Inflation Targeting and Medium-Term Planning: Some Simple Rules of Thumb

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- *Inflation targeting, a stable macroeconomic environment, and an average growth rate for potential output that is not expected to vary much in the next several years all help households, businesses, and governments in their medium-term economic and financial planning. A number of simple rules of thumb can be usefully employed in this planning.*
- *In particular, inflation targeting has, on average over a number of years, maintained most major measures of inflation quite close to the 2 per cent target midpoint.*
- *Inflation targeting and a clear fiscal framework have both contributed to a more stable macro-economic environment, in which output varies less around its potential level.*
- *Potential output growth is expected to average around 3 per cent over the next several years.*
- *In light of the above factors and historical relationships, labour income, profits, and consumer spending will likely grow, on average, by about 5 per cent over the medium term.*
- *Real and nominal long-term interest rates have been more stable over the past several years, and this stability is expected to continue. Real 30-year yields will likely vary in a range around 3.5 or 4.0 per cent, and nominal yields will correspondingly vary around 5.5 or 6.0 per cent.*

Recent economic shocks, such as the fall in stock market prices and the effects of the terrorist attacks on 11 September 2001, have at times created a good deal of uncertainty about the short-run economic outlook for Canada. There is evidence, however, that overall, the Canadian economy has become more stable in the past decade, despite the uncertainties caused by these events. This increased stability, a result of inflation targeting as well as other factors, is evident in several key economic variables, including inflation, inflation expectations, and output (for further discussion see Debs 2001 and Longworth 2002).

An examination of data on the average values or growth rates of some important economic variables and some of their ratios suggests certain relationships that can be useful in forming expectations of medium-term *average* values or growth rates. These relationships can be used by households, businesses, and governments to plan more confidently over medium-term horizons, given the predictability of inflation provided by the Bank of Canada's monetary policy. In particular, they can use some simple rules of thumb for medium-term planning regarding inflation, growth rates for real GDP, nominal GDP (the total output of the economy measured in current prices), labour income, profits, and long-term interest rates. In most cases, the rules of thumb suggested in this article are given to the nearest percentage point. Of course, annual growth rates (or levels, in the case of interest rates) will be more volatile than medium-term averages.

Implications for Inflation

The Bank of Canada has been targeting the 12-month percentage change in the Consumer Price Index (CPI)

1. Andrew Rennison and Gillian Boden also contributed to this article.

since 1991. At that time, inflation-reduction targets were set for the four subsequent years, with the aim of reducing inflation to a target level of 2 per cent by the end of 1995. Indeed, the Bank stated, "The purpose of setting out formal targets is to provide a clear indication of the downward path for inflation over the medium term so that firms and individuals can take this into account in their economic decision-making." (1990,10–11) Since 1995, the target midpoint for inflation has been maintained at 2 per cent within a target range of 1 to 3 per cent (Chart 1).

Crawford (2001) considers the long-run predictability of Canadian inflation and its benefits, as well as the steps taken by the Bank of Canada to improve this predictability when the inflation-target agreement was renewed in May 2001. The steps intended to increase predictability included providing more information to the public, using an improved measure of core inflation, and lengthening the term of the agreement to five years from three. The consequent reduction in the uncertainty surrounding future inflation rates would then allow households and firms to be more comfortable in their longer-term planning, thus decreasing distortions in the economy.

Although there will always be disturbances in the economy that will cause inflation to deviate from the target midpoint, inflation should remain within the target range a fairly high percentage of the time for it to be considered stable and predictable, as the Bank of Canada desires. Crawford demonstrates that, from the end of 1995 to July 2001, the CPI year-over-year inflation rate kept within the 1 per cent to 3 per cent band a good deal of the time. Table 1 extends some of his data to December 2002. It shows the frequency with which year-over-year inflation rates for CPI, CPI excluding the effects of changes in indirect taxes (CPIXT),[2] and core CPI[3] fall within various ranges around the 2 per cent target midpoint. The evidence from the table shows that inflation is close to the target midpoint in the vast majority of months. For example, core inflation was between 1 and 3 percent 96 per cent of the time, and total CPI, 78 per cent of the time.

Table 1

Inflation Measures and Various Ranges

Dec. 1995 to Dec. 2002

	Range		
	+/-1.5%	+/-1.0%	+/- 0.7%
CPI	95	78	55
CPIXT	95	71	55
Core	100	96	75

Note: The table shows the percentage of time each 12-month measure of inflation fell within the specified ranges around a target midpoint of 2 per cent.

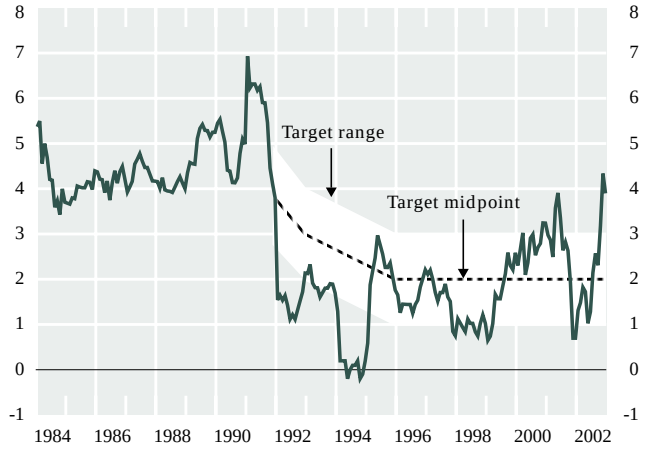
Crawford also shows that, when considering averages of inflation rates, the longer the averaging period, the narrower the range of inflation rates required to capture a given frequency of outcomes. For example, if the 12-month rates of CPIXT inflation fall within plus or minus 1 percentage point of the target midpoint roughly three-quarters of the time, then the five-year averages of these 12-month rates will fall within plus or minus 0.45 percentage point of the target midpoint about three-quarters of the time.

Although the Bank of Canada targets CPI inflation, measures constructed using the ratios of broad indexes of prices have not varied all that much. Chart 2 shows that the core price index and the GDP deflator,

Chart 1

Consumer Price Index

Year-over-year percentage change



2. In addition to the two measures of inflation that constitute the Bank's target and operational guide, we examine CPIXT because changes in indirect taxes tend to be one-off occurrences.

3. Throughout this article, core inflation refers to the CPI excluding the eight most volatile components and the effect of changes in indirect taxes on the remaining components.

Chart 2

Relative Prices

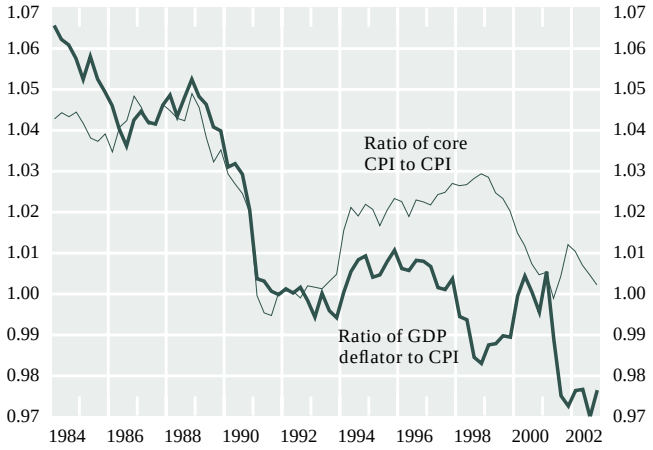
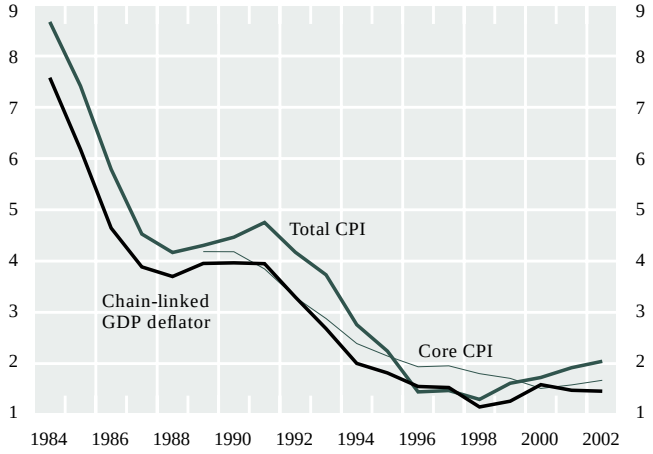


Chart 3

Inflation

Compound annual growth rates, 5-year period

Per cent



both relative to the CPI, have not varied greatly over the past two decades, especially since 1991.

Chart 3 shows annual growth rates averaged over five-year periods for total CPI, core CPI, and the GDP deflator. Because the ratios of these major aggregate price indexes have not moved by much, all three inflation measures stabilized at low levels, just below two per cent, during the 1990s.[4] Thus, given the Bank of Canada's commitment to a 2 per cent target for CPI inflation, 2 per cent is a reasonable rule of thumb for the rate of inflation going forward. (Of course, sub-aggregates, such as goods inflation or services inflation, can and do behave very differently.)

4. Chart 3 shows that the five-year average was down to 2 per cent by 1995 or 1996, depending on the measures. This is consistent with annual inflation having fallen to 2 per cent in the early 1990s.

Smooth Evolution of Potential Output and Implications for Real GDP Growth

Potential output may be thought of as the level of output consistent with no change in the inflation rate relative to inflation expectations. The combination of a continued smooth evolution of potential output and a monetary policy that targets inflation should contribute to a predictable profile for average growth in the Canadian economy in the coming years.

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Real GDP growth versus potential growth

In the last few years, the extent to which real output fluctuates around its potential level has decreased. The establishment of clear and appropriate frameworks for monetary and fiscal policies has been an important factor in this decline. In particular, a monetary policy geared to low, stable, and predictable inflation has anchored inflation expectations and allowed the economy to avoid boom-bust episodes. The Bank of Canada changes interest rates to counter demand shocks in both directions, thus smoothing both output and inflation. Moreover, a high degree of monetary policy credibility and a horizon of 18 to 24 months to bring inflation back to its target midpoint allow the Bank to leave interest rates unchanged in response to short-lived relative price shocks without affecting the real economy.

Chart 4 shows the historical evolution of real GDP and potential output. The output gap, which is the per cent difference between real and potential GDP, is shown in Chart 5. Since the recession of the early 1990s, the output gap has for the most part remained between plus or minus 2 per cent; in fact, over the last four years the gap has varied within a narrower range. The relative stability over recent periods contrasts with the more volatile output gap observed earlier.

Chart 4

Real GDP and Potential Output

Annual averages, billions of dollars

Logarithmic scale

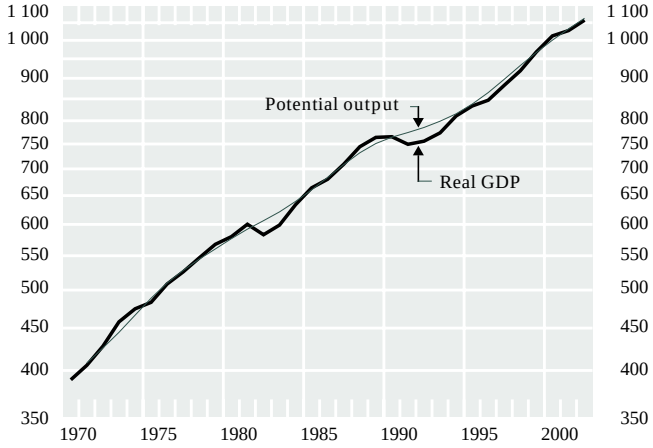
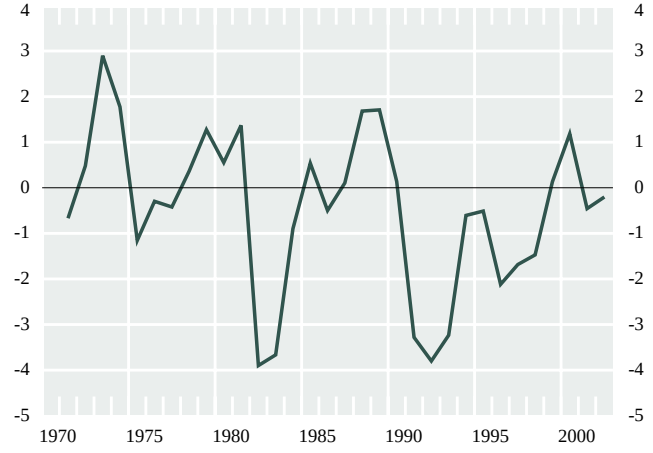


Chart 5

Annual Output Gap

Per cent



Potential output

Chart 6 shows the growth rate of the Bank's measure of potential output, as well as the growth rate of trend labour inputs. The difference between the two lines represents growth in trend labour productivity. Growth in potential output has remained between 3 and 4 per cent since 1996, and is currently running around 3 per cent.

The outlook for future potential output growth will be significantly influenced by demographic developments and the effects on labour productivity arising from business investment in new machinery and equipment. The aging of the Canadian population is eventually expected to slow the growth of Canada's labour force and thus to decrease the future growth rate of potential output.[5] These changes, however, are expected to take effect gradually; indeed, the most significant impact will not likely be seen until beyond 2011 (Kuszczak and Dion 1997–98).[6]

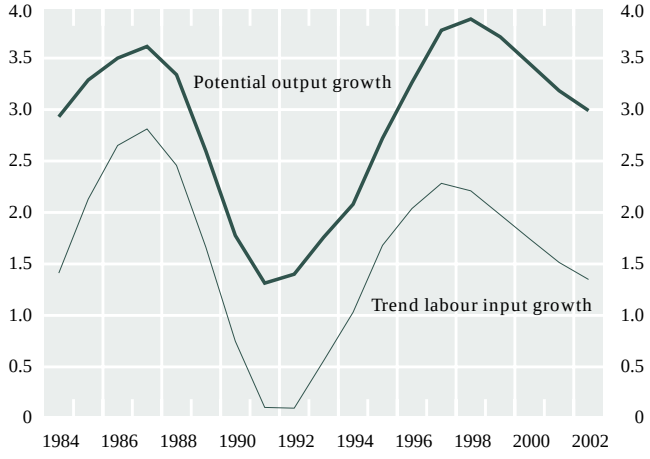
Productivity developments will also play an important role in determining the growth rate of potential output in the coming years. Canada has seen an acceleration in the growth rate of GDP per person-hour in the last five years: growth in labour productivity increased from an average of 1.4 per cent between 1970 and 1997 to an average of 1.8 per cent between

Chart 6

Potential Output and Trend Labour Input

Annual average growth rates

Per cent



5. Immigration policy can also have an effect on labour force growth.

6. This demographic shift continues to be consistent with Statistics Canada's demographic projections.

1997 and 2002. It is likely that productivity growth, stimulated in particular by increased investment in machinery and equipment and in information and communications technology in the late 1990s, will remain strong in the near and medium term. In the past, however, it has been notoriously difficult to foresee when increases in investment spending will affect productivity growth (Crawford 2002). This difficulty in turn creates some uncertainty about potential output growth.

Overall, the evidence suggests that the average growth of potential output in the medium term is likely to vary around 3 per cent until the effects of population aging on labour force participation take hold in eight years or so, and labour input growth starts to fall by half. Since potential and actual GDP can be expected to move together in the coming years, this suggests that 3 per cent is a reasonable rule of thumb for average real growth in GDP over the next five to eight years.

Implications for Income and Other Nominal Variables

The two previous sections have implications for the growth of nominal variables, such as income and nominal GDP. These implications arise from two facts. First, nominal GDP is just the product of real GDP and the GDP deflator. Second, a number of economic variables are a more or less constant proportion of nominal GDP.

Nominal GDP

Chart 7 shows the five-year average growth rates for real GDP, the GDP deflator, and nominal GDP. In recent years, low and stable inflation and real GDP growth averaging a little above 3 per cent have led to five-year average growth rates in nominal GDP of between 4 and 6 per cent. As inflation is expected to remain around 2 per cent on average, projected potential output growth of 3 per cent would translate into average nominal GDP growth of about 5 per cent over the next several years.

Labour income and profits

If indirect taxes and the statistical discrepancy are excluded, nominal GDP can be divided into labour income and capital income, both broadly defined.[7] Capital income includes not only total profits (including profits of government business enterprises in Canada),

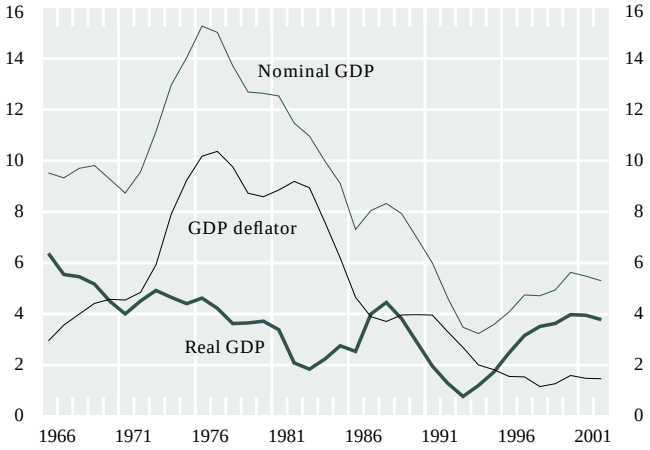
7. In making this calculation, 2/3 of net farm income and net unincorporated business income are considered to be labour income, and 1/3 is considered to be capital income.

Chart 7

Real GDP, Nominal GDP, and GDP Deflator

Compound annual growth rates, 5-year period

Per cent



excluding the inventory-valuation adjustment, but also interest and investment income and capital consumption allowances.

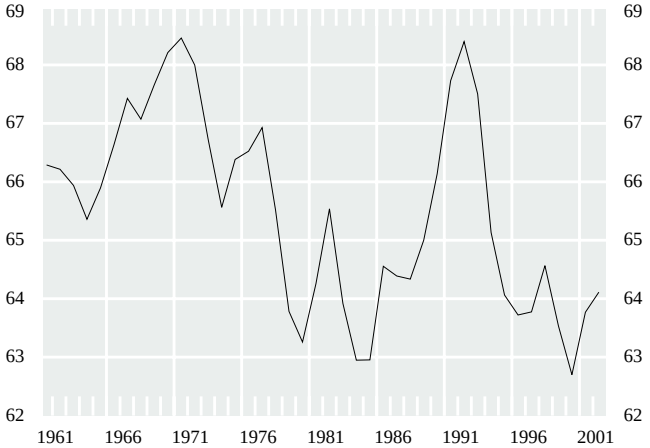
The share of labour income shows a very mild downward trend since 1961, but all of this trend can be accounted for by a downward shift in the late 1970s (Chart 8). Over the last 25 years or so, the labour share has had no discernible trend, varying around 64 per cent. Thus, the capital share has also had no discernible trend since the late 1970s, varying around 36 per cent. At times, the short-run movements of the shares have

Chart 8

Ratio of Labour Income to Nominal GDP

Annual average

Per cent



Note: Labour income and nominal GDP have been adjusted. See under "Labour income and profits," this page.

been significant. In recessions, capital income—in particular profits—tends to fall proportionately more than labour income, and thus its share can fall significantly. This was particularly evident in the early 1980s and 1990s.[8] The slowdown in economic activity in 2001 was also associated with a slight decline in the share of capital income.

We would expect both labour income and capital income to grow by about 5 per cent, on average, over the medium term.

When the share of labour income in GDP is unchanged, the rate of growth in labour income and capital income will be the same as the rate of growth in nominal GDP. Thus, when the shares are close to their recent norms, we would expect average growth rates over the next several years to be close to the projected growth in nominal GDP. Since shares are currently close to their 25-year norms, we would expect both labour income and capital income to grow by about 5 per cent, on average, over the medium term.

The 5 per cent growth in labour income can be roughly divided into 1 per cent growth in labour input (person-hours) and 4 per cent growth in labour compensation per person-hour. (It is important to note that some of this increase in average labour compensation per person-hour is the result of a shift in the composition of the labour force towards more highly educated, and therefore more highly compensated, employees.) Since inflation is expected to be 2 per cent per year, this growth represents 2 per cent growth in real compensation per person-hour (which is warranted by the approximate 2 per cent increase in labour productivity).[9]

In contrast to the total capital share of income, the profit share has had no discernible trend, even over the earlier years of this period, continually returning to around 12 per cent in every decade since the 1960s (Chart 9). Again, the absence of trend in the share implies that when the current share is close to the norm (as currently appears to be the case), a reasonable rule of thumb is that profits would grow at the same rate as nominal GDP, namely, 5 per cent on average over the next several years.

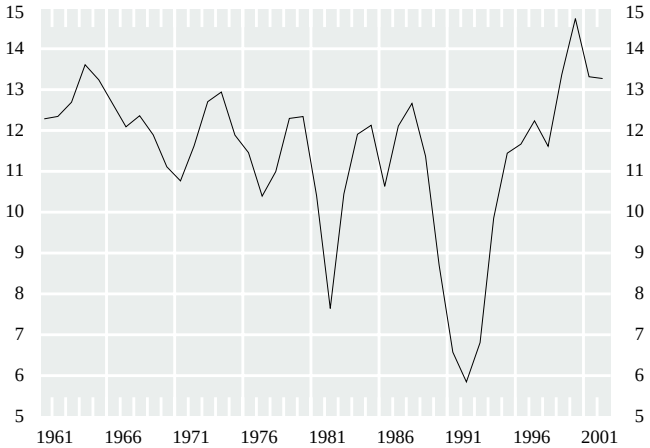
The expected growth in profits (also referred to as earnings) has significant implications for aggregate stock market valuations. Unless the aggregate earnings of companies listed on the Toronto Stock Exchange (which, of course, tend to be the largest companies) behave significantly differently from profits in the economy as a whole, they would not grow at a rate much different from 5 per cent per year on average over a number of years. (While earnings of individual companies might grow by double-digit figures for a number of years, it would be very unlikely for this to be true for earnings in aggregate.) Under the assumptions that the dividend-to-earnings ratio does not change over time, that the discount rate is constant, and that the growth of earnings is constant, the dividend-discount approach to stock market valuation (Hannah 2000) predicts that the rate of growth of the stock price would equal the growth of earnings. Now, all these assumptions are rather heroic, but they do provide a useful benchmark against which to judge other assumptions or projections of stock prices.

Chart 9

Ratio of Corporate Profits to Nominal GDP

Annual average

Per cent



Note: Corporate profits and nominal GDP have been adjusted. See p.19, "Labour income and profits," for details.

8. The increase in the labour share in the early 1990s was exacerbated by hikes in payroll taxes.

9. See Cozier (1989) for a discussion of the historical relationship between real wages and labour productivity.

Consumption

There has been considerable variation through time in the ratios of personal disposable income to nominal GDP, and of consumption to personal disposable income. Many of the larger variations in these two ratios at short-term to medium-term horizons, however, have been in opposite directions (Chart 10).[10] Thus, the ratio of consumption to nominal GDP, which is the product of these two ratios, has been much smoother and much more stable than either of them. In recent years, this ratio has remained more or less constant, at around 57 or 58 per cent.[11] With nominal income expected to grow by 5 per cent on average over the medium term, a reasonable rule of thumb is that nominal consumption would also grow by about 5 per cent on average. Indeed, in recent years, both have grown by about 5 per cent (Chart 11).

Chart 10

Consumption: Various Ratios

Annual averages

Per cent

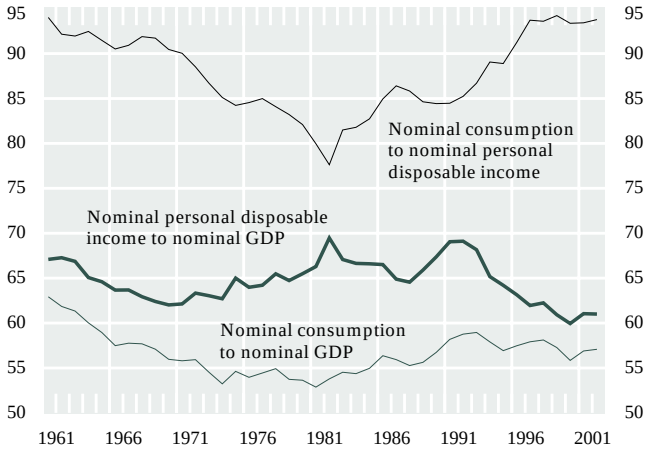
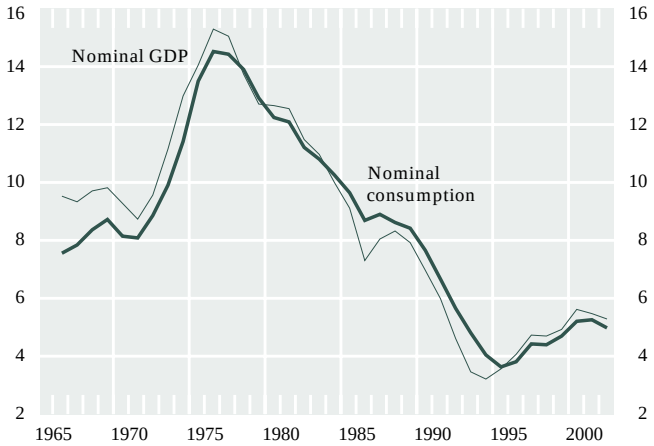


Chart 11

Nominal Consumption and Nominal GDP

Compound annual growth rates, 5-year period

Per cent



Implications for Long-Term Bond Rates

Real long-term bond rates typically average slightly above long-term real growth rates.[12] When 30-year Real Return Bonds were introduced in Canada, their real yields generally remained in the 4 to 5 per cent range until late 1996, when it became evident that the federal government had made significant progress in dealing with its fiscal problems (Chart 12). Subsequently, their real yields remained quite close to 4.0 per cent for three years, before declining to around 3.5 per cent by late 2000. (Part of this last 0.5 percentage point decline may reflect the weakness in the world economy that began to develop in the latter half of 2000 and has continued to the present.) Thus, a useful rule of thumb is that real yields would continue to vary around 3.5 or 4.0 per cent in coming years.

The difference between 30-year nominal and Real Return Bond yields declined to about 2 per cent by

10. The two major reasons for these offsetting variations are (i) the absence of inflation accounting of interest income (Jump 1980 and Lau 1993), which distorts personal disposable income, and (ii) the effect of government fiscal balances—increased deficits to finance personal transfers or tax cuts will increase the ratio of personal disposable income to GDP, but the ratio of consumption to personal disposable income will fall because future tax liabilities are taken into account by households.

11. Much of the decline in the ratio of consumption to nominal GDP from the early 1960s to the mid-1970s reflected a rise in the ratio of government spending on goods and services to nominal GDP. This rise was financed in part by increased personal taxes (note the decline in the ratio of personal disposable income to GDP until 1970), especially in the absence of an indexed tax system.

12. This has tended to be the case in Canada over the last 20 years. Economic theory would suggest that the real rate of return on capital would exceed the real growth rate of the economy. As long as the risk premium on private capital relative to government bonds is not too large, we would also expect that the real yield on government bonds would be slightly higher than the real growth of the economy. All this is strictly true only in a closed economy. In a small open economy, this real interest rate would reflect the world real interest rate, which in turn would reflect the real growth rate of the world economy.

Chart 12

Real and Nominal 30-year Bond Yields

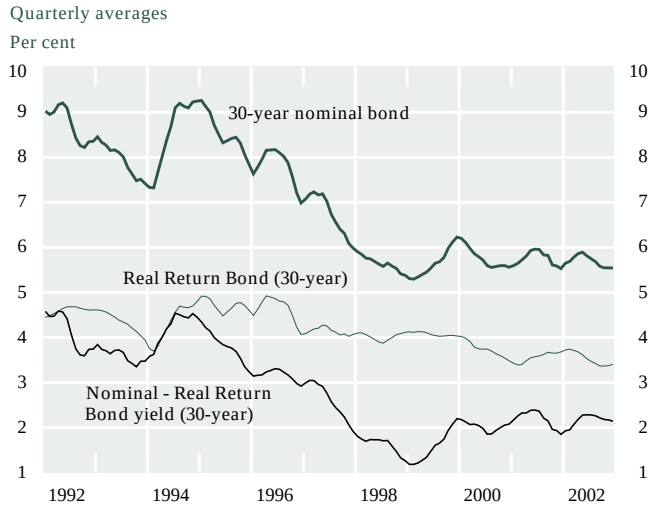
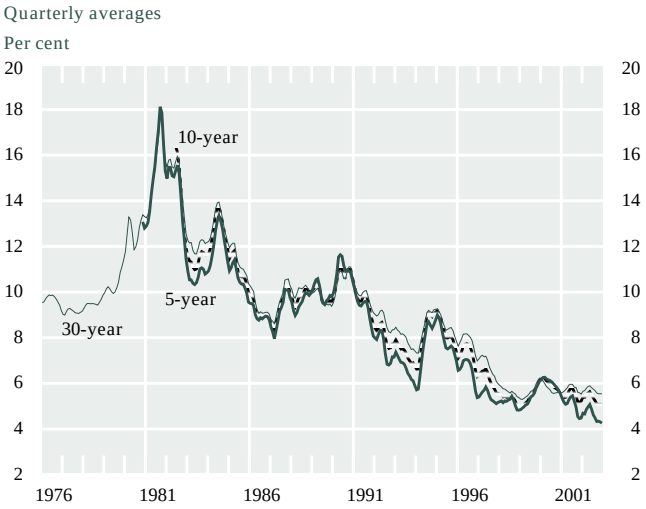


Chart 13

Benchmark Bond Yields



late 1997, reflecting the growing credibility of the 2 per cent inflation target, as well as increased credibility in fiscal policy. As a result, 30-year nominal bonds have tended to vary in a relatively narrow range around 5.5 per cent in recent years. With credibility in monetary and fiscal policy continuing, a useful rule of thumb is that 30-year nominal bonds will continue to vary in a range around 5.5 or 6.0 per cent.

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Five-year and 10-year bond yields tend to be more variable than 30-year yields because the weight of expected short-term interest rates over the first couple of years is greater for them than for 30-year yields. But they too have been much more stable in the last five or six years than in the previous 20 or 25 years (Chart 13). It is reasonable to think that a policy of low, stable, and predictable inflation will mean that this increased stability of yields will continue.

Conclusions

Although economic uncertainty is a fact of life, the Bank of Canada's framework of inflation control has led to a significant decline in the uncertainty regarding inflation and other nominal variables. This framework has also been useful in dampening the volatility in real GDP. Combined with a smooth projected path for potential output over the next several years, this allows for some simple rules of thumb for households, businesses, and governments to use in their medium-term planning. There are, of course, no guarantees as to the accuracy of these rules as forecasts, but they should prove useful when applied to averages over five years or so.

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