. The optimal asset mix depends on several factors, many of them plan-specific. Recently, a long-standing debate as to whether pension funds should be invested primarily in bonds has been rekindled.

31. Some alternative assets are distinct asset classes, while others are best considered as investment strategies. Hedge funds, for example, are investment strategies using traditional asset classes, although they are often referred to as alternative assets.

32. The Ontario Teachers' Pension Fund has created an asset class based on liability-hedging properties. It includes infrastructure, Real Return Bonds, commodities, and real estate.

33. Included in this group are all pension funds known to have made large allocations to alternative investments.

34. The CPP and QPP do not have the same liability structure as DB plans, since they are only partially funded.

35. The CPP has made only a small commitment to date, but expects to increase the policy weighting to 20 per cent over the longer term.

Table 1

Aggregate Alternative Asset Allocations for Selected Large Public Sector Pension Funds and CPP/QPP, 2003

	$ billions	%
Total assets	341.80	
Actual allocation		
Private equity	14.78	4.3
Infrastructure	5.59	1.6
Hedge funds and absolute-return strategies	13.28	3.9
Real estate	27.62	8.1
Total	61.27	17.9
Policy allocation*	101.61	29.7

* Annual reports do not consistently provide breakdowns of policy allocations for each alternative asset class.
Source: Annual reports

100 largest pension funds in Canada. We reviewed actual investment in alternative assets as well as long-term policy asset allocations (Table 1).

Actual investment in alternative assets accounted for nearly 18 per cent of the aggregate assets of these pension funds, representing over $60 billion in four asset classes: real estate, hedge funds, infrastructure, and private equity.[36] The range of investments in each fund was quite broad, however, from a low of less than 1 per cent[37] to a high of 37 per cent. Table 1 also shows the aggregate policy asset allocation across the pension funds. The policy asset allocation is the *desired* level of investment in alternative assets. In aggregate, the pension funds plan to invest 29.7 per cent of total assets ($102 billion) in alternative assets, but to date have only invested 18 per cent ($61 billion). Note that the annual reports provide very little detail regarding the target allocation across each individual type of alternative asset.

Next to real estate, which is held by all of the pension funds, private equity is the most common investment. Like real estate,[38] private equity is not a new asset class for pension funds; some have been invested since at least the early 1990s. Recently, the magnitude of actual and planned investment has increased; many of the pension funds plan to allocate up to 10 per cent of their portfolio to the class. They are also investing across a broader range of private equity subclasses, including venture capital, which is the riskiest form of private equity investment.

Although investment in hedge funds is a form of active management, these funds were included in Table 1 along with other alternative assets because a number of the pension funds are allocating capital to them within the policy asset mix. (Note also that Table 1 does not distinguish between investment in externally managed hedge funds and internal absolute-return (AR) strategies implemented by pension fund staff[39] because not all pension funds provide a breakdown between the two.) With the exception of the Ontario Teachers' Pension Plan (OTPP), investment in hedge funds has been quite modest.[40] At the end of 2003, OTPP had invested 5.4 per cent of its assets ($4.1 billion) in hedge funds, making it one of the largest such investors globally (Adamson 2004). Their use of AR strategies in-house accounts for a larger share of this type of investment ($6.6 billion, or 9 per cent of assets). If Table 1 is adjusted to exclude OTPP's AR strategies, the aggregate percentage allocated to alternative investments falls to about 15 per cent of total assets.

Infrastructure is a relatively new asset class, consisting of large investments in public infrastructure; for example, toll highways, airports, power plants, and bridges. The asset class provides stable cash flows that are weakly correlated with public markets and a good inflation hedge, particularly in regulated industries. Infrastructure investments are long term, often 30 years or more, matching the long duration of pension liabilities. Globally, Canadian pension funds were among the first to invest in the asset class. Some have made large, direct investments in infrastructure projects in the United Kingdom through partnerships and joint ventures (Capon 2005) and, more recently, in the United States.

One of the more interesting findings shown in Table 1 is the large discrepancy between actual investments and long-term policy asset allocations. Several factors account for the challenges of achieving the desired weighting of alternative assets. First, many alternative assets are quite complex, involving a steep learning curve. Investing in these assets requires a long lead time to complete due diligence, educate plan sponsors,

36. Some pension funds have modest investments in other alternative assets, such as timberland and commodities.

37. The pension fund with the extremely low allocation had just begun to consider alternative assets. If this fund is removed, the lowest allocation among this group is 5 per cent.

38. Several pension funds and asset managers have established real estate subsidiaries. Some are using leverage in real estate investment by issuing debt through these entities.

39. At least five of the pension funds or asset managers use AR strategies in-house.

40. This applies to the sector overall. Tremblay (2004) estimated that Canadian pension funds have invested a total of $10 billion in hedge funds. This compares with $8.2 billion estimated by Greenwich Associates.

and set up the appropriate infrastructure for investment and risk management. We found that actual asset allocations were closest to policy weightings for pension funds that had made initial small investments in the early to mid-1990s. These funds were further along the learning curve, which facilitated the large increase in actual investment that has occurred since the beginning of the decade.[41] Several pension funds that we interviewed were just beginning to make initial investments in alternative assets other than real estate. For these pension funds, it may be years before actual investment matches the policy allocation.

One of the more interesting findings . . . is the large discrepancy between actual investments and long-term policy asset allocations.

Other reasons for the discrepancy between policy and actual asset allocations include a lack of good investment opportunities, owing to a smaller universe of investable assets relative to public markets; high current valuations; and a limited supply of top-tier managers. With regard to the latter, interviewees frequently commented that the high returns associated with alternative assets are limited mainly to top-quartile managers. Median returns are modest across many alternative assets.[42] Also cited was the 30 per cent foreign-property limit designated under the Income Tax Act (ITA), which will be discussed in more detail below. Large PS pension funds frequently invest in private equity and infrastructure through limited partnerships. Although most pension fund investments in private equity, hedge funds, and infrastructure tend to be non-domestic, limited partnerships are generally deemed foreign property under the ITA, even if all aspects of the partnership are fully Canadian.[43]

41. A handful of pension funds or asset managers have specialized in a particular type of alternative investment, such as private equity, infrastructure, or hedge funds. These pension funds have enjoyed distinct first-mover advantages. At the extreme, OTPP, for example, which seems to have made early initial investments across all types of alternative investments, was able to more than double its investment between 1999 and 2003. OTPP currently has the highest allocation (about 40 per cent).

42. Median returns for some alternative assets can sometimes be lower than returns for publicly traded equities.

43. Unless they meet the conditions of qualified limited partnerships (QLPs). Recent changes to the definition of QLPs have made them more investment-friendly, but they remain an administrative burden for private equity firms, which prefer to use the more common limited-partnership structure.

Asset mix within the sector overall

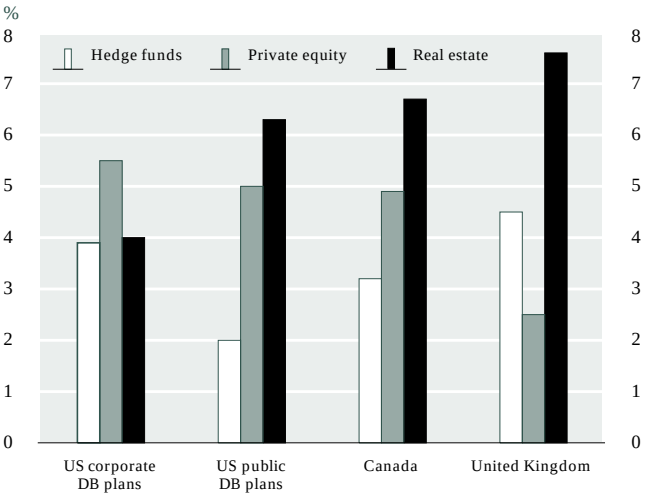
Investment consultants commented that most CS pension funds and smaller PS funds are also reviewing their investment policies with respect to alternative assets. Although they would like to allocate 5 to 10 per cent of their assets over time to reduce risk and add incremental return, to date, the policy asset mix for most pension funds remains close to the traditional 60/40 split.

Apart from the largest PS pension funds, funds currently invested in alternative assets have generally made actual allocations of no more than 3 to 5 per cent of total assets. Typically, they have made a small investment in private equity or hedge funds through funds-of-funds structures,[44] or real estate. Most pension funds are still early in the process of conducting due diligence and educating plan sponsors. Furthermore, most plan sponsors are taking a prudent approach, making small initial investments to determine whether they have sufficient resources to effectively and efficiently manage the asset class. According to Greenwich Associates, actual investment in alternative assets (private equity, real estate, and hedge funds) nearly doubled between 1999 and 2003, but still represented less than 10 per cent of total assets, most of which were invested in real estate.[45]

Chart 3 shows investors' average allocation to alternative assets, including the largest pension funds, grouped

Chart 3

Average Allocation to Alternative Assets*



* Calculated for invested funds only and not the entire sector

Source: Greenwich Associates

44. Interviewees commented that investment in 20 to 30 individual investments is required to diversify risk—one reason why funds-of-funds structures have become so popular. Only the largest pension funds have the capacity to economically invest directly.

45. Based on interviews with about 270 pension funds.

by asset class. Figures for Canada and the United Kingdom include endowments and foundations, although these entities account for only a small share of the aggregate investment. Canadian investors holding alternative assets have an aggregate allocation of about 15 per cent overall. Reflecting, in part, pension sector developments similar to those underway in Canada, investors in the United States and the United Kingdom are also increasing their allocation to alternative assets. Currently, weightings are similar to those of Canadian investors.

Limited A/L matching

As noted, although there is greater interest in asset-liability (A/L) matching, few pension funds have reduced their allocation to equities in favour of fixed-income securities. As we have seen, some pension funds have achieved a limited extension in the duration of their portfolios by investing in certain types of alternative assets. As well, a number of pension funds are implementing a limited form of duration matching (one of the two main types of A/L matching[46]), by extending the duration of their fixed-income portfolios.

Duration matching is accomplished by investing in assets whose duration matches the average duration of the plan liabilities. At the extreme, a plan sponsor could attempt to hedge out (immunize) the liability completely by investing the entire portfolio in matching fixed-income securities, which is similar to purchasing an annuity.[47] However, this strategy presents practical challenges; for example, the supply of longer-duration fixed-income securities, particularly Real Return Bonds (RRBs), which provide the most effective match for plans indexed to inflation, is limited. The choice of instrument used to hedge the liabilities also depends on how the liabilities are measured, including, for example, whether future salary increases are incorporated. Fixed-income securities are best suited for hedging liabilities that are known with a high level of certainty, one reason why it is possible to immunize terminated DB plans.

A/L matching is also costly, given current low interest rates. The return on a matched portfolio would be insufficient to meet most funds' target return on assets (ROA) or long-term funding target, requiring plan sponsors to increase contributions and expense recognition substantially over the long term. PS pension funds, for example, typically need to earn a minimum real return of about 4 to 5 per cent. At the end of 2004, the yield on the benchmark RRB was substantially lower, at about 2 per cent.

Based on our interviews, Canadian pension funds are not undertaking full A/L matching. However, they are achieving greater matching at the margin by extending duration in their fixed-income portfolios. The average duration for pension plan liabilities ranges from about 10 to 20 years, but historically, the majority of pension funds have benchmarked their fixed-income portfolios to the universe of bonds, whose duration is much lower. Several pension funds are reducing the duration gap by benchmarking the portfolio to long bonds.[48] Consultants believe that pension funds are likely to increase the level of A/L matching once funding deficits are eliminated.

Passively indexing to market benchmarks is no longer expected to generate sufficient returns to meet targets.

Active management

Active management is assuming a more important role in pension investment. Given reduced expectations for returns in public markets, passively indexing to market benchmarks is no longer expected to generate sufficient returns to meet targets.

In contrast to passive management, which focuses on earning market returns (beta), active management focuses on earning returns regardless of market direction (typically referred to as earning alpha). Alpha is generally expressed as the excess, or incremental, return over the designated asset-class benchmark. Active management relies on managers having superior skill or information that can be used to beat the market. The more efficient the market, the more difficult this

46. Duration is a measure of interest rate sensitivity. Matching the average duration of plan assets and liabilities is a hedge against movements in interest rates. Cash-flow matching links cash flows from bonds with expected pension payments.

47. Originally articulated by Black (1980) and Tepper (1981), this view is referred to as the financial-economics approach. The argument for holding an all-bond portfolio is developed in terms of the capital structure of the firm, considering tax policy and shareholder interests. Proponents of this view typically point to the example of Boots in the United Kingdom, which put all of its assets into fixed-income securities in 2001. Boots was able to do this because at the time it had a very large funding surplus. It has since added a small share of equities to the policy asset mix.

48. For example, at the end of 2004, the Scotia Capital Universe Index had a duration of over six, while the Long Bond Index had a duration of over 12.

tends to be. Managers who exceed the market benchmark do so at the expense of others, since they are betting against each other in a zero-sum game. Finding managers who can consistently outperform their benchmark is the major challenge.

Investment consultants commented that most pension funds are finding it necessary to shift more resources into active management in order to meet return targets, which they are accomplishing in a variety of ways, such as investing in hedge funds and private equity, increasing the number of active mandates, and using overlay strategies. Active management is increasingly viewed as "separable" from the policy asset allocation. Historically, pension funds actively managed the policy asset class but, now, through the use of derivatives, they are able to separate active management from the policy mix.[49] The most significant departure from past practices is in the use of AR strategies, including investment in hedge funds, changes in the mandates of traditional asset managers, and the use of these strategies in-house. As noted earlier, many large PS pension funds are allocating a growing share of their active risk budget to in-house AR strategies.

The objective of AR investment strategies is to generate positive returns, regardless of the movements in the markets where the asset classes are invested. While traditional asset managers have been constrained to relative performance against asset benchmarks, AR strategies have been the domain of hedge funds, since they are not limited to asset benchmarks or to using long-only strategies.

Other Influences

Limited supply of long-term bonds

There is a limited supply of nominal bonds and RRBs to accommodate increased pension sector demand for purposes of A/L matching. Table 2 shows the supply of marketable long-term Government of Canada (GoC) bonds and the assets of trusteed pension funds.[50] (Note that the longest-maturity bond currently issued by the Government of Canada is 30 years, for both nominal bonds and RRBs.) As indicated, the supply of bonds outstanding is small[51] relative to the large size of pension sector assets. Interviewees consistently commented that they would like to see more issuance

Table 2

Government of Canada Long-Term Bonds and Pension Sector Assets at Year-End (Can$ billions)

	2004
Nominal bonds, 10 yrs +	58.8
Real Return Bonds	18.7
Assets of trusteed pension plans	688.0

Source: Bank of Canada, Statistics Canada

of RRBs to augment this supply, as well as issuance across a wider range of maturities to create an RRB yield curve.[52] Given the challenges the federal government is already facing to maintain the existing supply in the face of falling borrowing requirements and issuance, it is unlikely that the demand from pension funds will be met unless other provinces or corporations decide to issue these types of securities.[53]

Foreign-property rule (FPR)

In its 2005 budget, delivered in February, the federal government announced that it would eliminate the foreign-property rule (FPR) of the ITA, effective immediately.[54] The FPR set a ceiling on the share of the book value of assets that tax-deferred retirement plans (Canadian pension plans, registered retirement savings plans, and registered retirement investment funds) can invest outside of Canada. The ceiling had been incrementally increased from the original 10 per cent in 1971 to 30 per cent in 2001. In practical terms, however, many pension funds were able to exceed the limit by using derivatives to establish foreign content.[55]

In our interviews, the FPR was the most frequently cited constraint on investment. Interviewees commented that it was costly to circumvent, particularly for smaller pension funds, and created inefficient structures and suboptimal investment portfolios. As pension sector assets have grown, competition for domestic assets has increased, particularly now that the CPP is partially funded. The Toronto Stock Exchange represents about 3 to 4 per cent of global equity markets and is concentrated in a limited number of sectors,

49. This view of active management is typically referred to as "portable" alpha.

50. Note that the assets of trusteed pension funds do not include those of the CPP or QPP.

51. There are also provincial and corporate issuers of long-term nominal and inflation-linked bonds, but the supply is a small fraction of GOC bond issuance.

52. Note that these views are a subset of those addressed in the regular debt market consultations (footnote 53) and in the recent "2003 Market Consultations on Real Return Bonds: Summary of Comments," available at http://www.bankofcanada.ca/en/notices_fmd/2003/market_consult03.html.

53. The Government of Canada conducts regular debt market consultations when it is determining its yearly borrowing program, which is outlined in its annual Debt Management Strategy. For the latest report, see http://www.fin.gc.ca/toce/2005/dms05e.html.

54. The budget bill (C–43) received Royal Assent on 29 June 2005.

55. Derivatives are not treated as financial assets.

making portfolio diversification difficult to achieve in the domestic market. In recent years, as we have already noted, the FPR was also constraining investment in domestic and foreign alternative assets.

It is difficult to assess how the removal of the FPR will influence pension investment, and to what extent. Although the benefits of international portfolio diversification are well known, institutional investors continue to exhibit a strong home-country bias. In the absence of the FPR, it is unclear how much investors would wish to increase their holdings beyond 30 per cent. Those wanting higher exposure, mainly larger pension funds, were already able to legally circumvent the limit using derivatives (e.g., foreign-equity futures or swaps).

The elimination of the FPR is providing the occasion for pension funds to review their foreign-currency hedging practices.

Most interviewees felt that elimination of the FPR was likely to have the greatest impact on fixed-income markets. Historically, aggregate sector investment in non-domestic fixed-income securities has been less than 5 per cent of total foreign investment. The elimination of the FPR makes it possible to hold foreign fixed-income securities directly within a more diversified global bond portfolio. It also broadens the universe of long-duration bonds (nominal and inflation-indexed) available to pension funds seeking greater A/L matching, although this may introduce more complications. For example, matching liabilities denominated in Canadian dollars with assets denominated in foreign currencies exposes pension funds to adverse relative movements in inflation, interest rates, and currencies.

The elimination of the FPR is providing the occasion for pension funds to review their foreign-currency hedging practices. During interviews it was clear that current practices varied considerably across funds. Most pension funds tend to hedge only U.S.-dollar assets, but the share of assets hedged varies from 20 per cent to 50 per cent. Note that the average Canadian pension fund holds more than 10 per cent of its assets in U.S. equities, and that several pension funds are also invested in other U. S.-dollar assets, such as hedge funds, private equity, and infrastructure. If allocations to foreign assets increase, it could lead to an increase in currency hedging.

Accounting standards and actuarial practices

The growing focus on corporate governance by shareholders, ratings agencies, and regulators has renewed a long-standing push for greater transparency in pension accounting and comparable global standards. Practices such as delayed recognition of actuarial and investment gains and losses, the smoothing of plan assets, and the use of expected rather than actual returns to calculate pension expenses tend to obscure the actual value and performance of the pension fund and the firm in any given period.[56] While the United Kingdom and, more recently, Europe have recently adopted new accounting standards that address some of these issues,[57] this has not yet occurred in Canada and the United States, where reform has been mainly limited to improving disclosure.

However, in April 2005, the Canadian Accounting Standards Board (ACSB) launched a consultation process to solicit views on its plans to make Canadian Generally Accepted Accounting Principles (GAAP) consistent with the standards of the International Accounting Standards Board (IASB). If the ACSB proceeds with this initiative, a move towards fair-value pension accounting is likely. Most observers believe this would accelerate the shift to DC plans for corporate sponsors, owing to the considerable volatility in earnings that it is likely to create.[58]

Many of the criticisms of pension accounting are also being applied to actuarial standards of practice. Particularly contentious are the smoothing of asset and liability values and the use of an ERP rather than a market interest rate to discount plan liabilities.[59] A debate currently underway within the actuarial profession concerns the relative merits of traditional actuarial practices that tend to obscure the economic value of

56. For simplicity, accounting changes that remove these effects are collectively referred to as fair-value accounting. For a discussion of recent and anticipated changes in worldwide standards for pension accounting and how they are likely to influence pension sector investment, see Fore (2004).

57. Financial Reporting Standard (FRS) 17 and International Accounting Standard (IAS) 19. IAS 19 is widely used in Europe.

58. The introduction of fair-value accounting in the United Kingdom is cited in the large number of DB plan closures in recent years.

59. Actuaries can reduce the funding liability by assuming pension assets will earn an ERP. On the basis that the pension assets will earn a premium, actuaries use a higher discount rate when calculating the present value of the funding liability, which decreases the value of the liability. Effectively, the higher the ERP (or the more risk a fund takes on the asset side of the balance sheet), the lower the additional funds required to hedge that risk.

the pension fund and the valuation principles of financial economics.[60] At the heart of the debate is the issue of whether the pension fund and, ultimately, the corporate financial statements should be subjected to the volatility of marked-to-market values. Following a rationale similar to the one used for pension accounting, traditional actuarial practices such as smoothing have historically been intended to help alleviate the short-term effects of market volatility on what is essentially a very long-horizon investment. The outcome of the debate will have considerable influence on the investment behaviour of pension funds, owing to the central role of actuarial valuation in pension investment, risk management, sector regulation, and even financial reporting.

Implications for Financial Markets

Over time, more pension funds may shift towards liability-driven investment and risk-management practices. This would clearly have implications for financial markets, given the potential for a fairly large reallocation of assets as the workforce ages and pension funds mature.

The reduction in the allocation to publicly traded equities observed in large PS pension funds could gradually occur in many more pension funds. Over the short term, this reallocation is likely to be constrained by low interest rates and an attempt to earn high returns to eliminate funding deficits. The extent to which a reduction in publicly traded equities can be offset with an increased allocation to alternative assets is limited. Not only is the universe of alternative assets small relative to publicly traded securities, these investments are much more challenging to manage, particularly for smaller pension funds. Also, the high historic returns that are currently driving investment decisions are likely to diminish as these markets become more efficient.

The demand for longer-duration fixed-income securities could increase substantially as pension funds manage the risks of older plans where the stream of benefit payments becomes more certain.[61] The demand of DB pension funds for fixed-income securities could also be augmented by demand from retirees who wish to reduce equity allocations in their RRSPs and DC plans.

Some governments have begun to issue longer-maturity bonds, partly in response to pension sector demand; 50-year bonds have recently been issued in the United Kingdom and in Europe.[62] Given the limited supply, the additional demand may contribute to a distortion of the yield curve. Indeed, it has already been cited as one of the factors behind the recent pressure on the long end of the U.S. yield curve. In Canada, pension sector demand for RRBs has been particularly strong relative to supply, which is one explanation offered for recent distortions in RRB yields.[63] Interviewees consistently commented that they would like to hold more RRBs for purposes of hedging liabilities.

As noted, there is a limited supply of long-term bonds outstanding relative to pension sector assets. Although the federal government has maintained its commitment to 30-year bonds and RRBs against a backdrop of debt reduction and reduced bond issuance, there are no plans to increase issuance from current levels. In its *Debt Management Strategy 2005–2006*, the government indicated that while it will continue to target a gradual reduction in the share of fixed-term debt to lower public debt charges (by increasing the issues of treasury bills while reducing the bond program), it has made a commitment to maintain issuance of RRBs in 2005–2006 at a level similar to the $1.4 billion issued in 2004–2005. The elimination of the FPR may address some of the supply concerns. However, some interviewees were reluctant to hedge their Canadian-dollar liabilities, domestic inflation surprises, and domestic interest rate moves using foreign securities. These risks must be thoroughly researched, since they may offset the benefits of A/L matching, which aims to hedge the plan against movements in interest rates and, in the case of indexed plans, inflation. If cross-country shifts in the yield curve and changes in inflation are not comparable, the objective will not be achieved.

The adoption of fair-value accounting has the potential to introduce considerable volatility to the financial statements of corporate plan sponsors. This could prompt a reallocation of assets into fixed-income securities that provide a better match to plan liabilities and reduce volatility. It could also accelerate the shift away from DB plans, as it has in other countries.

60. For a detailed discussion of some of the issues, see Society of Actuaries (2004).

61. The first wave of the large baby-boom cohort will begin to retire in 2010. DB pension plans will have increasingly fewer active members than retirees.

62. At least one issuer is structuring a bond to manage longevity risks.

63. Reid, Dion, and Christiansen (2004) noted that these distortions limit the usefulness of the spread between nominal bonds and RRBs as an indicator of inflation.

Conclusion

Developments in the past few years have underlined the financial risks inherent in DB pension plans. Many Canadian pension plans appear to be taking steps to better manage these risks by increasing their understanding of pension obligations and the volatility of the returns on their pension portfolios. For the majority of pension funds, however, this has not yet resulted in significant changes to their policy asset allocations or investment strategies. Given the sector's conservative nature, it is likely that a reallocation of pension sector assets will progress gradually. As the workforce ages and DB pension funds continue to mature, more assets could be shifted into fixed-income securities that better match the duration of liabilities and benefit payouts.

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Speeches

Introduction

In a speech to la Conférence de Montréal on 30 May, Governor David Dodge discussed how large and growing economic imbalances pose a risk to the global economy over the medium and long term, and spoke of the steps that authorities can take to help resolve these imbalances in a smooth, orderly way.

Speaking to the Winnipeg Chamber of Commerce on 15 June, Governor Dodge said that Canadians are making the adjustments that will help our economy thrive in a changing global economic environment.

Both speeches are reproduced in this issue of the *Review*. The full text of other speeches given by the Governor can be found on the Bank's website at http://www.bankofcanada.ca, including:

28 June 2005	Remarks to the Canada-U.K. Chamber of Commerce, London, U.K.
8 June 2005	Remarks to the Canadian Chamber of Commerce in Japan, Tokyo, Japan
2 June 2005	Remarks to the Canada China Business Council, Beijing, China
27 May 2005	Remarks to the Canadian Economics Association, Hamilton, Ontario
6 May 2005	Remarks to the Ottawa Chamber of Commerce, Ottawa, Ontario
20 April 2005	Opening statement to the Senate Committee on Banking, Trade and Commerce
19 April 2005	Opening statement to the House of Commons Finance Committee
15 April 2005	Remarks to the Canadian Association of New York, New York, N.Y.
14 April 2005	Opening statement following the release of the *Monetary Policy Report*
30 March 2005	Remarks to Humber College Institute of Technology & Advanced Learning, Toronto, Ontario
21 March 2005	Remarks to the National Association for Business Economics, Washington, D.C., U.S.A.
17 February 2005	Remarks to the Vancouver Board of Trade, Vancouver, British Columbia
27 January 2005	Opening statement following the release of the *Monetary Policy Report Update*
9 December 2004	Remarks to the Empire Club of Canada and the Canadian Club of Toronto, Toronto, Ontario
24 November 2004	Opening statement to the Senate Committee on Banking, Trade and Commerce
22 November 2004	Speech delivered on behalf of Canada's Finance Minister, Ralph Goodale, to the German-Canadian Business Club of Berlin

Adjusting to Change

Remarks by David Dodge
Governor of the Bank of Canada
to the Winnipeg Chamber of Commerce
Winnipeg, Manitoba
15 June 2005

Good afternoon. I'm glad to be back in Winnipeg. The last time I delivered a speech here was in January 2002. A lot has changed since then—in this city and in the Canadian economy. At that time, our economy was recovering from a worldwide economic slowdown and from the impact of the September 2001 terrorist attacks in the United States. Today, we face more intense international competition, but we also face new opportunities, as expanding economies become important markets for our products. Like the rest of Canada, Winnipeg and Manitoba are feeling the impact of these international changes.

Change is the central theme of my remarks today. First, I will talk about some of the changes that have taken place at the Bank of Canada over its 70-year history. Then I'll talk about some of the changes that are currently taking place in the global economy, as well as how we see our economy—across Canada and right here in Manitoba—adjusting to these changes.

Changes at the Bank of Canada

This year marks the 70th anniversary of the Bank of Canada. The Bank opened its doors on 11 March 1935, at a time when the Canadian economy was reeling from the effects of a Prairie drought and a worldwide depression. In its early days, much of the Bank's work was focused on trying to cushion the economy from the effects of high unemployment and falling prices, and replacing bank notes from different issuers with Bank of Canada notes. Almost every aspect of the Bank's work has changed since that time. But today I'll focus on the changes that have taken place in the conduct of monetary policy.

By the late 1950s, the Bank's monetary policy and the federal government's fiscal policy were trying to find a balance between controlling inflationary pressures in the economy and encouraging high levels of employment. The economic boom of the 1960s and the bitter inflationary experiences of the 1970s eventually led to an increased focus on price stability as the goal for monetary policy. We developed a better appreciation that keeping inflation low, stable, and predictable is the best contribution a central bank can make to the economic welfare of a nation.

The economic boom of the 1960s and the bitter inflationary experiences of the 1970s eventually led to an increased focus on price stability as the goal for monetary policy.

During those decades, we learned some key lessons. The first is that a floating exchange rate is a tremendous asset in helping an economy adjust to changes, particularly an economy as open as ours. A floating currency gives a country the flexibility it needs to adjust to economic forces that originate from inside and outside its borders.

The second lesson we learned is that, for monetary policy to be successful in controlling inflation, a floating exchange rate is not enough. An "anchor" for monetary policy is also needed. Canada first floated its dollar in 1950, but returned to a fixed exchange rate for eight

years during the 1960s. After the decision to float the dollar again in 1970, the Bank spent the 1970s and 1980s searching for an appropriate monetary policy anchor. By this, I mean a clear target for monetary policy, a way to help policy-makers keep policy on track, and a way to tie down or "anchor" expectations about future inflation. The outcome of that search was the eventual adoption of inflation targets as the anchor for Canadian monetary policy.

In February 1991, the Bank and the federal government announced an agreement on a series of inflation-reduction targets. This agreement has been extended three times, and since 1995, it has called for the Bank to keep inflation at 2 per cent, the midpoint of a 1 to 3 per cent target range. This inflation-targeting system, supported by a floating exchange rate, has done more than keep inflation low—it has delivered strong and sustained growth in output and employment in Canada.

Let me quickly stress that our inflation-targeting framework operates in a symmetric way—we care just as much about inflation falling below target as we do about inflation rising above target. If demand for goods and services pushes the Canadian economy against the limits of its capacity, and inflation is poised to rise above the target, the Bank will raise interest rates to cool off the economy. And when the economy is operating below its production capacity, and inflation is poised to fall below the target, the Bank will lower interest rates to stimulate growth. This symmetric approach helps the Canadian economy adjust to changing circumstances, while maintaining strong, sustained growth in output and employment.

We have found that monetary policy is more effective when people understand what we are doing and why.

The Bank's commitment to the idea of transparency is another way in which our monetary policy has evolved. There was a time when central bankers kept their actions and thoughts shrouded in secrecy, convinced that their policy would be more effective if implemented with an element of surprise. Times have changed, and best practices in monetary policy have evolved. We have found that monetary policy is more effective when people understand what we are doing and why. That's why we communicate regularly with parliamentarians, with markets, and with the public. We do this through our regular *Monetary Policy Reports* and *Updates* to those reports. We do this through press releases on fixed announcement dates for interest rate decisions, eight times a year. And we do this through public speaking engagements with audiences across the country.

Our methods of communication also continue to change. Today, we use more tools and more technologies to reach Canadians and explain our work. For example, the audio portion of this speech is being broadcast live on the Internet. And we have just completed a redevelopment of the Bank's website. Since its creation in 1995, our website has been central to our efforts to conduct the Bank's business in an open and transparent manner. The site is visited over 180,000 times a week. In 2003, it was named "Central Bank Website of the Year" by Central Banking Publications in the United Kingdom. We wanted to make the site even better, and so on Monday we launched a new version. It features an attractive graphic redesign, improved navigation, and a lot of new content. I encourage you to visit our new site at *www.bankofcanada.ca*, and we welcome your comments.

Changes in the Global Economy

So that's a quick look at some of the ways that the Bank has changed in 70 years. I'll spend the remainder of my time today discussing some of the major changes afoot in the global economy and how the Canadian economy is adjusting to these developments.

I've just returned to Canada from meetings with central bankers in China and Japan. I have also attended meetings in Switzerland, the United States, and Morocco over the past month. And in two weeks, I will head to the United Kingdom. In these countries, and in almost every other nation, people are being affected by the same powerful forces—growing competition from emerging-market economies, such as China and India, and large and growing financial imbalances in the United States and Asia. The growth of emerging-market economies has driven up demand for commodities, and that has pushed up the world prices for oil and many other commodities that we produce in Canada. Meanwhile, the more competitive world environment and productivity improvements in some countries are

lowering the prices for a number of consumer goods, communications services, and computer equipment.

All of these forces are causing significant exchange rate movements, including a sharp appreciation of the Canadian dollar against the U.S. dollar over the past couple of years. Higher prices for many commodities produced in Canada means that our terms of trade—that is, the ratio of the prices that Canadians receive for their exports to the prices that they pay for their imports—have improved by about 14 per cent since late 2001. This has contributed importantly to higher real incomes and stronger domestic demand.

How has the Canadian economy been adjusting to these various economic forces? In the Bank's last *Monetary Policy Report*, published in April, we noted that we have seen increased business investment spending in oil and gas extraction, in other mining activity, and in wood-product manufacturing. These sectors are benefiting from higher world prices for their products. We are also seeing rising investment in sectors that are not very exposed to international trade, such as electric power generation, finance and insurance, and information and cultural industries. In these latter cases, firms are reacting to strong growth in domestic demand. We've also had very strong investment in housing.

The good news is that many Canadian firms are making the necessary adjustments.

But in other sectors that are highly exposed to international trade, prices are either falling or are rising very slowly. Here, I am referring to goods-producing sectors, such as auto parts, furniture, and clothing manufacturing, as well as service sectors such as tourism. Firms in these industries are feeling the pressure of the higher Canadian dollar, and they are also facing increased competition from other regions of the world.

The good news is that many Canadian firms are making the necessary adjustments. Investment spending is being directed towards increased specialization, higher productivity, and lower costs. Since much of the productivity-enhancing machinery and equipment is priced in U.S. dollars, the stronger Canadian dollar has made it easier for firms to invest in equipment that boosts productivity. Stiffer competition is also encouraging firms to seek new markets, increase their specialization, and offer more value-added, customized services.

Other adjustments are also taking place. A growing number of firms are looking to cut costs by importing more inputs. We've certainly seen this type of adjustment taking place among manufacturers of telecommunications equipment. Other firms are phasing out the production of goods and services with low profit margins and concentrating on those that yield higher returns.

Current Economic Developments in Canada and Manitoba

Through its monetary policy, the Bank is helping these adjustments by supporting domestic demand. In our April *Monetary Policy Report*, we projected that domestic demand would grow by almost 4 per cent in 2005. According to recently released data, it grew by slightly more than expected during the first quarter of the year. So we continue to see evidence that strong domestic demand is offsetting the smaller contribution that net exports are making to economic growth.

On 14 July, we will publish our *Monetary Policy Report Update*, which will contain our latest views on the Canadian economy. The Bank is in the process of gathering and analyzing the full set of information on the global and the Canadian economies that will feed into our next interest rate decision, and into the *Update.*

On our last policy-announcement date in May, we decided to maintain the target for the overnight interest rate at 2 1/2 per cent. At that time, we indicated that global and Canadian economic developments had been unfolding broadly in line with our expectations and that our outlook for the Canadian economy through to the end of 2006 was unchanged from the one we presented in our April *Monetary Policy Report*. The analysis contained in that *Report* is still relevant. So is our statement that, in line with this outlook for growth and inflation, a reduction of monetary stimulus—that is, an increase in our key policy rate—will be required over time.

Now, let me say a few words about the economic prospects for Manitoba. The provincial economy grew by an estimated 2.3 per cent last year, up from 1.5 per cent in 2003. Like the rest of Canada, Manitoba will rely heavily on domestic spending as an engine of growth in 2005. Private sector forecasters are expecting output

growth of about 2.7 per cent this year, largely as a result of strong consumption and investment. Exports should also continue to grow, albeit at a slower pace than in 2004. This projection assumes that agricultural production will increase in 2005. It is too early to predict the impact of the recent floods that have ruined many fields in the province.

Diversification in Manitoba's economy has been helpful. This province's economy is one of the most diversified in Canada—with a good mix of goods-producing and service industries, resources and manufacturing, traditional and new technology. And there is growing diversity and innovation within industries, such as pharmaceuticals, furniture manufacturing, and the transportation-equipment sector. The broadening of Manitoba's economic base has provided stability to the economy and has kept the province's unemployment rate well below the national average. Manitoba has also been helped by continued fiscal prudence.

Conclusion

Change is rarely made without difficulty, even when we know that the change is for the better. This is certainly true of adjustments in response to the global economic realities of today. In some cases, industries are being forced to rethink the way they do business. Some firms will close, and some jobs will be lost. This type of adjustment is never easy.

But economic change creates new opportunities. And in cities like Winnipeg, and all across Canada, individuals, businesses, industries, and public sector institutions are making the adjustments that will help them improve their competitiveness and seize new opportunities. These efforts also make the Canadian economy stronger and more resilient. That is the best way to prepare ourselves and our economy for whatever changes the future may bring.

Reflections on the International Economic and Monetary Order

Remarks by David Dodge
Governor of the Bank of Canada
to la Conférence de Montréal
Montréal, Quebec
30 May 2005

Today, I want to talk about an issue that is central to the prospects for the world economy—the management of large, global economic imbalances that have become the subject of increasing concern among market participants and policy-makers around the world. I am referring, of course, to the persistent and growing current account deficit in the United States that is mirrored by large current account surpluses elsewhere, especially in Asia.

These large, global economic imbalances will ultimately be resolved, either in an orderly, or in an abrupt, disorderly way.

Up to now, world capital markets have been managing these imbalances in a reasonably smooth way. In the short term, it is reasonable to expect that they will continue to do so. But over the medium term, imbalances of this magnitude are not sustainable. At some point, they will have to be resolved. Why? For one thing, a country's external indebtedness cannot keep growing indefinitely as a share of its GDP. Eventually, investors will begin to balk at increasing their exposure to that country, even if it is a reserve-currency country, such as the United States. For another thing, the buildup of foreign exchange reserves by Asian countries will eventually feed into domestic monetary expansion and lead to higher inflation. These imbalances will ultimately be resolved, either in an orderly, or in an abrupt, disorderly way. The question is, are current economic policies and today's international monetary order likely to facilitate an orderly resolution of the imbalances? If not, what changes are needed to reduce the risk of an abrupt, disorderly adjustment?

The Origins of Global Imbalances

Before we discuss solutions and prescriptions, let me talk briefly about the nature and origins of the current global imbalances. In essence, these imbalances reflect the international financial flows associated with saving-investment mismatches. Specifically, over the past decade or so, we have seen many countries outside the United States increase their saving by a very large amount, while at the same time, the United States has reduced its saving and has become increasingly reliant on foreign borrowing.

The origins of the increased saving outside the United States are many and varied. Following the Asian crisis of 1997–98, many countries in that region built up large foreign exchange reserves to guard against having to rely on international assistance in any future crisis. Even countries that avoided the worst effects of the Asian crisis—China, for example—increased their net savings by building up reserves. But more importantly, policies to encourage export-led growth in many Asian economies have exacerbated the situation. Some countries have actively tried to prevent an appreciation of their currencies by intervening in the foreign exchange market. In doing so, not only are

they increasing the imbalances, they are also seen by some to be securing an unfair trade advantage and shifting the burden of global adjustment onto others.

Of course, savings have also increased outside Asia. In Germany, for example, two factors have led to a large increase in saving in recent years: the conclusion of the reconstruction effort following the 1989 reunification and efforts to fix the German public pension system. Certain oil-exporting countries, including Russia, have also started to generate large net savings. And some developing economies, such as Brazil, have moved from being rather large net borrowers to being net savers today.

Inside the United States, there has been a sharp decrease in national saving. The high expected returns in equity markets in the late 1990s led to large capital flows into the United States. The significant capital gains—first on equities in the late 1990s and then on housing in this decade—led to a net decline in household saving out of current income. Furthermore, the low interest rates after 2001, and importantly, the shift in the U.S. fiscal position after 2000, have contributed to growing net dissaving in the United States. As a result, the U.S. current account deficit—which represents the amount of net dissaving going on in the United States—now stands at about 6 per cent of GDP.

Why Global Imbalances Are a Problem

So you might ask, why should policy-makers worry about the resolution of these imbalances? After all, there should be a process that works through world financial markets to allow savers in one country to lend to borrowers in another. Such a process supports higher global growth, since countries with surplus savings can invest them in countries that do not save enough internally.

Within national borders, regional savings-investment imbalances emerge all the time. And we don't normally worry about them because there are effective market-based mechanisms in place that work to resolve them. Relative wages and prices change, as do relative returns on capital. This causes a movement in the real exchange rate between regions, which then provides an equilibrating mechanism. The ability of labour to move within a country helps to promote an orderly adjustment process.

But there are reasons to worry about imbalances in a global context. To begin with, market-based means of resolving international imbalances are somewhat less effective and potentially more disruptive. This is because there is less labour mobility across international borders, and so larger movements in relative wages and prices are needed in order for them to act as an equilibrating mechanism. Further, certain national and international policies, as well as interventions in the foreign exchange market, have been inhibiting the necessary relative wage and price movements. Indeed, some of these policies are making the situation worse. And so the concern is that the longer these imbalances remain unresolved, the greater the chances that the ultimate resolution will be disorderly. Equally troubling, there is a greater chance of protectionist measures that can seriously damage the global economy.

The longer these imbalances remain unresolved, the greater the chances that the ultimate resolution will be disorderly. Equally troubling, there is a greater chance of protectionist measures that can seriously damage the global economy.

Policy Impediments to Resolving Imbalances

Let's look a bit more closely at some of the key impediments to the resolution of imbalances. Some of these impediments are national policies, while others relate to the international monetary order. Let me talk about national policies first. Many of these impediments have been identified in discussions at the G–7 over the past couple of years.

It is clear that, to date, there has not been enough progress on structural reforms. This lack of progress is somewhat frustrating, given that there is a reasonable consensus on what should be done domestically in all countries. First, microeconomic policies should allow markets for both goods and labour to function as well as possible and with a maximum degree of flexibility. Almost every country, including Canada, talks a good line about this, but action has been rather slow everywhere. Second, strong policies must encourage the creation and maintenance of a sound financial system

that can efficiently allocate domestic and foreign savings. Progress here, although slow, is taking place. The work of the Financial Stability Forum, and the contributions in this area from the Bank for International Settlements, have been helpful. But much remains to be done. Third, all countries must pursue fiscal policies aimed at producing a sustainable public debt-to-GDP ratio. Where structural fiscal balance is absent, it should be achieved; where it is present, it should be maintained. There are some real problems on this front in the United States, in Europe, in Japan, and in some developing countries.

A multiple-front approach like this, that works to remove the impediments arising from existing national policies, would certainly go a long way towards allowing market-based mechanisms to resolve global imbalances in an orderly way. However, I doubt that this approach by itself would do the whole job, if real exchange rates are not allowed to adjust in a timely manner.

Movements in real exchange rates can come from changes in nominal exchange rates, changes in relative wages and prices, or a combination of the two. But when the nominal exchange rate is fixed, the only way to bring about adjustments in the real exchange rate is through large movements in relative wages and prices. Theoretically, this is feasible—but only if wages and prices are highly flexible both upwards and downwards. But this high degree of flexibility is practically non-existent. And so, when exchange rates are fixed, global economic adjustment can still take place, but it comes at a high cost—through shrinking output and rising unemployment in countries with current account deficits and through very high inflation in countries with current account surpluses.

The only way to truly minimize the costs of adjustment is to allow nominal exchange rates to move around.

While this adjustment is costly, it does work, provided countries that are fixing their currencies through foreign exchange intervention are not offsetting the monetary consequences of this by "sterilizing" the intervention. This is an important point. When intervention is sterilized, this temporarily prevents the movements in wages and prices needed to bring about the necessary economic adjustment. In these cases, adjustment is postponed—in both surplus and deficit countries. But the adjustment and its costs are only delayed, they are not avoided. Indeed, the costs typically end up being larger than they would otherwise be, precisely because they have been delayed. The only way to truly minimize the costs of adjustment is to allow nominal exchange rates to move around.

The ability of a flexible exchange rate to help with economic adjustment was a major factor behind Canada's decision to float its currency in 1950. By the end of the 1990s, most industrialized economies and a number of emerging-market economies had done the same. Other economies, particularly in Asia, have opted for a fixed exchange rate regime. However, some of these countries, by sterilizing their foreign exchange intervention, have rejected the adjustment mechanisms that should go along with such a regime. By sterilizing, not only are they accumulating even larger foreign exchange reserves, more importantly, they are undermining the efficiency of their own domestic economies and interfering with the resolution of imbalances.

So there are impediments in Europe, the United States, and Asia that are all getting in the way of a timely and orderly resolution. Because of this, global imbalances are growing, and this is increasing the risk of a disorderly correction at some point down the road. In addition, the longer the adjustment is delayed, the greater the risk that industrialized nations will take protectionist measures against emerging-market economies that are perceived as not playing by the rules.

The Rules of the Game

So, what are the policy prescriptions that hold the greatest probability of bringing about an orderly resolution of the imbalances? Put simply, what should be the "rules of the game?" I've already spoken about the consensus that exists on the need for action domestically. What I want to do now is talk about what would be helpful on the international front.

To begin with, we certainly need to preserve and increase the potential for goods and services to move freely across national borders. This means further enhancement of the rules of free trade through the Doha round and a strengthening of the World Trade Organization (WTO) to ensure proper compliance

with the rules. This effort, as you know, is going on rather more slowly than we would have hoped three years ago, and my sense is that the prospects for substantial improvement are not as good as we thought they might be. However, keep in mind that the last round took 10 years to complete. So, it is important to keep moving forward and to support the WTO in its enforcement of proper compliance with the rules.

Of course, free trade needs the support of well-functioning capital markets, as well as exchange rate regimes that allow market-equilibrating forces to play a greater role in the adjustment process. Just as the WTO provides critical support for trade, there is also a need for an effective organization to support the international monetary system. Under Bretton Woods, this role was given to the International Monetary Fund (IMF). But world financial conditions have evolved dramatically, while in many respects, the IMF remains the same institution that was created in 1944 for an era of fixed exchange rates.

To be clear, the basic mandate of the Fund—the promotion of an international order that fosters economic growth and investment—remains relevant and important. And the Fund's main responsibilities—surveillance, lending, and helping member nations to develop their financial infrastructure and efficient product and labour markets—are the right ones. But the IMF could, and should, be doing its job more effectively. The IMF must evolve to take account of today's realities.

The IMF could, and should, be doing its job more effectively. The IMF must evolve to take account of today's realities.

Essentially, change is needed in four areas. First, we must recognize that the Fund has little direct ability to affect the policies of non-borrowing members. Consequently, its ability to influence discussions of important global issues, such as external imbalances, hinges on the quality of its economic and financial surveillance, its advice, and its ability to communicate its message. The IMF should focus its surveillance on systemic issues that can affect global financial stability—an area where the Fund's particular expertise gives it a strong comparative advantage over other institutions. This surveillance must be seen to be independent of national authorities—and independent of the IMF's lending activities. The Fund's analytic and surveillance functions must be strengthened and must not be subservient to its lending function.

Second, in a world of freely flowing private capital, we must rely on market-based mechanisms to resolve financial crises, if and when they occur. While the Fund has a continuing role to play in providing liquidity assistance to members in financial distress, there are limits to such assistance—the IMF does not, cannot, and should not have endless reserves.

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Third, to help guide market expectations regarding the scale of official assistance, we must be very clear that extraordinary Fund lending is just that—extraordinary. If market players cannot judge whether or not the Fund will intervene, and at what amount, they are unable to make appropriate credit decisions. Without clarity on the rules governing access to Fund resources, we leave ourselves open to delays in resolving crises and to moral hazard. These rules must also be as free as possible from political considerations and must allow funds to be used for liquidity assistance only. The provision of additional loans to insolvent countries helps neither the borrower nor other creditors. In this regard, the Fund must improve its ability to distinguish between cases of illiquidity and insolvency.

Finally, and very importantly, the IMF must be more effective in its role as a forum where global economic issues are discussed and solutions are found. The Fund should be considered as the place where national authorities can gather around the same table for a frank exchange about policy issues common to all. The Fund must be imbued with the same co-operative spirit seen at the OECD during the 1960s and 1970s as it helped to build a liberal economic order and framework for freer trade.

But it's difficult to discuss problems and find solutions if key players don't feel that they are adequately represented. There is a crucial need to build an international financial institution that is seen as meeting the needs of all members. A good start would be to re-examine the representation of Asian and other emerging-market economies, and the implications for their quotas and voting power on the IMF's Board.

A larger stake by Asian members in the IMF also implies greater responsibility on their part for the success of the Fund as guardian of the international monetary and financial systems. Indeed, by taking greater responsibility, Asian nations would affirm their commitment to the Fund's important objectives. Moreover, by being able to draw more on the strengths of the Asian economies, the IMF would be in a better position to do its job properly.

Conclusion

I truly hope that such an institution—one that makes progress in these four areas—will emerge from the strategic review of the IMF that is currently underway. The creation of a global institution for the twenty-first century is tremendously important, not just for Canada, but for all nations.

If we all follow appropriate policies, then market mechanisms can defuse the danger posed by global imbalances.

If we can get it right, a more effective IMF would be helpful in the worldwide effort to resolve global imbalances in an orderly way. But a global institution can't do it all by itself. Policy-makers around the world need to make sure that they are part of the solution and not part of the problem. All countries must recognize that it is doubly important to pursue the sound domestic policies that I mentioned—the promotion of flexible markets, the creation and maintenance of a sound financial system, and the pursuit of sound fiscal and monetary policies. Clearly, following these policies is in each country's own domestic interest. But the benefits would flow beyond national borders. If we all follow appropriate policies, then market mechanisms can defuse the danger posed by global imbalances. And that is an outcome that is in everyone's interest.

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Summary Tables

A1 Summary of Key Monetary Policy Variables

Monthly		Inflation-control target (12-month rate)			Policy instrument			Monetary conditions			Monetary aggregates (12-month growth rate)			Inflation indicators					
		Target range	CPI	Core CPI*	Operating band for overnight rate (end of month)		Overnight money market rate	Monetary conditions index (January 1987=0)	90-day commercial paper rate	C-6 trade-weighted exchange rate (1992=100)	Gross M1	M1++	M2++	Yield spread between conventional and Real Return Bonds	Total CPI excluding food, energy, and the effect of changes in indirect taxes	CPIW	Unit labour costs	IPPI (finished products)	Average hourly earnings of permanent workers
					Low	High													
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
2001	J	1-3	2.6	2.4	4.00	4.50	4.2414	-7.70	4.22	80.97	9.4	8.2	6.9	2.28	2.1	2.4	3.8	2.6	3.3
	A	1-3	2.8	2.3	3.75	4.25	4.1679	-8.28	3.96	80.18	9.1	8.6	7.0	1.99	2.1	2.3	2.8	2.5	2.5
	S	1-3	2.6	2.3	3.25	3.75	3.4858	-9.69	3.19	78.65	11.7	10.7	7.6	2.18	2.0	2.3	1.9	3.5	2.3
	O	1-3	1.9	2.2	2.50	3.00	2.7412	-10.59	2.45	78.28	12.1	10.9	7.8	1.71	1.8	2.1	2.6	1.4	2.5
	N	1-3	0.7	1.7	2.00	2.50	2.5955	-10.78	2.17	78.50	13.8	13.2	8.6	1.91	1.4	1.7	1.8	0.6	3.0
	D	1-3	0.7	1.6	2.00	2.50	2.2444	-10.94	2.08	78.33	14.4	14.0	7.7	1.93	1.3	1.6	2.3	1.0	3.3
2002	J	1-3	1.3	1.8	1.75	2.25	1.9923	-10.82	2.07	78.63	14.4	15.6	8.0	1.95	1.4	1.8	1.5	2.0	3.5
	F	1-3	1.5	2.2	1.75	2.25	1.9926	-11.07	2.16	77.84	12.6	15.7	7.6	1.96	1.4	2.1	0.6	1.5	3.4
	M	1-3	1.8	2.1	1.75	2.25	1.9933	-10.61	2.36	78.45	12.4	15.7	7.1	2.30	1.8	2.1	0.4	1.1	3.2
	A	1-3	1.7	2.2	2.00	2.50	2.2440	-10.07	2.46	79.48	11.6	15.3	7.0	2.29	1.9	2.1	-0.2	0.6	2.8
	M	1-3	1.0	2.2	2.00	2.50	2.2471	-9.31	2.68	80.79	11.8	14.3	6.7	2.24	2.0	1.9	0.7	-0.3	2.4
	J	1-3	1.3	2.1	2.25	2.75	2.4964	-9.12	2.78	80.99	12.9	15.6	6.8	2.32	2.1	1.9	0.2	0.6	2.7
	J	1-3	2.1	2.1	2.50	3.00	2.7418	-10.40	2.88	77.71	13.3	14.7	6.7	2.28	2.1	2.0	-0.3	0.5	2.8
	A	1-3	2.6	2.5	2.50	3.00	2.7448	-9.68	3.09	78.90	13.8	15.1	6.7	2.18	2.2	2.4	0.5	1.3	3.0
	S	1-3	2.3	2.5	2.50	3.00	2.7447	-10.27	2.90	77.97	10.8	12.6	6.1	2.18	2.3	2.3	0.1	0.9	2.8
	O	1-3	3.2	2.5	2.50	3.00	2.7449	-10.06	2.83	78.63	11.5	12.6	5.6	2.18	2.5	2.4	0.7	2.1	2.7
	N	1-3	4.3	3.1	2.50	3.00	2.7431	-10.21	2.85	78.24	9.5	10.3	4.8	2.15	3.1	3.0	1.8	1.8	2.5
	D	1-3	3.9	2.7	2.50	3.00	2.7439	-9.80	2.83	79.24	7.0	8.2	3.9	2.09	3.3	2.4	1.1	2.1	1.9
2003	J	1-3	4.5	3.3	2.50	3.00	2.7439	-9.34	2.91	80.15	7.4	7.3	3.7	2.27	3.3	2.9	1.6	1.1	1.9
	F	1-3	4.6	3.1	2.50	3.00	2.7469	-8.61	2.97	81.78	6.9	6.5	3.4	2.40	3.3	2.9	1.9	1.1	2.1
	M	1-3	4.3	2.9	2.75	3.25	2.9920	-7.72	3.28	83.22	6.2	5.5	3.3	2.50	3.1	2.7	2.0	0.1	1.8
	A	1-3	3.0	2.1	3.00	3.50	3.2373	-6.92	3.35	85.07	6.6	5.2	3.1	2.28	2.8	2.1	2.8	-1.5	1.3
	M	1-3	2.9	2.3	3.00	3.50	3.2416	-6.02	3.27	87.60	7.2	5.3	3.5	2.12	2.5	2.2	2.1	-2.7	1.8
	J	1-3	2.6	2.1	3.00	3.50	3.2449	-5.11	3.11	90.45	7.7	5.3	3.3	2.04	2.1	2.0	2.2	-3.7	1.4
	J	1-3	2.2	1.8	2.75	3.25	2.9947	-6.60	2.89	87.07	10.0	6.6	3.5	2.25	1.7	1.9	2.6	-2.1	2.1
	A	1-3	2.0	1.5	2.75	3.25	2.9972	-6.68	2.80	87.11	9.5	6.6	3.5	2.29	1.7	1.7	2.6	-2.6	2.1
	S	1-3	2.2	1.7	2.50	3.00	2.7490	-5.93	2.64	89.52	8.5	6.5	3.4	2.15	1.8	1.9	1.9	-3.8	2.7
	O	1-3	1.6	1.8	2.50	3.00	2.7492	-4.85	2.71	92.25	7.3	6.1	3.0	2.38	1.8	1.8	1.9	-5.5	2.7
	N	1-3	1.6	1.8	2.50	3.00	2.7481	-4.73	2.73	92.54	8.8	6.8	3.1	2.38	1.8	1.7	0.9	-6.0	2.3
	D	1-3	2.0	2.2	2.50	3.00	2.7481	-4.68	2.66	92.87	9.9	7.6	3.9	2.41	1.5	2.1	1.1	-5.4	2.7
2004	J	1-3	1.2	1.5	2.25	2.75	2.4951	-5.77	2.37	90.68	10.7	8.3	3.8	2.66	1.5	1.5	1.3	-5.3	2.7
	F	1-3	0.7	1.1	2.25	2.75	2.4953	-6.21	2.25	89.82	13.2	9.8	4.4	2.53	1.0	1.2	1.8	-4.3	2.8
	M	1-3	0.7	1.3	2.00	2.50	2.2482	-5.72	2.10	91.55	14.2	10.4	4.7	2.65	1.1	1.2	0.8	-3.5	3.0
	A	1-3	1.6	1.8	1.75	2.25	1.9959	-6.98	2.05	88.28	15.6	12.0	5.1	2.85	1.2	1.7	1.3	-1.3	3.2
	M	1-3	2.5	1.5	1.75	2.25	1.9985	-7.08	2.07	87.98	16.2	13.1	5.1	3.00	1.2	1.8	1.0	2.8	3.0
	J	1-3	2.5	1.7	1.75	2.25	2.0005	-6.36	2.10	89.81	14.4	13.0	5.7	2.96	1.4	1.8	1.3	3.1	3.3
	J	1-3	2.3	1.9	1.75	2.25	1.9973	-6.03	2.12	90.65	11.1	11.6	5.4	2.98	1.4	1.9	1.0	0.6	2.5
	A	1-3	1.9	1.5	1.75	2.25	1.9979	-5.28	2.22	92.43	10.6	10.6	5.1	2.93	1.0	1.7	-	0.3	2.3
	S	1-3	1.8	1.5	2.00	2.50	2.2496	-4.22	2.50	94.63	10.3	10.4	5.1	2.72	1.0	1.6	1.3	-	2.1
	O	1-3	2.3	1.4	2.25	2.75	2.4960	-3.03	2.60	97.77	11.2	10.5	5.7	2.72	0.8	1.7	0.7	0.7	2.3
	N	1-3	2.4	1.6	2.25	2.75	2.4977	-1.82	2.74	100.95	10.3	9.8	5.2	2.73	1.1	1.8	1.1	-0.6	3.1
	D	1-3	2.1	1.7	2.25	2.75	2.4999	-3.02	2.57	97.89	11.5	10.7	5.6	2.81	1.3	1.7	1.9	-0.7	2.6
2005	J	1-3	2.0	1.6	2.25	2.75	2.4980	-3.35	2.56	96.96	11.1	10.2	5.8	2.71	1.2	1.6	0.7	-0.1	3.1
	F	1-3	2.1	1.8	2.25	2.75	2.4971	-3.54	2.57	96.37	10.2	9.8	5.8	2.69	1.4	1.7	0.7	-0.6	2.2
	M	1-3	2.3	1.9	2.25	2.75	2.4794	-2.74	2.68	98.39	10.0	9.2	5.6	2.69	1.4	1.9	2.1	-0.8	2.8
	A	1-3	2.4	1.7	2.25	2.75	2.4954	-3.69	2.58	95.92	10.1	8.5	5.7	2.67	1.2	1.8		-0.7	2.8
	M	1-3	1.6	1.6	2.25	2.75	2.4866	-4.02	2.59	94.93	9.2	7.6		2.60	1.2	1.6		-2.5	2.0
	J				2.25	2.75	2.4936	-2.88	2.58	98.28				2.42					2.7

* New definition for core CPI as announced on 18 May 2001: CPI excluding the eight most volatile components: fruit, vegetables, gasoline, fuel oil, natural gas, intercity transportation, tobacco, and mortgage-interest costs, as well as the effect of changes in indirect taxes on the remaining CPI components

A2 Major Financial and Economic Indicators

Rates of change based on seasonally adjusted data, percentage rates unless otherwise indicated

	Year, quarter, and month	Money and credit									Output and employment				
		Monetary aggregates					Business credit		Household credit		GDP in current prices	GDP volume (millions of chained 1997 dollars, quarterly)	GDP by industry (millions of 1997 dollars, monthly)	Employment (*Labour Force Information*)	Un-employment rate
		Gross M1	M1+	M1++	M2+	M2++	Short-term business credit	Total business credit	Consumer credit	Residential mortgages					
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	1992	7.1	4.2	0.2	5.8	7.1	-3.4	1.8	1.3	8.4	2.2	0.9		-1.0	11.2
	1993	9.4	5.1	-0.7	4.2	6.6	-6.3	0.7	2.3	7.6	3.8	2.3		0.5	11.4
	1994	13.2	8.4	1.4	1.9	6.8	1.6	4.7	7.9	6.4	6.0	4.8		2.1	10.4
	1995	6.6	0.8	-2.6	3.8	4.1	5.5	5.0	7.5	3.7	5.1	2.8		1.7	9.6
	1996	12.2	8.2	3.3	4.4	6.8	1.5	5.5	6.5	4.2	3.3	1.6		0.9	9.7
	1997	16.9	11.2	7.2	0.9	7.2	7.7	10.0	10.0	5.6	5.5	4.2		2.1	9.2
	1998	10.3	7.0	3.1	-1.1	5.5	11.5	11.6	10.1	4.9	3.7	4.1	3.8	2.5	8.4
	1999	7.6	6.0	4.3	3.6	5.3	2.4	6.3	7.1	4.3	7.4	5.5	5.6	2.6	7.6
	2000	14.7	10.6	8.8	5.9	7.0	6.5	7.4	12.6	4.8	9.6	5.2	5.5	2.6	6.8
	2001	12.1	10.3	9.6	6.6	7.6	-1.5	5.6	6.8	4.0	2.9	1.8	1.9	1.3	7.2
	2002	11.7	10.9	13.7	7.4	6.4	-6.0	3.9	6.5	7.4	4.2	3.1	3.5	2.4	7.7
	2003	8.0	5.1	6.3	4.7	3.4	-3.2	1.4	9.1	8.1	5.4	2.0	2.1	2.3	7.6
	2004	12.4	9.1	10.8	4.7	5.1	-0.5	4.1	10.3	9.6	6.1	2.9	3.1	1.8	7.2
Annual rates	2001 II	9.0	11.6	10.5	7.7	7.2	-15.3	2.6	5.9	3.5	0.5	0.6	1.1	1.1	7.1
	III	8.5	7.9	11.2	5.1	5.7	-4.3	5.5	4.6	6.5	-5.1	-0.6	-0.3	0.5	7.2
	IV	23.7	17.6	22.8	13.9	10.5	-0.2	6.0	2.0	7.2	-1.4	3.5	2.6	0.4	7.7
	2002 I	11.9	14.5	18.6	8.5	6.9	-10.9	4.2	6.3	7.5	7.7	4.9	6.1	2.9	7.9
	II	5.1	5.5	8.2	3.5	4.4	-6.3	2.6	9.7	8.8	11.0	3.4	4.7	4.3	7.7
	III	10.5	7.7	7.8	5.7	4.3	-3.5	2.3	9.6	8.2	5.7	3.8	4.0	4.2	7.6
	IV	9.9	7.0	7.1	4.9	3.4	0.8	2.4	9.6	7.4	7.4	2.3	1.6	2.5	7.5
	2003 I	2.1	0.6	2.7	4.7	1.8	-1.8	0.5	6.4	7.8	9.6	3.1	2.3	2.5	7.4
	II	6.4	2.6	3.5	5.2	3.7	-2.9	-0.1	10.7	7.8	-3.3	-1.2	-0.1	0.5	7.7
	III	19.5	12.3	13.2	4.7	5.0	-7.6	1.6	11.5	9.0	4.9	1.3	1.6	1.1	7.8
	IV	7.4	6.1	8.2	1.3	3.0	-8.2	2.9	8.2	9.7	5.2	3.6	4.5	3.5	7.5
	2004 I	18.3	11.2	13.2	5.4	5.5	-2.4	3.9	10.2	9.0	6.7	2.6	2.6	1.2	7.3
	II	16.8	14.2	16.3	8.1	7.8	9.8	6.3	11.5	10.5	10.6	5.0	4.4	2.4	7.2
	III	1.0	3.4	5.9	4.0	4.5	7.1	6.6	11.4	10.6	6.8	3.5	3.7	1.3	7.1
	IV	8.7	6.5	6.3	2.8	4.2	3.9	5.3	9.3	10.4	4.1	2.1	1.9	1.7	7.1
	2005 I	15.9	11.4	10.7	6.9	6.4	6.5	7.1	11.3	8.5	3.9	2.3	2.5	0.6	7.0
	II													1.7	6.8
Last three months		14.1	10.1	8.4	7.4	7.1	3.9	4.8	13.6	8.5			1.9	1.7	6.7
Monthly rates	2004 J	-	0.7	1.0	1.0	0.9	2.2	0.8	1.0	1.0			0.5	0.1	7.2
	J	-0.2	-	0.2	-	0.2	0.5	0.5	0.9	0.7			0.3	0.1	7.1
	A	-0.1	-0.2	-	-	0.1	-0.7	0.4	0.9	0.9			0.4	-0.1	7.1
	S	-	0.2	0.4	0.2	0.3	-0.2	0.2	0.7	0.7			-	0.2	7.0
	O	1.0	0.8	0.7	0.5	0.5	0.2	0.1	0.9	1.0			-	0.3	7.1
	N	0.6	0.2	0.2	-0.3	-	0.9	0.9	0.6	0.7			0.3	-	7.2
	D	2.1	1.6	1.4	0.9	0.8	1.4	1.0	0.6	0.9			0.3	0.1	7.0
	2005 J	0.9	1.0	0.8	0.8	0.5	0.1	0.3	0.9	0.5			0.3	-	7.0
	F	1.3	0.5	0.9	0.6	0.7	-	0.4	1.3	0.7			0.2	0.2	7.0
	M	0.8	0.9	0.4	0.1	0.2	0.7	0.4	1.2	0.6			-0.1	-	6.9
	A	1.6	1.0	0.8	1.0	0.8	0.4	0.3	1.1	0.7			0.4	0.2	6.8
	M	0.7	0.8	0.6			-	0.4						0.2	6.8
	J													0.1	6.7

A2 (Continued)

Capacity utilization rate		Prices and costs				Wage settlements		Bank of Canada commodity price index (unadjusted)		Securities mid-market yield			Year, quarter, and month
Total industrial	Manufacturing industries	CPI	Core CPI*	GDP chain price index	Unit labour costs	Public sector	Private sector	Total	Non-energy	Treasury bills 3-month	Canada 10-year benchmark bonds	Canada 30-year Real Return Bonds	
(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	
78.8	76.4	1.5	1.8	1.3		2.0	2.6	-0.3	0.6	7.01	7.86	4.62	1992
80.6	79.9	1.8	2.1	1.4		0.6	0.8	0.5	3.0	3.87	6.57	3.78	1993
83.0	83.5	0.2	1.8	1.1		-	1.2	3.3	7.5	7.14	9.07	4.92	1994
82.1	83.9	2.2	2.3	2.3		0.7	1.4	8.3	11.1	5.54	7.11	4.42	1995
82.0	82.8	1.6	1.7	1.6		0.5	1.8	3.8	-1.2	2.85	6.37	4.09	1996
83.6	83.6	1.6	1.9	1.2		1.1	1.9	-3.7	-4.3	3.99	5.61	4.14	1997
84.6	84.3	0.9	1.3	-0.5	1.0	1.6	1.7	-15.3	-12.6	4.66	4.89	4.11	1998
85.9	85.8	1.7	1.4	1.7	0.1	1.9	2.7	6.7	1.5	4.85	6.18	4.01	1999
87.0	86.1	2.7	1.3	4.2	3.0	2.5	2.4	18.4	3.5	5.49	5.35	3.42	2000
84.4	81.8	2.6	2.1	1.1	2.8	3.3	3.0	-5.2	-6.9	1.95	5.44	3.76	2001
84.2	82.6	2.2	2.3	1.1	0.6	2.9	2.6	-5.9	-6.6	2.63	4.88	3.33	2002
83.7	81.4	2.8	2.2	3.3	2.0	2.9	1.2	20.1	8.8	2.57	4.66	2.79	2003
85.5	84.7	1.9	1.5	3.0	1.1	1.3	2.2	20.5	21.4	2.47	4.39	2.11	2004
85.4	82.8	5.2	3.2	-	1.7	3.1	3.0	-16.0	23.0	4.30	5.73	3.53	2001 II
83.6	80.9	0.5	2.2	-4.4	2.5	3.7	3.2	-38.1	-22.2	3.05	5.32	3.68	III
82.7	79.9	-2.1	0.6	-4.8	0.4	3.0	2.6	-41.3	-30.8	1.95	5.44	3.76	IV
83.3	81.1	3.0	2.5	2.7	-1.1	3.1	2.1	15.9	12.3	2.30	5.79	3.68	2002 I
84.4	82.9	4.3	3.5	7.4	-0.7	2.7	2.3	40.0	-1.8	2.70	5.37	3.42	II
85.0	83.7	4.6	3.0	1.9	1.8	3.2	2.5	2.8	-1.5	2.83	4.92	3.25	III
84.2	82.6	3.5	2.0	4.9	4.9	3.3	3.5	20.4	-4.0	2.63	4.88	3.33	IV
84.6	82.8	5.2	3.9	6.4	1.4	2.9	2.4	82.0	14.1	3.14	5.13	3.08	2003 I
83.0	80.8	-1.8	-0.3	-2.1	1.4	3.1	0.2	-17.4	14.8	3.07	4.37	2.99	II
82.8	79.9	1.9	1.3	3.7	2.0	3.2	2.4	0.6	20.8	2.58	4.64	3.08	III
84.3	82.1	1.6	2.9	1.4	0.5	2.3	1.6	17.6	19.5	2.57	4.66	2.79	IV
84.0	82.1	2.0	1.1	4.0	1.5	2.8	2.7	45.3	38.9	1.98	4.33	2.39	2004 I
85.1	84.0	3.3	1.6	5.0	0.9	-0.3	2.5	36.7	34.4	2.01	4.83	2.37	II
86.4	86.3	1.2	1.0	3.2	0.2	1.8	0.9	5.4	1.5	2.45	4.58	2.32	III
86.6	86.5	2.7	2.5	1.7	2.5	2.0	2.6	13.7	-15.7	2.47	4.39	2.11	IV
86.4	87.0	1.2	1.7	1.7	1.2	2.5	2.3	16.3	25.6	2.56	4.39	2.08	2005 I
								23.7	-1.2	2.48	3.81	1.87	II
		2.6	1.1		1.2			23.7	-1.2	2.48	3.81	1.87	
		0.2	0.2		0.1			-0.9	0.9	2.01	4.83	2.37	2004 J
		-	0.1		-0.1			0.3	-0.3	2.08	4.82	2.31	J
		-0.1	-0.2		-0.3			1.0	0.5	2.13	4.68	2.22	A
		0.2	0.2		0.6			-1.9	-2.2	2.45	4.58	2.32	S
		0.4	0.2		-0.1			6.8	-3.6	2.57	4.52	2.28	O
		0.2	0.4		0.2			-3.5	-	2.63	4.44	2.17	N
		0.1	0.2		0.8			-0.2	2.0	2.47	4.39	2.11	D
		-0.1	-		-0.8			1.0	1.1	2.43	4.21	2.03	2005 J
		0.2	0.2		0.4			2.5	3.8	2.46	4.28	2.07	F
		0.4	0.1		0.8			7.2	2.3	2.56	4.39	2.08	M
		0.3	0.1					1.6	-1.0	2.45	4.14	1.92	A
		-0.2	0.1					-5.2	-3.0	2.46	4.02	1.86	M
								5.5	0.1	2.48	3.81	1.87	J

* New definition for core CPI as announced on 18 May 2001: CPI excluding the eight most volatile components: fruit, vegetables, gasoline, fuel oil, natural gas, intercity transportation, tobacco, and mortgage-interest costs, as well as the effect of changes in indirect taxes on the remaining CPI components

A2 (Continued)

	Year, quarter, and month	Government surplus or deficit (-) on a national accounts basis (as a percentage of GDP)		Balance of payments (as a percentage of GDP)		U.S. dollar, in Canadian dollars, average noon spot rate
		Government of Canada	Total, all levels of government	Merchandise trade	Current account	
		(28)	(29)	(30)	(31)	(32)
	1992	-5.1	-9.1	1.3	-3.6	1.2083
	1993	-5.5	-8.7	1.8	-3.9	1.2898
	1994	-4.6	-6.7	2.6	-2.3	1.3659
	1995	-3.9	-5.3	4.4	-0.8	1.3726
	1996	-2.0	-2.8	5.1	0.5	1.3636
	1997	0.7	0.2	2.9	-1.3	1.3844
	1998	0.8	0.1	2.6	-1.2	1.4831
	1999	0.9	1.6	4.3	0.3	1.4858
	2000	1.9	2.9	6.2	2.7	1.4852
	2001	1.1	0.7	6.4	2.3	1.5484
	2002	0.8	-0.1	5.0	1.8	1.5704
	2003	0.1	-	4.7	1.5	1.4015
	2004	0.6	0.7	5.1	2.2	1.3015
Annual rates	2001 II	1.6	1.5	6.6	2.6	1.5409
	III	0.9	0.1	5.5	1.4	1.5453
	IV	0.2	-0.8	5.4	1.1	1.5803
	2002 I	0.6	-0.5	5.5	2.7	1.5946
	II	0.7	-0.2	4.8	2.0	1.5549
	III	0.7	-0.2	4.9	1.5	1.5628
	IV	1.1	0.5	4.7	1.2	1.5698
	2003 I	0.7	0.5	5.2	1.5	1.5102
	II	-1.1	-0.6	4.0	0.8	1.3984
	III	0.3	-	4.9	1.8	1.3799
	IV	0.3	0.1	4.7	1.9	1.3160
	2004 I	0.2	0.1	5.1	2.1	1.3179
	II	0.2	0.5	5.9	3.0	1.3592
	III	0.9	0.8	5.1	2.2	1.3072
	IV	1.1	1.3	4.4	1.6	1.2203
	2005 I	-1.2	1.3	4.0	1.2	1.2267
	II					1.2439
Last three months						1.2439
Monthly rates	2004 J					1.3577
	J					1.3219
	A					1.3118
	S					1.2878
	O					1.2469
	N					1.1961
	D					1.2191
	2005 J					1.2253
	F					1.2397
	M					1.2161
	A					1.2360
	M					1.2555
	J					1.2402

Notes to the Tables

Symbols used in the tables

R Revised

– Value is zero or rounded to zero.

Note:

Blank spaces in columns indicate that data are either not available or not applicable.

A horizontal rule in the body of the table indicates either a break in the series or that the earlier figures are available only at a more aggregated level.

A1

(1) In February 1991, the federal government and the Bank of Canada jointly announced a series of targets for reducing inflation to the midpoint of a range of 1 to 3 per cent by the end of 1995. In December 1993, this target range was extended to the end of 1998. In February 1998, it was extended again to the end of 2001. In May 2001, it was extended to the end of 2006.

(2-3) Year-to-year percentage change in consumer price index (Table H8). The core CPI is the CPI excluding the eight most volatile components: fruit, vegetables, gasoline, fuel oil, natural gas, intercity transportation, tobacco, and mortgage-interest costs, as well as the effect of changes in indirect taxes on the other CPI components

(4–5) The *operating band* is the Bank of Canada's 50-basis-point target range for the average overnight rate paid by investment dealers to finance their money market inventory.

(6) The *overnight money market financing rate* is an estimate compiled by the Bank of Canada. This measure includes overnight funding of the major money market dealers through general collateral buyback arrangements (repo) including special purchase and resale agreements with the Bank of Canada. Prior to 1996, data exclude all repo activity with the exception of those arranged directly with the Bank of Canada. These latter have been included in the calculation since 1995.

(7) The *monetary conditions index* is a weighted sum of the changes in the 90-day commercial paper rate and the C–6 trade-weighted exchange rate (see technical note in the Winter 1998–1999 issue of the *Bank of Canada Review*, pages 125 and 126). The index is calculated as the change in the interest rate plus one-third of the percentage change in the exchange rate. The Bank does not try to maintain a precise MCI level in the short run. See *Monetary Policy Report*, May 1995, p.14.

(8) *90-day commercial paper rate*. The rate shown is the Bank of Canada's estimate of operative market trading levels on the date indicated for major borrowers' paper.

(9) The C–6 exchange rate is an index of the weighted-average foreign exchange value of the Canadian dollar against major foreign currencies. (See technical note in the Winter 1998–1999 issue of the *Bank of Canada Review*, pages 125 and 126.) Weights for each country are derived from Canadian merchandise trade flows with other countries over the three years from 1994 through 1996. The index has been based to 1992 (i.e., C–6 = 100 in 1992). The C–6 index broadens the coverage of the old G–10 index to include all the countries in the EMU.

(10) Gross M1: Currency outside banks plus personal chequing accounts plus current accounts plus adjustments to M1 described in the notes to Table E1 *(Bank of Canada Banking and Financial Statistics)*.

(11) M1++: M1+ plus non-chequable notice deposits held at chartered banks plus all non-chequable deposits at trust and mortgage loan companies, credit unions, and caisses populaires less interbank non-chequable notice deposits plus continuity adjustments.

(12) M2++: M2+ plus Canada Savings Bonds plus cumulative net contributions to mutual funds other than Canadian-dollar money market mutual funds (which are already included in M2+).

(13) Yield spreads between *conventional* and *Real Return Bonds* are based on actual mid-market closing yields of the selected long-term bond issue. At times, some of the change in the yield that occurs over a reporting period may reflect switching to a more current issue. Yields for *Real Return Bonds* are mid-market closing yields for the last Wednesday of the month and are for the 4.00% bond maturing 1 December 2031. Prior to 24 September 2001, the benchmark bond was 4.25% maturing 1 December 2026. Prior to 7 December 1995, the benchmark bond was 4.25% maturing 1 December 2021.

(14–15) CPI excluding food, energy, and the effect of changes in indirect taxes. CPIW adjusts each of the CPI basket weights by a factor that is inversely proportional to the component's variability. For more details, see "Statistical measures of the trend rate of inflation." *Bank of Canada Review,* Autumn 1997, 29–47

(16) *Unit labour costs* are defined as aggregate labour income per unit of output (real GDP at basic prices).

(17) IPPI: Industrial product price index for finished products comprises the prices of finished goods that are most commonly used for immediate consumption or for capital investment.

(18) Data for average hourly earnings of permanent workers are from Statistics Canada's *Labour Force Information* (Catalogue 71-001).

A2

The majority of data in this table are based on, or derived from, series published in statistical tables in the *Bank of Canada Banking and Financial Statistics.* For each column in Table A2, a more detailed description is given below, as well as the source table in the *Banking and Financial Statistics,* where relevant.

(1) Gross M1: Currency outside banks plus personal chequing accounts plus current accounts plus adjustments to M1 described in the notes to Table E1.

(2) M1+: Gross M1 plus chequable notice deposits held at chartered banks plus all chequable deposits at trust and mortgage loan companies, credit unions, and caisses populaires (excluding deposits of these institutions) plus continuity adjustments.

(3) M1++: M1+ plus non-chequable notice deposits held at chartered banks plus all non-chequable despoits at trust and mortgage loan companies, credit unions, and caisses populaires less interbank non-chequable notice deposits plus continuity adjustments.

(4) M2+: M2 plus deposits at trust and mortgage loan companies and government savings institutions, deposits and shares at credit unions and caisses populaires, and life insurance company individual annuities and money market mutual funds plus adjustments to M2+ described in notes to Table E1.

(5) M2++: M2+ plus Canada Savings Bonds plus cumulative net contributions to mutual funds other than Canadian-dollar money market mutual funds (which are already included in M2+).

(6) Short-term business credit (Table E2)

(7) Total business credit (Table E2)

(8) Consumer credit (Table E2)

(9) Residential mortgage credit (Table E2)

(10) Gross domestic product in current prices (Table H1)

(11) Gross domestic product in chained 1997 dollars (Table H2)

(12) Gross domestic product by industry (Table H4)

(13) Civilian employment as per labour force survey (Table H5)

(14) Unemployment as a percentage of the labour force (Table H5)

(15-16) Data for capacity utilization rates are obtained from the Statistics Canada quarterly publication *Industrial Capacity Utilization Rates in Canada* (Catalogue 31-003), which provides an overview of the methodology. *Non-farm goods-producing industries* include logging and forestry; mines, quarries and oil wells; manufacturing; electric power and gas utilities; and construction.

(17) Consumer price index (Table H8)

(18) Consumer price index excluding the eight most volatile components: fruit, vegetables, gasoline, fuel oil, natural gas, intercity transportation, tobacco, and mortgage-interest costs, as well as the effect of changes in indirect taxes on the other CPI components. (Table H8)

(19) Gross domestic product chain price index (Table H3)

(20) Unit labour costs are defined as aggregate labour income per unit of output (real GDP at basic prices).

(21–22) The data on wage settlements are published by Human Resources and Skills Development Canada and represent the effective annual increase in base wage rates for newly negotiated settlements. These data cover bargaining units with 500 or more employees. Contracts both with and without cost-of-living-allowance clauses are included.

(23–24) Bank of Canada commodity price indexes: Total and total excluding energy (Table H9)

(25) *Treasury bills* are mid-market rates for typical quotes on the Wednesday shown.

(26–27) *Selected Government of Canada benchmark bond yields* are based on actual mid-market closing yields of selected Canada bond issues that mature approximately in the indicated term areas. At times, some of the change in the yield occurring over a reporting period may reflect a switch to a more current issue. Yields for *Real Return Bonds* are mid-market closing yields for the last Wednesday of the month and are for the 4.00% bond maturing 1 December 2031. Prior to 24 September 2001, the benchmark bond was 4.25% maturing 1 December 2026. Prior to 7 December 1995, the benchmark bond was 4.25% maturing 1 December 2021.

(28-29) The data on the government surplus or deficit on a national accounts basis are taken from Statistics Canada's *National Income and Expenditure Accounts* (Catalogue 13-001), where the government surplus or deficit is referred to as "net lending."

(30) Merchandise trade balance, balance of payments basis (Table J1)

(31) Current account balance, balance of payments basis (Table J1)

(32) U.S. dollar in Canadian dollars, average noon spot rate (Table I1)