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Canada—Selected Issues

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INTERNATIONAL MONETARY FUND

CANADA

Selected Issues

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Canada--Basic Data

Area and population

Area	3,852,000 sq. miles (9,977,000 sq. km.)
Population density	3 per sq. km.
Population (1995)	29.5 million
Annual rate of population increase (1995)	1.2 percent
Life expectancy at birth (1991)	77.4 years
Crude birth rate (1990)	13.8 per thousand
Infant mortality (aged under 1; 1990)	7.1 per thousand
Per capita supply of calories (1990)	3,482 per day
Per capita supply of protein (1990)	102 grams per day
Population per physician (1990)	511 persons
Civilian unemployment rate (February 1996)	9.6 percent

GDP (1995)

US\$568.4 billion
Can\$780.0 billion

GDP per capita (1995)

US\$18,530.2

	1991	1992	1993 (Percent)	1994	1995
<u>Origin of GDP</u>					
Agriculture, forestry, fishing, and trapping	2.9	2.7	2.8	2.8	2.8
Mining and oil wells	4.0	4.1	4.2	4.3	4.4
Manufacturing	17.4	17.6	17.9	18.4	18.9
Construction	6.1	5.7	5.5	5.5	5.1
Community, business, and personal services	12.2	12.2	12.2	12.1	12.3
Transportation, storage, communication, and utilities	11.2	11.3	11.3	11.5	11.7
Finance, insurance, and real estate	16.1	16.1	16.1	15.8	15.8
Nonbusiness services	18.5	18.7	18.2	17.4	16.9
Other	11.5	11.6	11.8	12.2	12.1

Ratios to GDP

Exports of goods and nonfactor services	24.4	26.3	29.4	33.2	37.0
Imports of goods and nonfactor services	25.5	27.1	29.8	32.5	34.5
Current account of the balance of payments	-4.0	-3.8	-4.0	-3.0	-1.7
General government revenues	44.0	44.2	43.5	43.3	43.4
General government expenditures	50.6	51.6	50.8	48.5	47.6
Overall general government surplus or deficit (-) 1/	-6.6	-7.4	-7.3	-5.3	-4.2
Gross domestic saving (private)	22.9	22.7	22.5	21.6	20.4
Gross domestic investment (private)	16.6	15.8	16.0	16.7	16.3
Money and quasi-money (M2, end of year)	50.1	50.6	50.5	49.3	49.3

Annual changes (annual averages)

Real GDP per capita	-3.0	-0.7	0.8	3.4	1.0
Real GDP	-1.8	0.8	2.2	4.6	2.2
Total domestic demand	-1.2	0.4	2.0	3.2	1.1
Real fixed investment (private)	-4.0	-1.7	0.5	7.5	-0.2
Real consumption (private)	-1.6	1.3	1.6	3.0	1.4
GDP at current prices	1.0	2.0	3.3	5.2	4.0

GDP deflator	2.9	1.2	1.0	0.6	1.7
Producer prices (finished goods)	1.8	2.0	3.2	3.2	3.3
Consumer prices	5.6	1.5	1.8	0.2	1.9

General government revenues 1/	2.5	2.6	1.7	4.6	4.4
General government expenditures 1/	7.8	4.1	1.6	0.5	2.0

Money and quasi-money (M2) 2/	4.6	3.1	3.1	2.7	4.0
Money (M1) 2/	5.5	5.7	14.6	7.0	6.4
Quasi-money 2/	4.4	2.7	1.4	2.0	3.6

Merchandise exports (f.o.b.)	-3.7	10.8	16.6	20.2	16.4
Merchandise imports (f.o.b.)	-0.2	9.2	15.2	18.0	11.1

Nominal effective exchange rate	1.7	-5.8	-5.7	-6.2	-2.0
Real effective exchange rate (ULC based)	3.1	-6.3	-8.5	-5.5	-6.6

	1991	1992	1993	1994	1995
<u>(billions of Canadian dollars)</u>					
Federal government finances (fiscal years) 3/					
Revenues	122.0	120.4	116.0	123.3	131.4
Expenditures	156.4	161.4	158.0	160.8	161.1
Overall surplus or deficit (-)	-34.4	-41.0	-42.0	-37.5	-29.7
Balance of payments					
Merchandise exports (f.o.b.)	140.2	155.4	181.3	217.9	253.5
Merchandise imports (f.o.b.)	136.6	149.2	171.9	202.8	225.2
Investment income (net)	-19.2	-20.0	-26.1	-28.9	-32.9
Nonfactor services and transfers (net)	-11.5	-12.1	-12.0	-8.5	-8.5
Balance on current account	-27.0	-25.9	-28.8	-22.3	-13.1
Net private capital	29.0	17.5	32.7	12.5	9.2
Net official financing	1.1	7.0	5.2	5.9	-2.2
Errors and omissions	-3.0	1.4	-9.2	4.0	6.0
International reserve position					
	<u>(billions of SDRs)</u>				
Official international reserve assets 4/	11.8	8.7	9.3	8.5	10.2
IMF data (as of February 29, 1996)					
Article VIII status					
Exchange rate (March 12, 1996)				Can\$1.3690 per US\$	
Intervention currency				US\$	
Quota				SDR 4,320.3 million	
Total Fund holdings of Canadian dollars				SDR 3,487.1 million	
Special Drawing Rights Department					
Allocation of SDRs				SDR 779.3 million	
Holdings of SDRs				SDR 791.9 million	

-
- 1/ National income accounts basis.
2/ December over previous December.
3/ Public accounts basis; fiscal year begin on April 1.
4/ End-of-year values.

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I. Introduction 1/

Previous reports have considered a number of important policy and economic issues, including those related to unemployment, the system of federal-provincial transfers, the public pension system, and fiscal deficit reduction (Table I-1). This report builds on this work and addresses some of the key policy and economic challenges facing the Canadian economy.

Chapter II presents a new approach to predicting the business cycle in the context of the Canadian economy. The conventional approach to predicting economic activity has been to use single equation models or atheoretical vector autoregressions that relate economic output to other economic and financial variables. This chapter suggests an alternative approach that uses a range of parametric and nonparametric tests to gauge the ability of various indicators to predict turning points in the business cycle. The results suggest that the slopes of the Canadian and the U.S. term structure offer reliable information regarding the future course of real GDP in Canada; monetary indicators, including the change in the nominal monetary conditions index and the change in real M1, are also helpful in predicting the cycle.

Price inflation in Canada has been moderate in recent years, raising questions about whether the effects of the exchange rate depreciation that has occurred since 1991 has already been fully reflected in domestic prices. Chapter III presents a model that links the inflation rate to the business cycle and the rates of change in the exchange rate and in unit labor costs. All three variables are found to systematically affect inflation. However, quantitatively, the most important determinant of inflation is the excess demand gap. Thus, the results suggest that the relatively low rate of inflation in recent years has been primarily due to the persistence of an excess supply gap in the Canadian economy and the decline in unit labor costs.

Sharp fluctuations in the exchange rates of the major currencies have led to a considerable volume of research on the issue of measurement of misalignments in exchange rates. Chapter IV describes one such measure of misalignment--the Fundamental Equilibrium Exchange Rate (FEER)--and notes that estimates of the FEER are subject to considerable uncertainty. In particular, the chapter concludes that in the case of the FEER for the Canadian dollar, the range of uncertainty is large enough to cast doubt on the usefulness of the FEER methodology for gauging exchange rate misalignments.

The downward trend in the personal saving rate in Canada since 1982 and its more recent decline in 1995 have raised concerns about the near-term

1/ Ana Stevens (Administrative Assistant) and Irene Aquino (Staff Assistant) contributed to the production of this document.

prospects for domestic demand, primarily household consumption, and longer term concerns about the sufficiency of household saving to support investment and growth. Chapter V reviews recent trends in the saving rate and examines the factors that may have contributed to the recent decline. It concludes that the decline in the saving rate appears to be largely related to the transition to a low inflation environment since the early 1980s; saving rates that exclude the effects of inflation have been considerably more stable.

The generosity of the Canadian unemployment insurance system has been associated with a rise in structural unemployment, which, in turn, has led to a number of recent reform efforts. Chapter VI reviews the most recent proposals, which would tighten eligibility requirements by reducing benefits for previous claimants and increase funding for active labor market programs. This chapter cites evidence to suggest that, while the reform appropriately tightens eligibility requirements, there seems to be room for further action in the areas of repeat claimants and regionally extended benefits. In addition, the chapter suggests that active labor policies may be of limited effectiveness in promoting employment, especially given the adverse effects on employment of the payroll tax that funds these programs.

Demographic trends are expected to put substantial pressure on the fiscal situations of most industrial countries early in the next century. In the case of Canada, the share of the population that will be retired is expected to rise markedly after the year 2010, which will severely strain the finances of the public pension system--the Canada Pension Plan. Chapter VII presents estimates of the Plan's unfunded liability and projections of the Plan's finances over the next 55 years. The outlook shows that early action is needed to make substantial cuts in benefits or marked increases to contribution rates.

Much of the volatility in Canada's financial and exchange markets during recent years has been ascribed to investor concerns regarding the high level of public sector indebtedness. Chapter VIII examines some of the key issues regarding the size and characteristics of federal and provincial debt, describes current management strategies, and discusses the risks regarding the maturity structure and currency composition of the outstanding stock of debt.

Chapters X and XI describe recent developments in Canadian trade policy and overseas developments assistance, respectively.

**Table I-1. Canada: Recent Staff Studies
on Economic Issues and Policies**

- 1. Recent Economic Developments (SM/92/25)**
 - a. The Natural Rate of Unemployment in Canada
 - b. Fiscal Impulse Measures for Canada
- 2. Selected Papers on the Canadian Economy (SM/93/45)**
 - a. Labor Market Aspects of Industrial Restructuring in Canada
 - b. Simple Measures of the Output Gap in Canada
 - c. The Natural Rate of Unemployment in Canada Revisited
 - d. A Forecasting Equation for the Canadian-U.S. Dollar Exchange Rate
 - e. The Canada-U.S. Free Trade Agreement: A Retrospective on the Agreement and the Canadian Experience
 - f. Balance Sheet Risk, Credit Supply, and Their Impact on Real Economic Activity
- 3. Economic Developments and Policies (SM/94/97)**
 - a. Federal-Provincial Fiscal Relations
 - b. Aging Populations and Canadian Public Pension Plans
 - c. Labor Market Policies
 - d. Current Account Model
- 4. Recent Developments and Policies (SM/95/81)**
 - a. Estimates of the Structural Rate of Unemployment
 - b. A Survey of Alternative Methodologies for Estimating Potential Output
 - c. Federal-Provincial Transfers--A Review and Assessment
 - d. Unemployment Insurance in Canada
 - e. Public Support for the Elderly in Canada
 - f. Illustrative Fiscal Policy Simulations

II. Forecasting Turning Points in Canada 1/

1. Introduction

Economists have long been involved in the search for a few key indicators that summarize and predict the behavior of market economies. That pursuit took its most organized form in the National Bureau of Economic Research's early research program, culminating in the work of Burns and Mitchell (1946) and Friedman and Schwartz (1963). Such work, however, fell out of favor for a while, as economists first relied on large structural models and then on mostly atheoretical time-series techniques. 2/ Of late, researchers are again focussing on the forecasting performance of single indicators, in part because the track records of the alternatives have been uninspiring.

The macroeconomic time series for the United States have been sifted by many researchers, notably including Stock and Watson (1989), who employed modern time series techniques to investigate the predictive ability of 280 macroeconomic variables. Other researchers have successfully championed individual indicators. For example, Laurent (1988) identified the systematic flattening, and even inversion, of the term structure of interest rates in the United States in advance of economic downturns, and Estrella and Hardouvelis (1991) demonstrated the indicator properties of the yield curve more formally with a battery of econometric tests. Both Bernanke and Blinder (1992) and Friedman and Kuttner (1992), extending the insight of Stock and Watson (1989), considered in some detail the predictive ability of the spread of the commercial paper rate over a comparable treasury bill rate.

Similar work has progressed in other industrial countries as well; the results of some of the studies on Canada are summarized in Table II-1. For

1/ Prepared by Carmen M. Reinhart and Vincent Reinhart (Assistant Director, Division of Monetary Affairs, Board of Governors of the Federal Reserve).

2/ The turning point for the study of cyclical indicators was Koopmans's (1947) famous review, "Measurement without Theory" of Burns and Mitchell (1946). Koopmans argued that when considering the business cycle, " . . . even for the purpose of systematic and large scale observation of such a many-sided phenomenon, theoretical preconceptions about its nature cannot be dispensed with, and the authors do so only to the detriment of the analysis," page 163. Similarly, large-structural macro models came under attack with Lucas's (1976) "Econometric Policy Evaluation: A Critique" which extended that same logic to argue that " . . . given that the structure of an econometric model consists of optimal decision rules of economic agents, and that optimal decision rules vary systematically with changes in the structure of series relevant to the decision market, it follows that any change in policy will systematically alter the structure of econometric models," page 126.

Canada, Cozier and Tzacks (1994) and Clinton (1994-95) have shown that the yield curve for government securities tilts down in advance of economic contraction. Hostland, Poloz, and Storer (1988), Milton (1988), and Muller (1990), in contrast, study the ability of monetary and credit aggregates in to signal economic activity in Canada, and reach the conclusion that the change in M1 appears to be most reliably related to future spending growth while the growth of M2 is the better predictor of inflation. Hu (1993) also finds that the term structure is useful in forecasting activity in the major countries and that its link to economic activity has strengthened since the 1970s, particularly for the United States and Canada; Estrella and Mishkin (1995) provide evidence that the yield curve helps to predict economic activity and long-run inflation trends in four European countries.

There have been important contributions to the technique of forecasting business-cycle turning points, including Neftci (1982), who used the statistical literature on optimal stopping time to calculate probabilities of turning points, and Diebold and Rudebusch (1989), who introduced a variety of ways to evaluate probability forecasts. Still, most of the judgments on potential indicators have come from regression exercises where success is judged by high explanatory power in predicting some measure of output growth. However, this emphasis on standard regression technique can be problematic. To the extent that behavior changes over time or business-cycle dynamics are inherently nonlinear, point estimates of a variable's significance may be unreliable. Moreover, the uncertain nature of the underlying time-series properties of both sides of those equations makes it difficult to be confident about the distributions of any specific estimator.

A different perspective is offered in this chapter by noting that a key inference problem in the study of business cycles is gauging the probability of recession in any given period. An indicator is useful in that process if an estimate of the conditional probability of recession, given the recent behavior of the indicator, is more precise than an estimate of the unconditional probability of recession. In order for a difference to exist between those unconditional and conditional forecasts, a variable must behave differently when an economy is approaching or in recession than it does during economic expansions. That logic allows simple tests of a variable's usefulness, some of which do not impose specific parametric forms and, therefore, are more likely to be robust across a variety of possible distributions of the underlying data. Because the tests are so straightforward, it is also possible to assess their robustness in a variety of manners.

Specifically, summary data is presented on the monthly behavior of sixteen major Canadian time series over the post-World War II period, splitting the sample into three subsets, corresponding to those periods twelve months before economic downturns, the recession themselves, and all other months. Intuitively, a leading indicator should behave differently in the twelve months before economic contractions than it does during expansions; a coincident indicator should behave differently in economic contractions than it does during expansions. From that perspective, the leading indicator properties of a variable should be obvious when comparing

the empirical probability distributions of these three subsets, which we estimate by a kernel-smoothing algorithm. More formally, a variety of parametric and nonparametric tests are then performed to establish which variables move differently around and in recession than elsewhere. Some popular macro variables--including the growth, in real terms, of stock prices, M2, and domestic credit--do not appear to move sufficiently differently across the three subsets of the data to be useful as leading indicators.

Of course, macroeconomic time series are characterized by differing degrees of sluggishness. Some, particularly financial market prices, can move quickly and show considerable volatility, while others, particularly aggregate measures of goods prices and spending, tend to move more slowly through time. To control for these differences, we estimated autoregressive relationships for each variable and then subjected the errors from those relationships--the impulses driving their movement--to a battery of parametric and nonparametric tests. This logic--that the level of a variable could contain both news about the business cycle and lagged effects of its own earlier movements--can be made more general. An indicator might be useful in forecasting because it contains information about the business cycle or because it summarizes information contained in other variables. In particular, it is possible that an indicator might win a forecasting race because it better summarized the stance of monetary policy, with obvious implications for economic activity, than other variables. ^{1/} To assess this possibility, we generalized our first-stage regressions. We first added lagged values of the Canadian short-term rate to extract the systematic effect of domestic monetary policy. In a second step, we added the current and lagged values of U.S. short-term rates to control for foreign influences on the Canadian economy. The residuals from those regressions were treated as the news in the indicators and were tested for systematic differences across stage of the business cycle. Judging an indicator solely by its idiosyncratic component resulted in a significant winnowing of the list of potential leading and coincident indicators.

Only two of the original sixteen time series call at least one-half of the recessions and send at least as many signals as noise and appear to have unique explanatory power, in that they contain information over and beyond that seen in their own histories or domestic or foreign interest rates. Two readings on the yield curve--the slope of the Canadian term structure and the slope of the U.S. term structure--perform best.

The next section presents the sixteen macro time series that will be put under scrutiny. These can be sorted into four categories: financial (including rates of return, prices, and quantities), international,

^{1/} For example, Sprinkel (1964) argued that the stock market led U.S. turning points because it responded to monetary policy actions sooner than did aggregate spending. For Canada, Macklem (1995) held that the term structure slope is a useful indicator because it measures the stance of monetary policy.

composite (the level and the change of the Bank of Canada's monetary conditions index), and real-side. We examine the behavior of these variables in and around the nine postwar recessions in our data set. We also track the ex-post forecasting record of each time series by recording their success in signaling a recession. As a prelude to our basic tests, we also examine the distribution of each variable before, during, and outside economic contractions. In Section III, those statements are made more formally in terms of conditional probabilities, and we present the results of the parametric and nonparametric tests. In Section IV, we extend the coverage of those first stage regressions to gain some insight on the sources of cyclical movements. We first extract the systematic nature of domestic monetary policy and then test the ability of each variable to predict cyclical turning points. Then, we extract the information contained in U.S. monetary policy and determine the forecast ability of domestic factors. This battery of tests is summarized in Section V, while Section VI offers concluding comments.

2. Indicators and economic contractions

In this section, we describe the time-series variation in sixteen key macro indicators relative to turning points in the Canadian business cycle, which are listed in Table II-2. There have been nine recessions in the post-World War II period and, as reported in the memorandum item in the table, the Canadian economy has spent 17 percent of the months since 1958 in recession. This sample average can be thought of as an estimate of the unconditional probability that the economy was in a downturn in any given month. Our goal is to find an indicator, or indicators, that allows us to arrive at a more precise estimate of the probability of recession. We will select among the variables listed in Table II-3.

a. Financial market yields, prices, and quantities

Term structure of interest rates in Canada. As measured by the yield on ten-year-and-over Government of Canada bonds less the three-month treasury bill rate (Chart II-1), the flattening of the Canadian yield curve since early 1994 has been substantial. ^{1/} Nonetheless, the spread, which is presently around 200 basis points, is slightly above its average value over the past forty years (the dotted line in the upper panel) and is a good deal wider than is typical before an economic recession. In the average cyclical experience, the yield curve generally began to flatten as much as one year prior to the onset of recession, and the spread moved distinctly into negative territory before the economic peak (the middle left panel).

^{1/} We use the three-month treasury bill rate to conform with other studies. As Macklem, Paquet, and Phaneuf (1995, p. 6) point out, prior to the mid-1970s, this rate was influenced by the eligibility of bills for secondary reserve requirements. The correlation of the bill rate with other short rates, however, is high.

The behavior of the spread of the yield of the ten-year note over the three-month bill rate over the past forty years suggests a simple forecasting rule: flat or inverted yield curves signal that the economy is about to enter or is currently in a recession. To allow systematic comparisons across indicators, we defined a signal of recession to be any reading on the indicator that was in the bottom twentieth percentile of its distribution. (This cutoff value is marked by the solid horizontal line in the upper panel just above zero.) The middle right panel of the exhibit holds that filter rule to a strict accounting. In the months from February 1958 to July 1995 that the yield curve was quite flat or inverted, 44 percent of those signals were recorded in the twelve months leading up to an economic downturn and 29 percent were posted in downturns.

In a probabilistic framework, the middle right panel provides estimates of conditional probabilities, or the probabilities given a signal that the economy is about to enter into a recession (44 percent), is in a recession (29 percent), or is in a continuing expansion (27 percent). This can be demonstrated by noting that, by the way the sample is split, the economy must in any month be in one of three states: about to enter a recession (B), in recession (R), or in a continuing expansion (E). By sorting when the yield curve signals (an event denoted as I) by the stage of the cycle relative to the total number of signals, we have implicitly estimated the joint probabilities of a signal and a state.

In statistics texts, these joint probabilities generally are represented as $\Pr[I \cap B]$, $\Pr[I \cap R]$, and $\Pr[I \cap E]$, which can be used to calculate conditional probabilities (as in Lindgren (1968)). For example, the probability of being in recession, given a signal, equals

$$\Pr[R|I] = \frac{\Pr[I \cap R]}{\Pr[I]} \quad (1)$$

Simply, the conditional probability equals the share of the total number of signals observed in a particular state, as is provided in the middle right panel of the table.

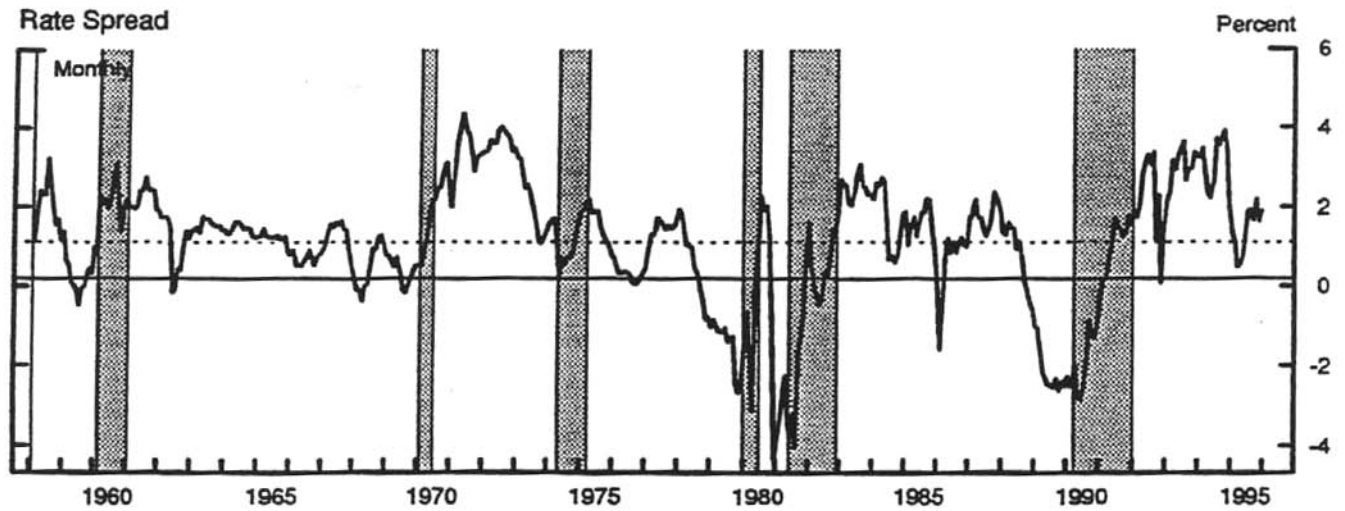
Notice that signals from the yield curve help sharpen inference about the stage of the cycle. As was already noted in the discussion of Table II-2, the unconditional probability of recession in any given month, $\Pr[R]$, is about 15 percent. Knowing that the yield curve is flat or inverted raises the estimated probability of recession, $\Pr[R|I]$, to 29 percent. The leading indicator properties of the term structure are evident in such a comparison as well. As is presented in the memo item in Table II-2, the Canadian economy has spent about 17 percent of the months since 1958 about to enter into recession (or $\Pr[B]=0.17$). Observing a flat or inverted term structure raises that estimate considerably ($\Pr[B|I]=0.44$).

Another measure of the yield curve's predictive success can be extracted by counting the number of recessions it called correctly. Of the

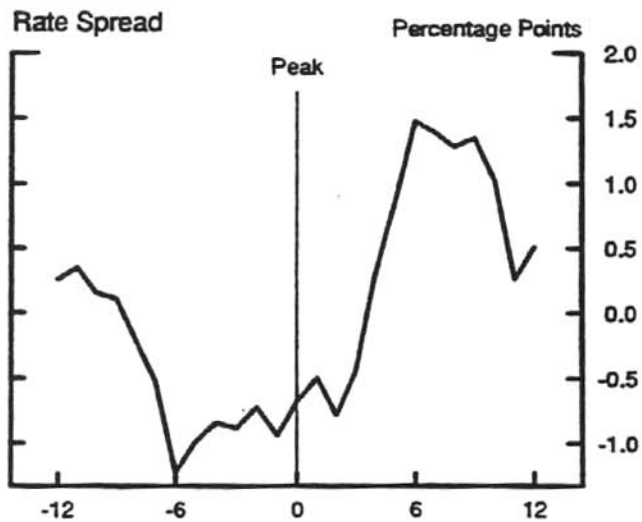
CHART II-1

CANADA

BEHAVIOR OF 10-YEAR NOTE YIELD LESS 3-MONTH BILL RATE AROUND ECONOMIC PEAKS IN CANADA



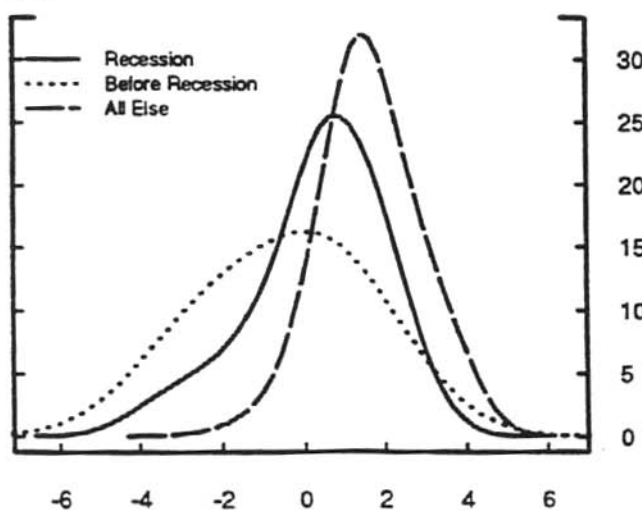
Average of All Cycles



Signals

Time Period: Feb. 1958 to Dec. 1995	
Threshold percentile	20
Percent of those signals:	
Within 12 months before peak	44
In recession	29
Outside 12 months before peak and recession	27
Number of turning points accurately called	5
Number of turning points missed	1

PDF



Summary Statistics

	During Recession	Before Recession	All Else
Mean	0.35	-0.45	1.63
Median	0.51	-0.02	1.53
Variance	2.39	3	1.25
Skewness	-0.91	-0.29	-0.07
Kurtosis	0.53	-0.97	0.26

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six economic peaks over this time period, five were preceded within twelve months by an inverted yield curve. The one that got away was the recession beginning in 1974, although even then the term structure had flattened considerably.

Imposing a cutoff value for what defines a signal is arbitrary, even if, in this particular case, watching for an inversion to the yield curve has an intuitive appeal. An alternative strategy is to examine the behavior of the term structure in three parts of the business cycle: in the year leading up to recession, in recession, and in all other months. ^{1/} Smoothed estimates of the histograms for these three subsets of the monthly readings of the term structure are presented in the bottom left panel of Chart II-1. By comparing these smoothed estimates of the probability distribution functions (which were fit by a kernel-smoothing algorithm), we obtain direct evidence of the yield-curve's predictive ability. In advance of economic contractions (the dotted line), the term structure is much more likely to be inverted than at other times, either when the economy is in recession (the solid line) or in expansion (the dashed line). These three curves can be thought of as estimates of the distributions of conditional probabilities of the indicators given the stage of the business cycle.

The considerable spread of these distributions suggests that there were numerous false signals. As shown in the lower right panel, the median term structure is about flat in the year before recessions, indicating that one-half the time it will have a positive slope. The means and medians across the three subperiods presented in that panel also provide a rough sense of the cyclical properties of the yield curve and will allow more formal tests in the next section.

The commercial paper spread. The predictive power of the yield curve can be put in some perspective by examining the track record of another popular financial market indicator of the business cycle, the spread of the six-month commercial paper rate over the six-month treasury bill rate. This risk spread gained considerable attention in the United States when Stock and Watson (1989) identified it as a key component of their experimental index of leading indicators. As shown in the upper panel of Chart II-2, this spread does widen entering economic downturns in Canada. On average, the commercial paper rate gains about 60 basis points more than the bill rate in advance of recession (the middle left panel). If signals are arbitrarily recorded when the spread is in the upper twentieth percentile of its range from February 1958 to July 1994, then the spread caught five of six recessions but were misleading quite often, in that 63 percent of the time that a high spread was recorded the economy was not in or about to enter into recession. However, the record since the

^{1/} In some sense, this division of the data by stage of the economic cycle follows Burns and Mitchell's (1948) notion of a reference cycle. Unlike Burns and Mitchell, we strictly use calendar time to make the division.

mid-1980s has been less kind. The spread has tended to be quite narrow and missed the 1990-91 recession.

Real equity prices. This same technique can be applied to other financial variables, including what many analysts would take to be the grandfather of all leading indicators, the value of equity prices. The top panel of Chart II-3 plots the twelve-month growth rate in the Toronto Stock Exchange (TSE) index deflated by the consumer price index over the past 37 years. Consistent with the long-held view that the stock market helps to signal turning points, there is a pronounced cyclicity to equity prices. On average, real equity prices swing from rising at a 20 percent rate one year before a recession to contracting at near a 15 percent rate four months into the recession.

However, this erratic series sent too many warnings: about 47 percent of the months since 1958 had negative twelve-month changes in real equity prices. Placing the cutoff at the bottom twentieth percentile, only 7 percent of the time do those signals come in the period just before an economic recession. To put this in starker terms, an analyst would be better off using the simple historical average of the share of months before a recession--the unconditional probability which equals about 17 percent--than respond to the signal from the stock market to calculate a conditional probability. The vast majority of the correct signals, 46 percent, occurred when the economy was actually contracting, suggesting that equity prices do better as a coincident, rather than a leading, indicator. Declines in real equity prices preceded half of the economic downturns since 1958.

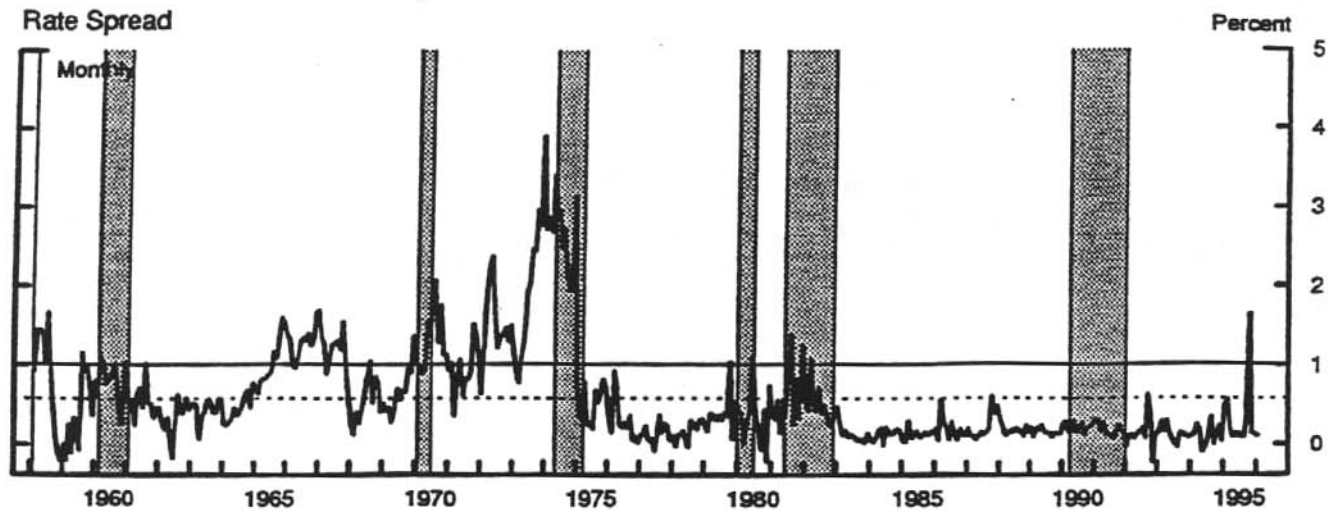
The erratic nature of the signals from the equity market can also be seen in the bottom panel of the figure, where we present smoothed distributions for the monthly change (at an annual arithmetic rate) in real equity prices. The range of variations is quite wide, and there is substantial overlap of the outcomes across the stage of the business cycle.

Real M1, real M2, and real credit growth. M1 was the monetary aggregate at center stage of the Bank of Canada's implementation of monetary policy between 1975 and 1982 (as described in Freedman (1994)) before financial innovation introduced considerable instability in the demand for money. Much of the appeal of M1 as an intermediate target had to do with its role as a useful leading indicator of economic activity. As Muller (1992) pointed out, M1 was better at predicting turning points than the broader monetary or credit aggregates. As shown in Chart II-4, real M1 growth has usually fallen below its twentieth percentile in the period leading up to or during a recession, and on average, begins to decline 12 months prior to the beginning of the recession. In "normal" periods, it has only crossed that benchmark 13 percent of the time. However, M1 is not without its faults and calls to mind Samuelson's observation of the indicator properties of the U.S. stock market--real M1 growth has forecast ten of the last six recessions in Canada. There are noticeable shifts in the distributions of monthly growth rates of real M1 across stage of the business cycle. In the median experience, real M1 contracts at annual rates of 2 1/2 percent and 1 1/4 percent in advance and during recession,

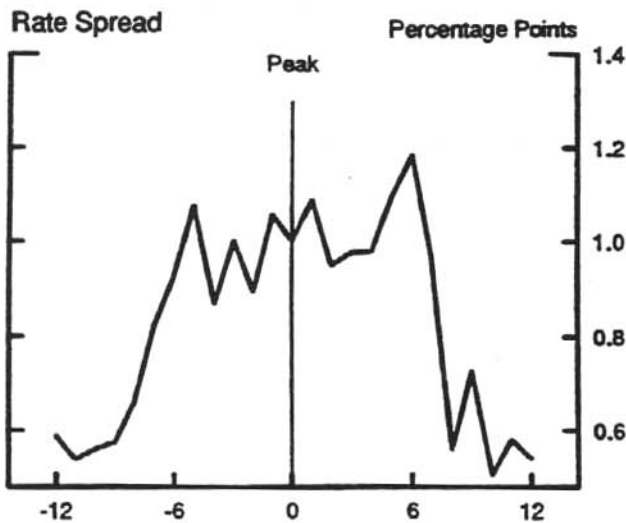
CHART II-2

CANADA

**BEHAVIOR OF THE SPREAD BETWEEN THE 3-MONTH CORPORATE
AND 3-MONTH BILL RATE AROUND ECONOMIC PEAKS IN CANADA**



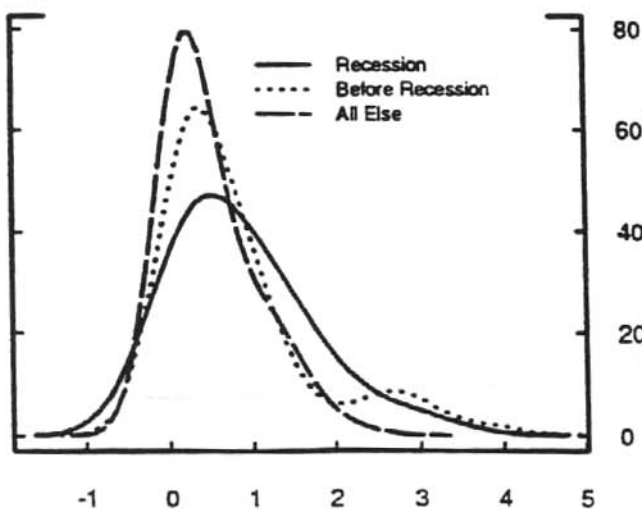
Average of All Cycles



Signals

Time Period: Feb. 1958 to Jan. 1996	
Threshold percentile	80
Percent of those signals:	
Within 12 months before peak	19
In recession	19
Outside 12 months before peak and recession	63
Number of turning points accurately called	5
Number of turning points missed	1

PDF



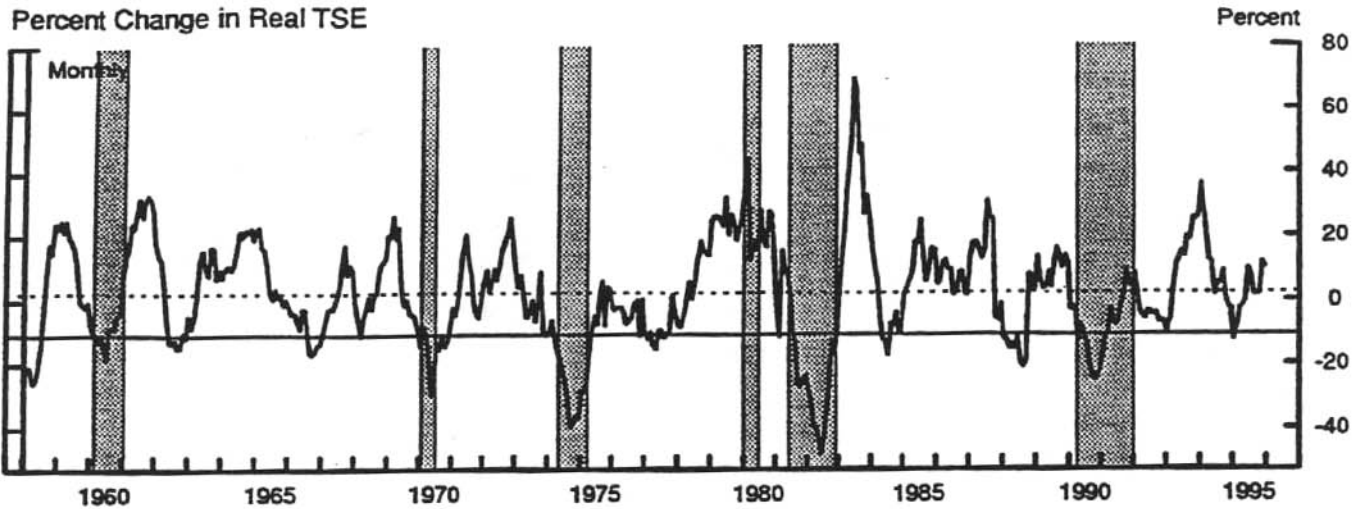
Summary Statistics

	During Recession	Before Recession	All Else
Mean	0.87	0.8	0.5
Median	0.72	0.45	0.29
Variance	0.55	0.75	0.25
Skewness	1.19	1.74	1.22
Kurtosis	1.01	2.59	0.86

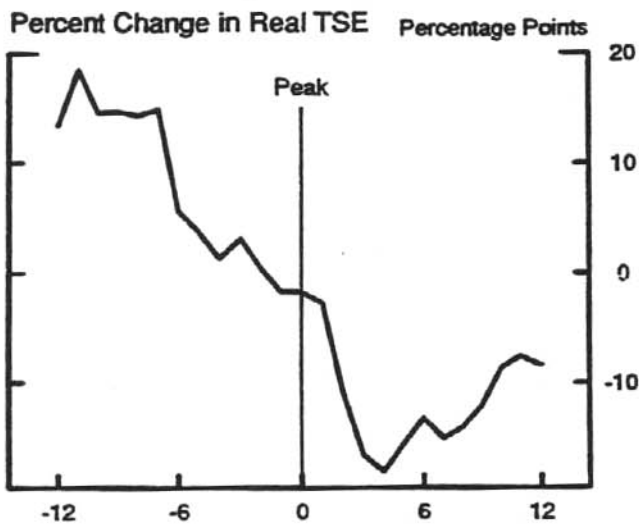
CHART II-3

CANADA

BEHAVIOR OF REAL STOCK PRICES AROUND ECONOMIC PEAKS IN CANADA



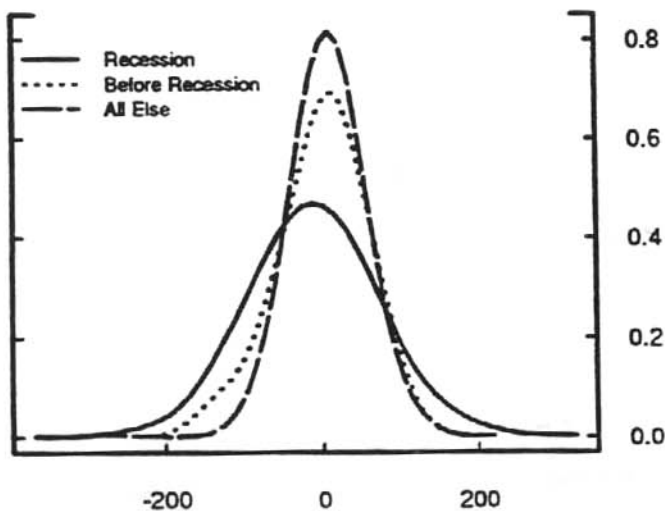
Average of All Cycles



Signals

Time Period: Jan. 1958 to Nov. 1995	
Threshold percentile	20
Percent of those signals:	
Within 12 months before peak	7
In recession	46
Outside 12 months before peak and recession	47
Number of turning points accurately called	4
Number of turning points missed	2

PDF



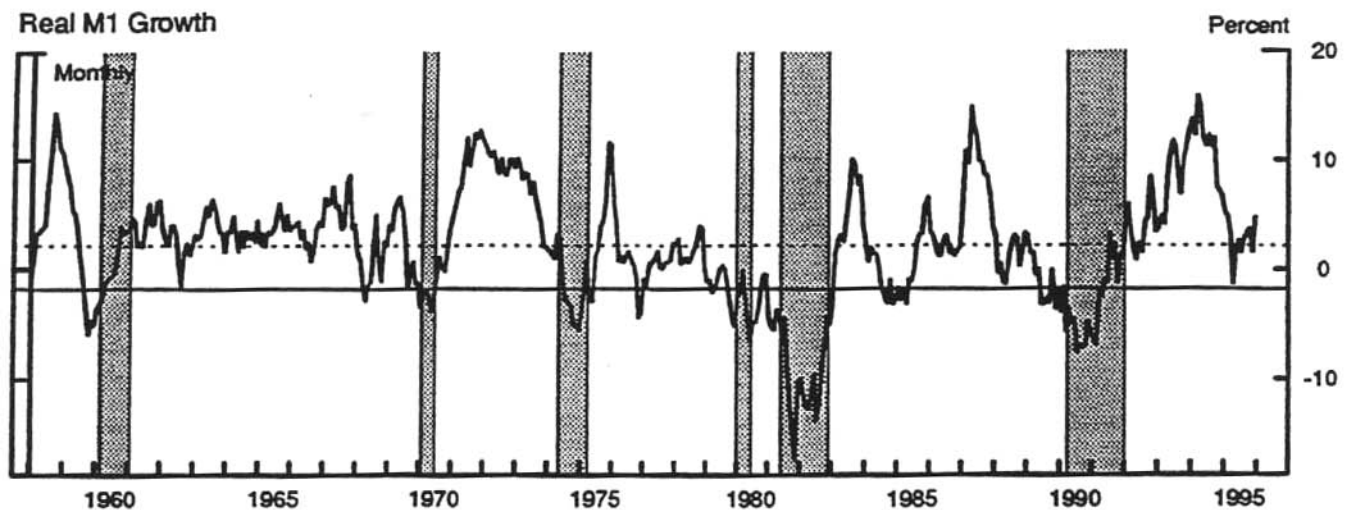
Summary Statistics

	During Recession	Before Recession	All Else
Mean	-12.01	-1.55	6.36
Median	-18.9	8.44	8.51
Variance	5476.31	2769.51	1958.14
Skewness	0.01	-0.63	-0.71
Kurtosis	0.45	0.33	4.61

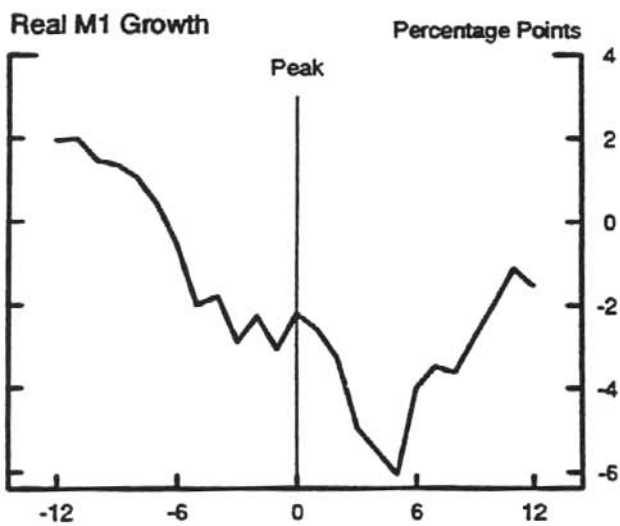
CHART II-4

CANADA

BEHAVIOR OF REAL M1 GROWTH AROUND ECONOMIC PEAKS IN CANADA



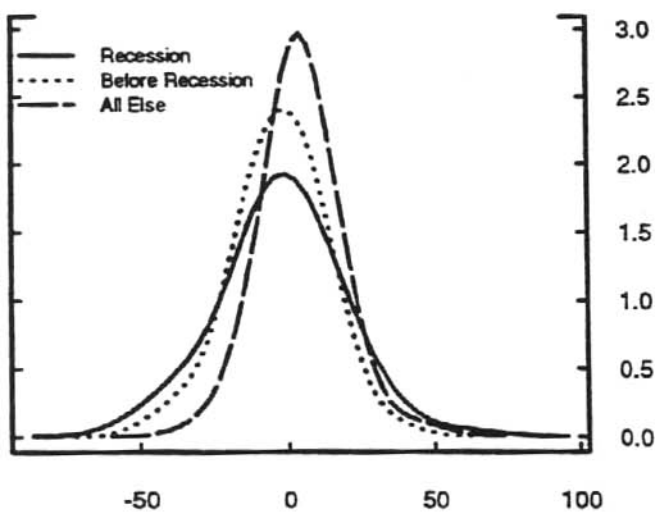
Average of All Cycles



Signals

Time Period: Jan. 1958 to Nov. 1995	
Threshold percentile	20
Percent of those signals:	
Within 12 months before peak	33
In recession	54
Outside 12 months before peak and recession	13
Number of turning points accurately called	5
Number of turning points missed	1

PDF



Summary Statistics

	During Recession	Before Recession	All Else
Mean	-2.19	-3.07	4.25
Median	-1.24	-2.44	3.72
Variance	398.81	220.92	172.93
Skewness	0.04	-0.32	0.3
Kurtosis	0.92	0.7	1.54

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respectively, as opposed to increasing at a 3 3/4 percent rate at other times.

By contrast, the behavior of real M2 growth (Chart II-5) indicates that, at best, it is a coincident indicator; by the time the M2 contraction is evident the recession is well underway. Indeed, real M2 growth has not caught any of the last five turning points, and its probability distributions appear indistinguishable inside or outside recessions. Of course, the poor track record of M2 in predicting the business cycle need not imply that it has no significance for policy makers. Hostland, Poloz, and Storer (1988) and Muller (1990) have pointed out that M2 is more useful as an indicator of future inflation than of economic activity. Real domestic credit (Chart II-6) does somewhat better in calling downturns in the business cycle, catching one half of the last six recessions. However, more than one half the time (70 percent), it sends misleading signals, making it a very noisy indicator.

b. International prices and quantities

Canada is a very open economy by almost any standard. For instance, the sum of export and imports averaged about 60 percent of GDP during 1990-95, well above the 20 percent registered for the United States. More recently, that ratio has been even higher. Hence, exchange rate developments can, at least in principle, exert an important influence on economic activity (see Duguay (1994)). In this subsection we examine whether external variables, most of which capture developments in the United States, provide useful information in determining business cycle turning points.

The G-10 exchange rate changes and changes in the Canada-U.S. exchange rate. An exchange rate depreciation can be expected, other things equal, to stimulate exports and provide an external boost to the economy. This would imply that pre-recession periods may be characterized by an appreciating exchange rate and an erosion in international competitiveness, which would ultimately lead to a contraction in the export sector and in economic activity. In reality, however, a change in the exchange rate cannot be considered in isolation from the factors influencing the exchange rate. For instance, an exchange rate depreciation may result from heightened political uncertainty or concerns about underlying fundamentals, such as fiscal policy and debt. By undermining confidence, these factors could lead to reduced consumer spending and investment, which could trigger recession. Such a line of reasoning would then offer the opposite prediction, a depreciation in the exchange rate could be signaling the onset of recession.

Charts II-7 and II-8 suggest that the partial equilibrium approach may be a reasonable explanation of the data. The multilateral exchange rate (G-10) in Chart II-7 and the bilateral exchange rate vis-à-vis the U.S. dollar are defined so that an increase represents an appreciation of the Canadian dollar. As is evident in the top and middle left panels of both figures, the exchange rate typically begins to appreciate about five months before the onset of recession. However, the range of variation for

these cyclical averages is quite narrow relative to the overall movement in exchange rates, suggesting that signals from the foreign exchange market well may be swamped by noise. Indeed, more than half of the large appreciation in the Canadian dollar, whether measured against the U.S. dollar or a multilateral basket, come outside the twelve months before recession and recession themselves. As to their track record in calling recessions, both exchange rates called one-half of the turning points in their respective samples.

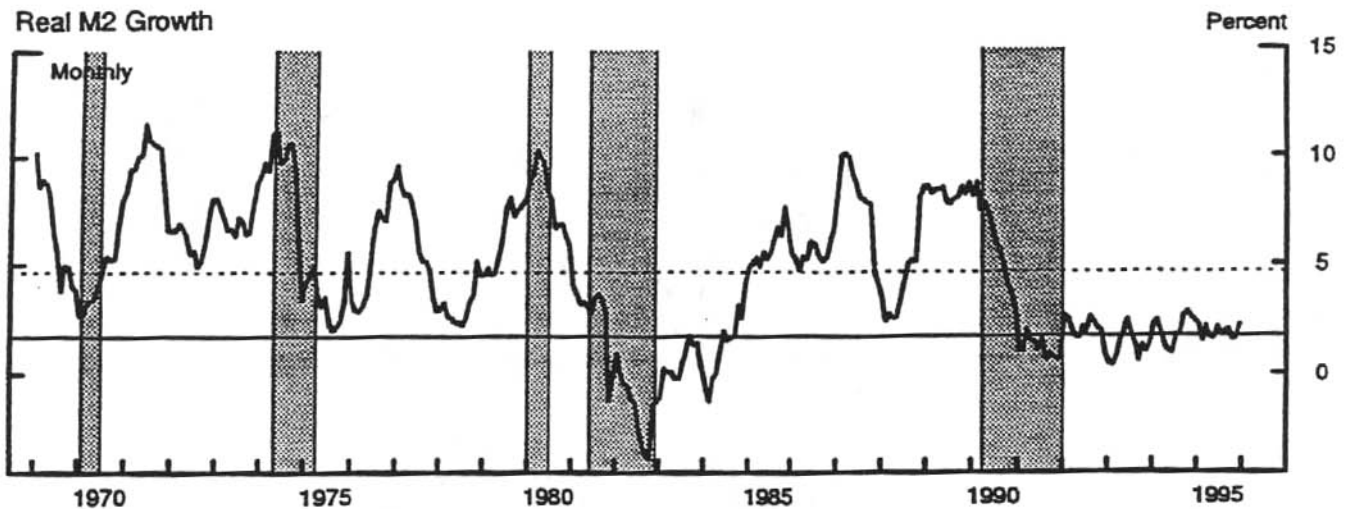
The three-month and ten-year Canada-U.S. interest rate spreads.

One might argue that, as the business cycle matures and risks of a downturn increase, the premia on Canadian debt demanded by the markets should increase, widening the spread with comparable U.S. instruments. An alternative, but complementary, proposition is that as the late stages of an economic expansion bring the economy above its potential, the Bank of Canada acts countercyclically, tightening monetary policy. The result is higher interest rates and wider spreads. Charts II-9 and II-10 trace the evolution of short- and long-term spreads during the course of the business cycle. Several features stand out. First, spreads widen prior to the onset of recession for both maturities, but more so for the three-month treasury bill. The bill spread starts to widen earlier (nine months prior to the peak), while the bond spread widens 6 months prior to the peak. Taken together these suggest the Canadian yield curve flattens relative to the United States, suggesting that the tightening of monetary policy argument may be the more relevant in explaining the cyclical behavior of spreads.

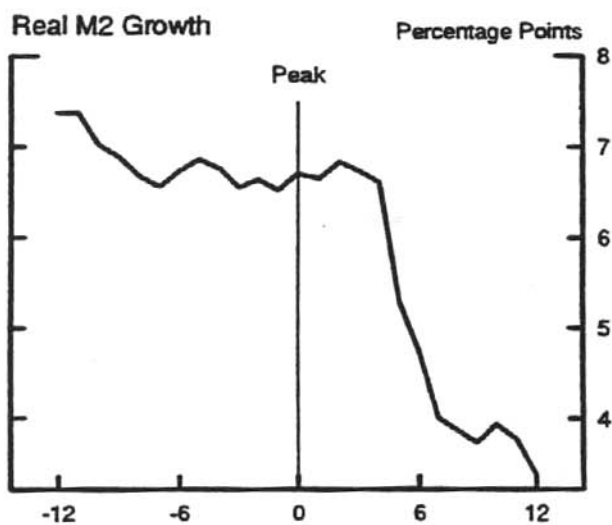
As to the indicator properties, neither spread stands out as a particularly reliable indicator. The treasury-bill spread records an almost equal number of hits and misses and, as with the stock market and exchange rates, it provides false signals the majority of the time. The ten-year bond spread does better, capturing five of the last six turning points. However, it also sends false signals 70 percent of the time. It would appear that Canadian-U.S. interest rate spreads are driven by other factors, most likely including political issues or policy developments that are not systematically linked to the Canadian business cycle.

Term structure of interest rates in the United States. Given the importance of the U.S. business cycle for the Canadian economy and the yield curve's comparatively high ability to predict that cycle (see, for instance, Laurent (1988), Estrella and Hardouvelis (1991), and Hu (1993)), we now examine how well the yield curve in the United States predicts economic activity in Canada. Cozier and Tzack (1994) and Clinton (1995) have suggested that the U.S. yield curve added little explanatory power to their output equations, when the Canadian yield curve and other financial variables were included in the regressions. Here, we focus on the univariate ability of the U.S. yield curve to forecast Canadian turning points. Chart II-11 summarizes the main findings: a flattening in the U.S. yield curve occurs about a year before the onset of recession (much the same as the timing in the Canadian yield curve); the term structure captures six of the last seven turning points; the yield curve flattens nearly 70 percent of the time in either the period preceding the recession or the

BEHAVIOR OF REAL M2 GROWTH AROUND ECONOMIC PEAKS IN CANADA



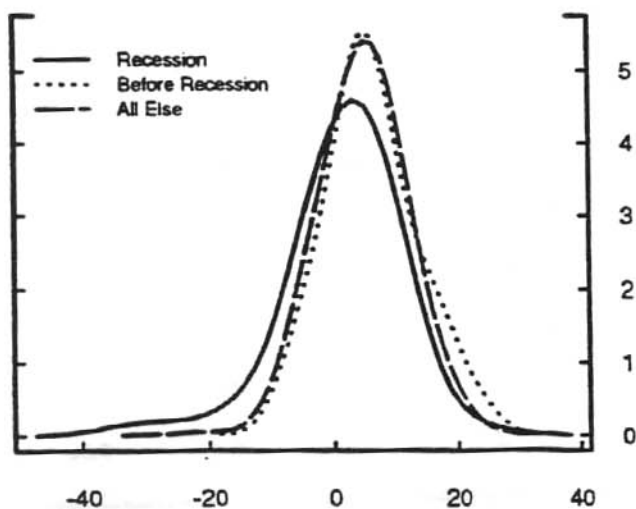
Average of All Cycles



Signals

Time Period: Jan. 1969 to Nov. 1995	
Threshold percentile	20
Percent of those signals:	
Within 12 months before peak	0
In recession	37
Outside 12 months before peak and recession	63
Number of turning points accurately called	0
Number of turning points missed	5

PDF



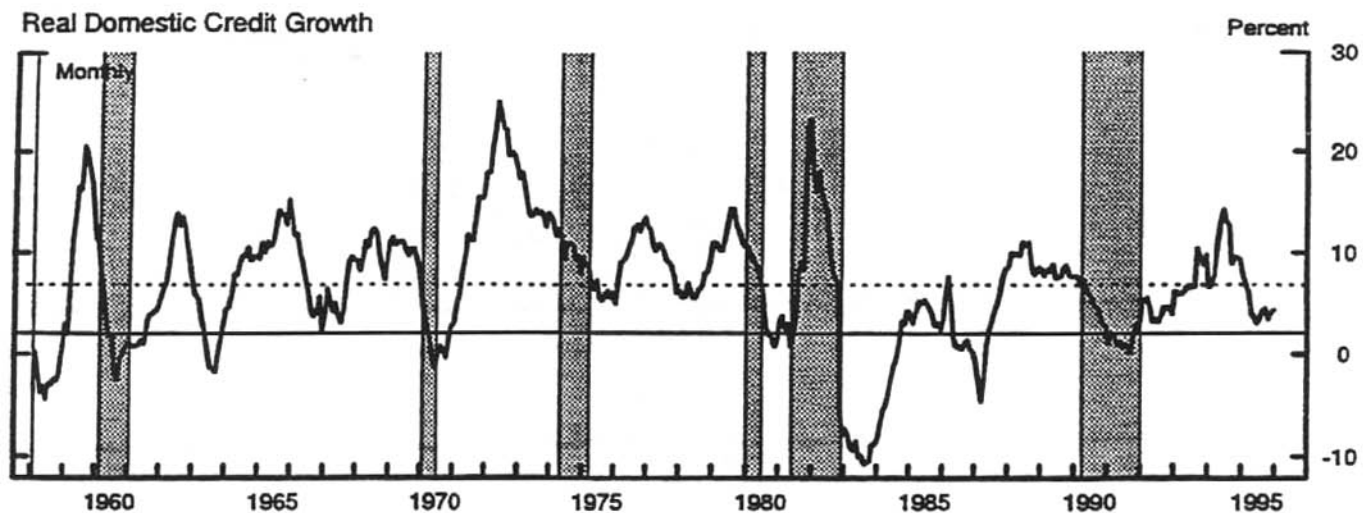
Summary Statistics

	During Recession	Before Recession	All Else
Mean	1.72	6.31	4.88
Median	2.76	5.41	5.38
Variance	79.55	48.64	39.37
Skewness	-1.18	0.37	-0.24
Kurtosis	3.4	-0.07	0.76

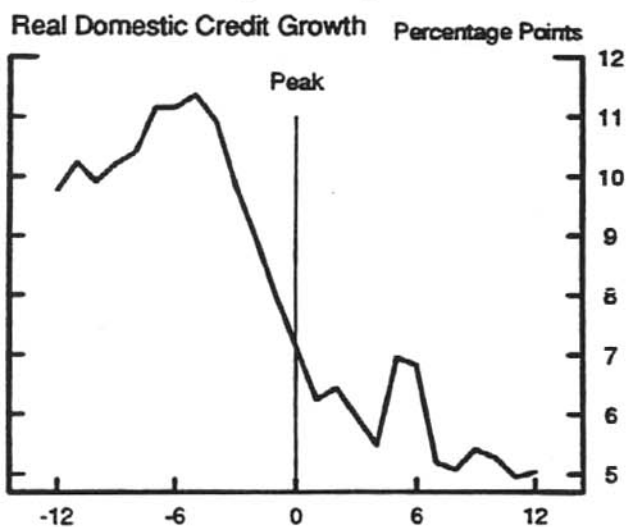
CHART II-6

CANADA

**BEHAVIOR OF REAL DOMESTIC CREDIT GROWTH
AROUND ECONOMIC PEAKS IN CANADA**



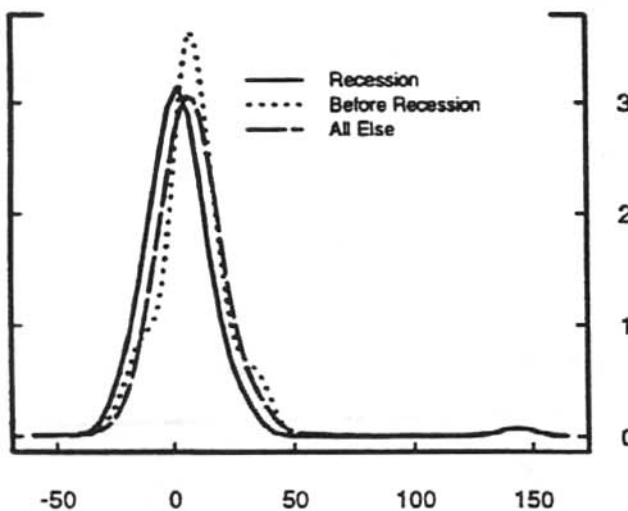
Average of All Cycles



Signals

Time Period: Feb. 1958 to Dec. 1995	
Threshold percentile	20
Percent of those signals:	
Within 12 months before peak	5
In recession	24
Outside 12 months before peak and recession	70
Number of turning points accurately called	1
Number of turning points missed	5

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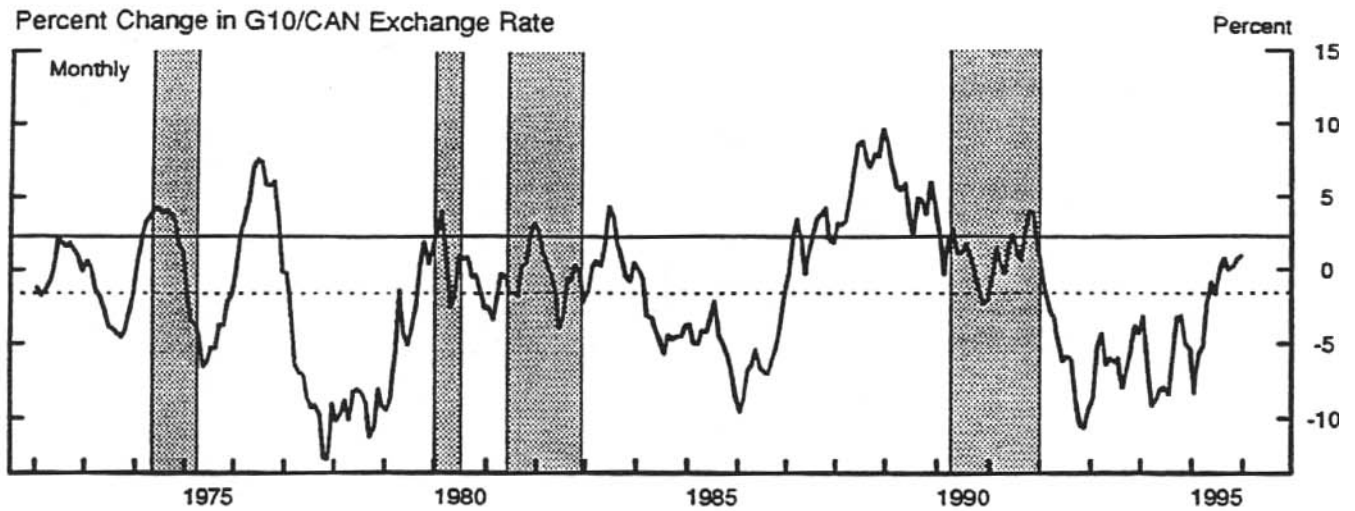
Summary Statistics

	During Recession	Before Recession	All Else
Mean	3.34	7.71	7.17
Median	1.94	7.74	7.28
Variance	366.53	167.77	143.29
Skewness	4.8	-0.03	0.14
Kurtosis	34.87	0.4	0.95

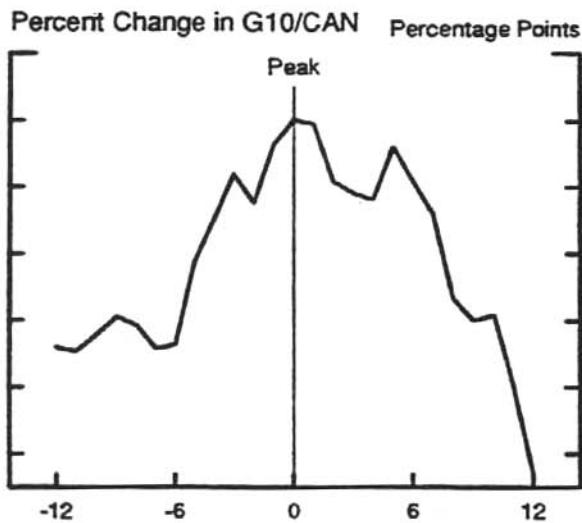
CHART II-7

CANADA

BEHAVIOR OF G10/CANADIAN EXCHANGE RATE CHANGES
AROUND ECONOMIC PEAKS IN CANADA 1/



Average of All Cycles



Signals

Time Period: Jan. 1972 to Dec. 1995

Threshold percentile 80

Percent of those signals:

Within 12 months before peak 21

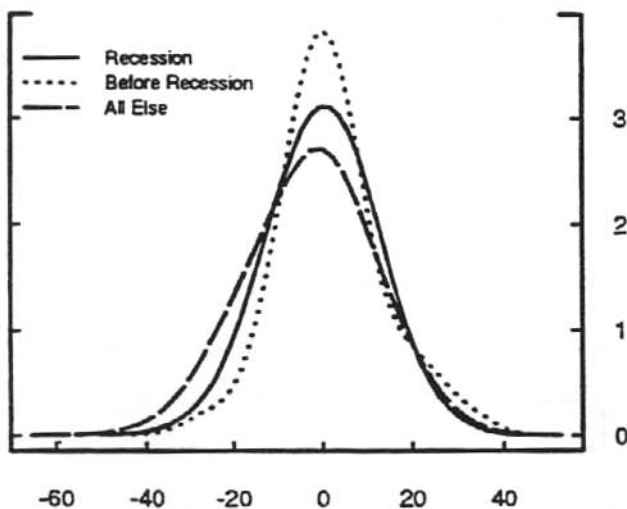
In recession 26

Outside 12 months before peak
and recession 53

Number of turning points
accurately called 2

Number of turning points
missed 2

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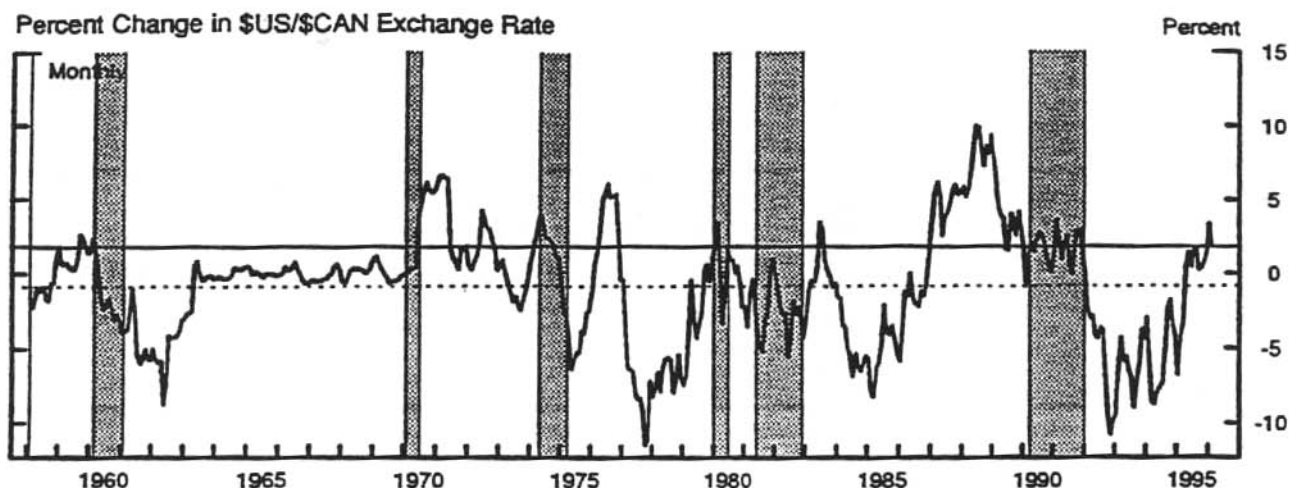


Summary Statistics

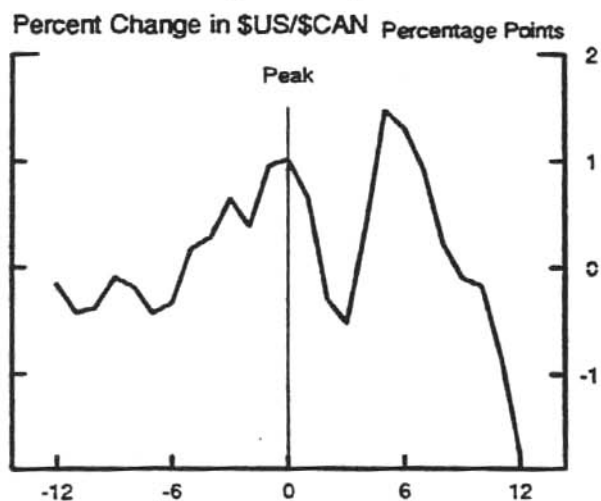
	During Recession	Before Recession	All Else
Mean	-0.16	1.67	-2.6
Median	0.4	0.85	-1.38
Variance	111.24	125	157.92
Skewness	-0.16	0.4	-0.2
Kurtosis	0.15	1.09	-0.09

1. An increase denotes an appreciation.

BEHAVIOR OF U.S./CANADIAN EXCHANGE RATE CHANGES AROUND ECONOMIC PEAKS IN CANADA 1/



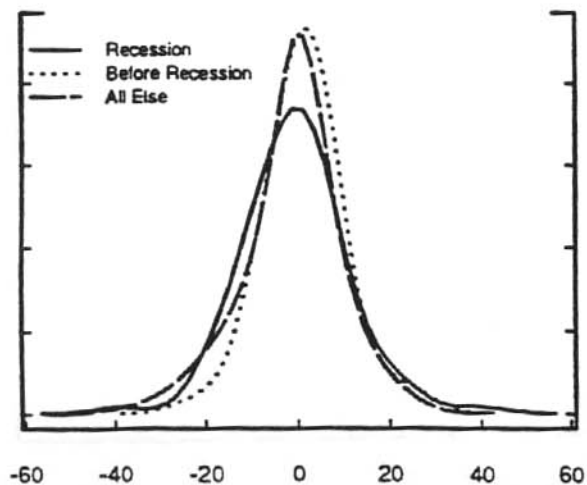
Average of All Cycles



Signals

Time Period: Feb. 1958 to Feb. 1996	
Threshold percentile	80
Percent of those signals:	
Within 12 months before peak	15
In recession	24
Outside 12 months before peak and recession	61
Number of turning points accurately called	3
Number of turning points missed	3

PDF



Summary Statistics

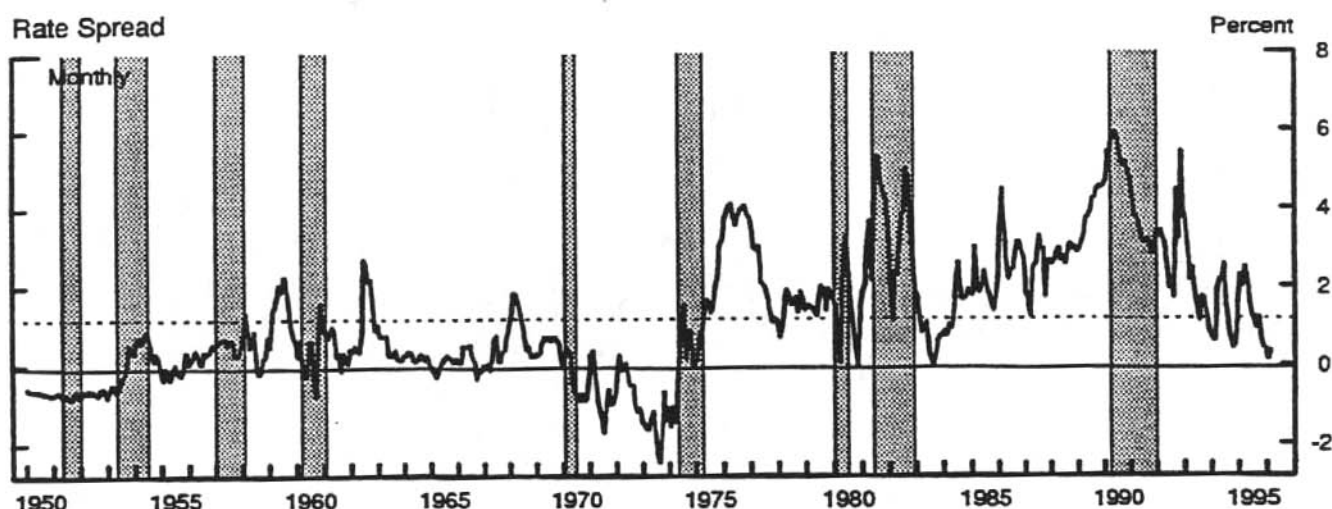
	During Recession	Before Recession	All Else
Mean	-0.58	1.41	-1.27
Median	-0.11	1.49	0.01
Variance	126.25	75.2	105.68
Skewness	0.2	0.21	-0.55
Kurtosis	2.46	1.64	1.27

1. An increase denotes an appreciation.

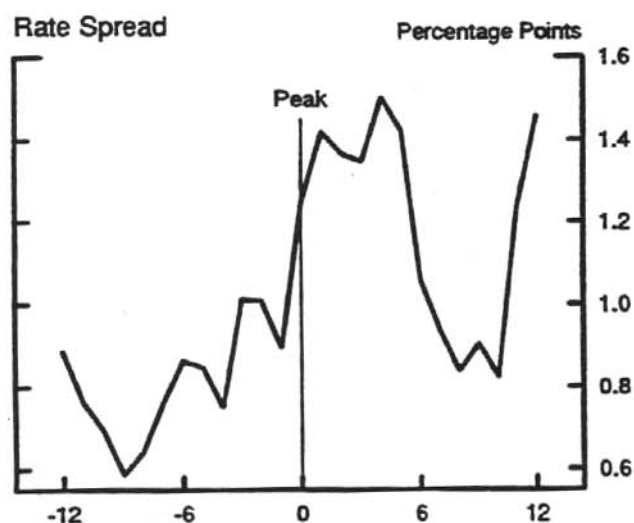
CHART II-9

CANADA

BEHAVIOR OF THE SPREAD BETWEEN THE CANADIAN AND
U.S. 3-MONTH BILL RATES AROUND ECONOMIC PEAKS IN CANADA

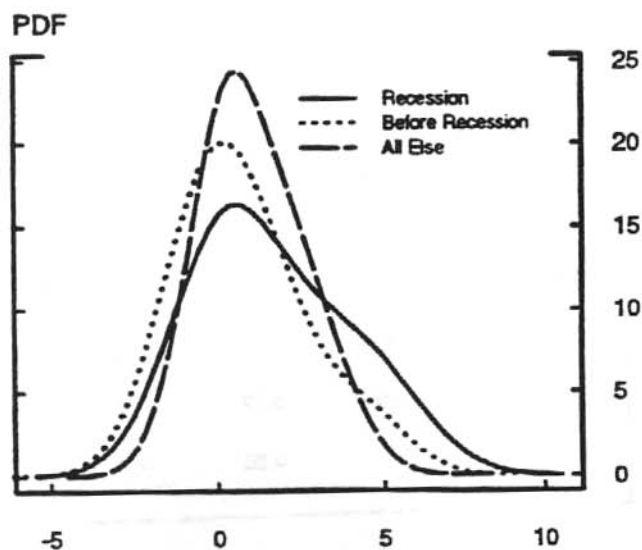


Average of All Cycles



Signals

Time Period: Jan. 1950 to Feb. 1996	
Threshold percentile	20
Percent of those signals:	
Within 12 months before peak	34
In recession	17
Outside 12 months before peak and recession	50
Number of turning points accurately called	4
Number of turning points missed	5

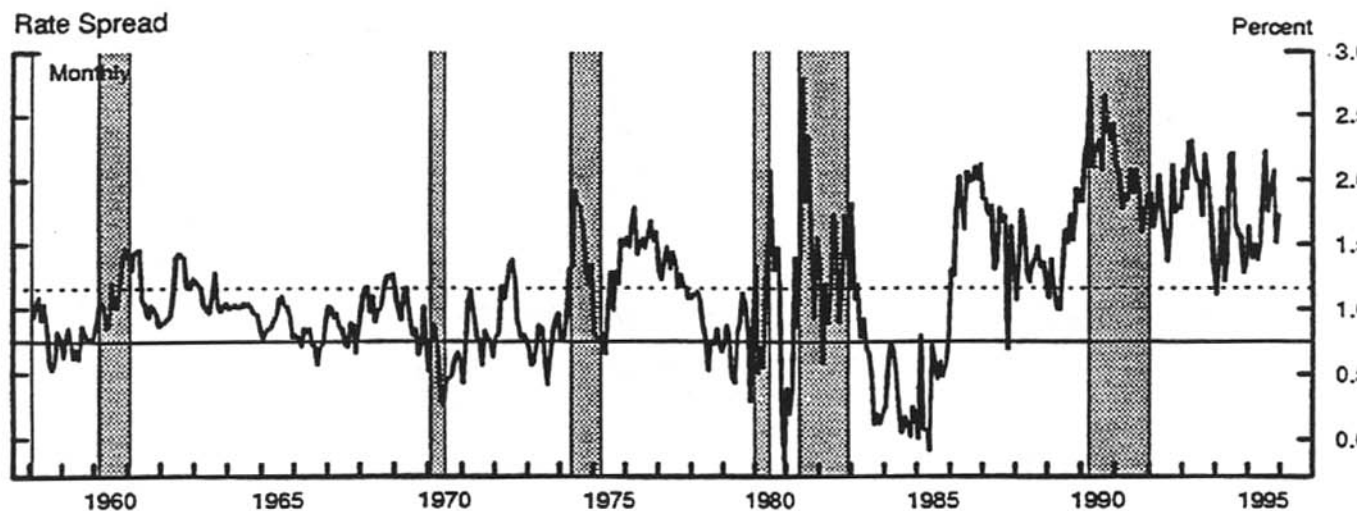


Summary Statistics

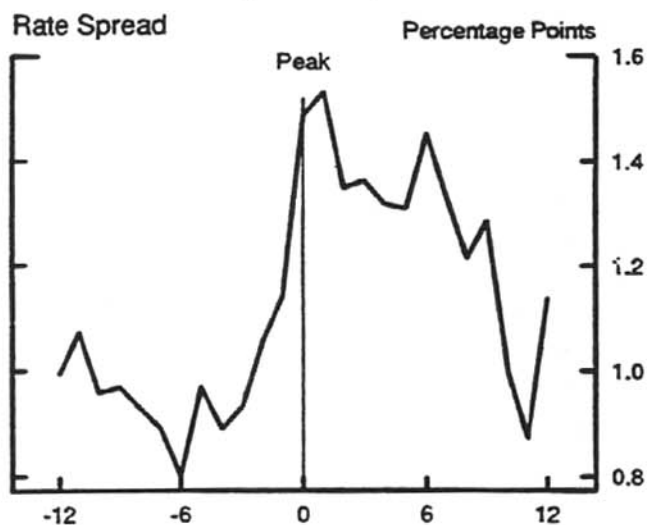
	During Recession	Before Recession	All Else
Mean	1.69	0.81	1.11
Median	0.8	0.53	0.83
Variance	3.91	3.07	1.83
Skewness	0.65	0.8	0.44
Kurtosis	-0.89	0.16	-0.39

CANADA

BEHAVIOR OF THE SPREAD BETWEEN THE CANADIAN AND
U.S. 10-YEAR NOTE YIELDS AROUND ECONOMIC PEAKS IN CANADA

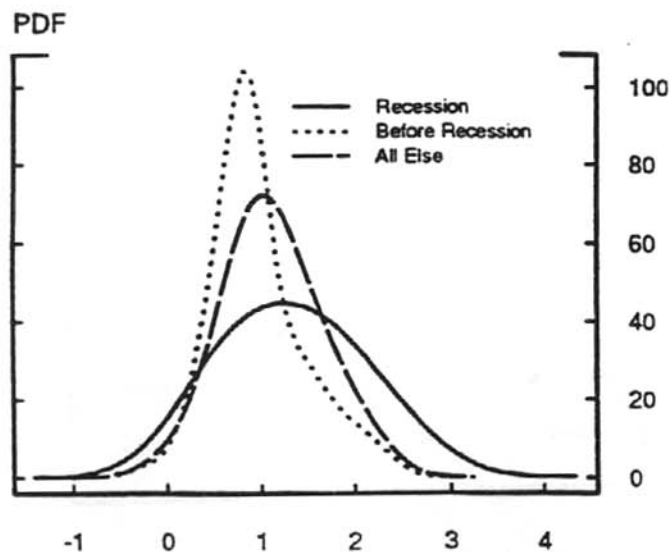


Average of All Cycles



Signals

Time Period: Feb. 1958 to Nov. 1995	
Threshold percentile	20
Percent of those signals:	
Within 12 months before peak	21
In recession	9
Outside 12 months before peak and recession	70
Number of turning points accurately called	5
Number of turning points missed	1

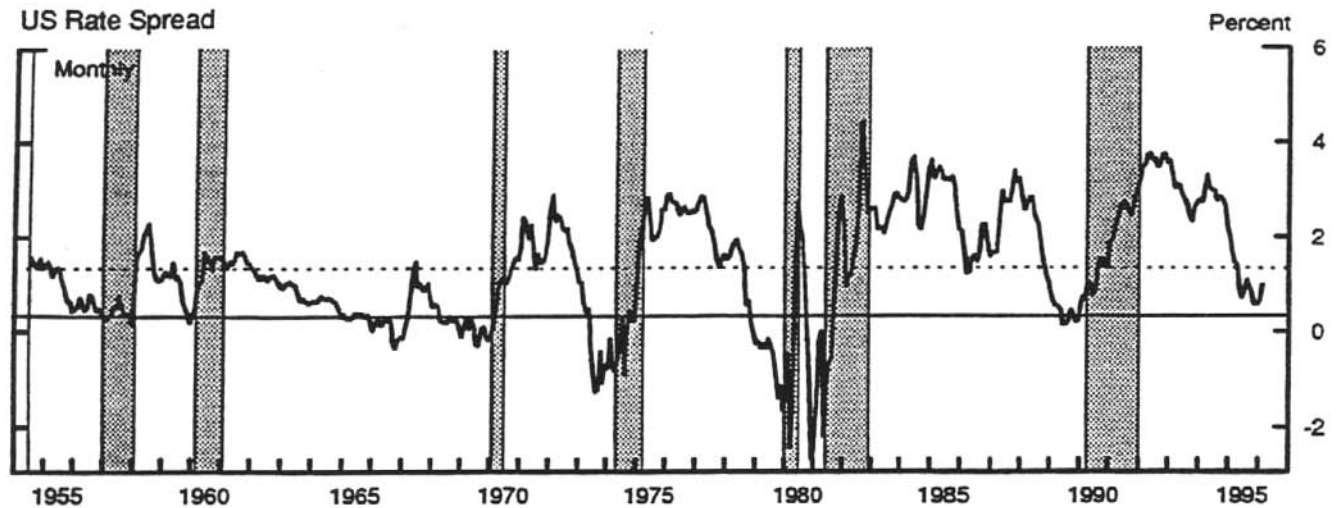


Summary Statistics

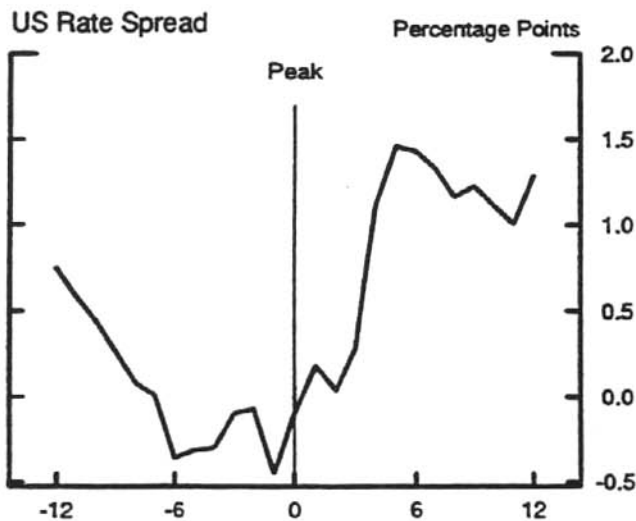
	During Recession	Before Recession	All Else
Mean	1.33	0.97	1.13
Median	1.33	0.86	1.07
Variance	0.44	0.22	0.23
Skewness	0.19	0.77	0.16
Kurtosis	-0.82	0.86	-0.14

CANADA

**BEHAVIOR OF U.S. 10-YEAR NOTE YIELD LESS 3-MONTH BILL RATE
AROUND ECONOMIC PEAKS IN CANADA**



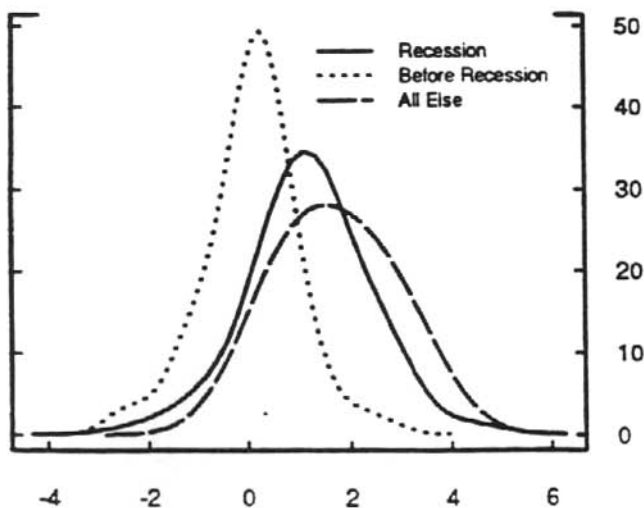
Average of All Cycles



Signals

Time Period: Jul. 1954 to Feb. 1996	
Threshold percentile	20
Percent of those signals:	
Within 12 months before peak	49
In recession	18
Outside 12 months before peak and recession	33
Number of turning points accurately called	6
Number of turning points missed	1

PDF



Summary Statistics

	During Recession	Before Recession	All Else
Mean	1.18	0.05	1.7
Median	1.18	0.14	1.58
Variance	1.33	0.85	1.04
Skewness	-0.14	-0.35	0.12
Kurtosis	1.14	1.35	-1

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recession itself; false signals are given only about one-third of the time. Indeed, the U.S. yield curve does almost as well as the Canadian yield curve in predicting economic activity in Canada.

Industrial production in the United States. The last external influence we examine is that of an explicit measure of real economic activity--industrial production (Chart II-12). To the extent that the United States is, by far, the largest market for Canadian exports (with about an 80 percent share), this raises the issue of the extent to which the economic cycles are synchronous. We find that U.S. industrial production had an equal number of called and missed turning points and that a decline in production only preceded the turning point about 1 percent of the time. However, while its leading indicator properties are limited, U.S. industrial production is clearly a reliable coincident indicator, turning down either before or during every postwar recession in Canada.

c. Composite variables: the nominal MCI

The nominal MCI and changes in the nominal MCI. The monetary conditions index (MCI), designed by the Bank of Canada to capture the impetus of monetary policy, is a weighted average of the three-month bill rate and the change in the weighted average exchange value of the Canadian dollar from a base year. The weights were determined from simulations of the Bank's large-scale macro model and, as explained in Freedman (1994), the weight to the exchange rate varies between 1/3 and 1/2. The Bank of Canada's use of the MCI as an operational target (see Freedman (1994)) makes it an obvious candidate as a potential indicator of economic turning points. ^{1/} The predictive abilities of the level of the nominal MCI as well as its rate of change are summarized in Charts II-13 and II-14.

The performance of the level of the MCI is mixed. As would be expected if monetary conditions are tightened in a countercyclical fashion, the MCI tends to rise in the period preceding the recession (and peak shortly after the peak in economic activity). Indeed, the MCI rises above its twentieth percentile 12 months prior to the economy's peak nearly 30 percent of the time, and two-thirds of the time either before or during a recession. However, the level of the MCI has missed as many turning points as it has called. An inspection of the top panel of Chart II-13 reveals the presence of a negative trend in the level of the MCI, which resulted from the decline in nominal interest rates since its base period (1987). This secular decline (unlike cyclical easings of monetary policy) reflects the trend decline in inflation over the sample. The percentage point change in the MCI does much better as a leading indicator, accurately signaling the last four recession and rising above its twentieth percentile either before or during a recession in about two-thirds of the time. Hence, by this

^{1/} While the MCI is a useful description of monetary policy, the Bank of Canada does not attempt to maintain a precise target for the MCI, particularly on a day-to-day basis.

accounting criterion, it ranks with real M1 growth and the Canadian and U.S. term structure.

d. Real-side quantities

Having reviewed the performance of a variety of domestic and foreign financial variables, as well as foreign real variables, the last two indices examined are the changes in the composite leading indicators and the ratio of real inventory to shipments.

Composite leading indicator. The main conclusions drawn from the information provided by Chart II-15 are: the (smoothed) leading indicator does not lead--it coincides with economic downturns; the composite leading index only captured two of the last seven recessions and declined prior to the onset of a recession less than 10 percent of the time; and the fact that the percent decline in the index declines exceeds its twentieth percentile in 64 percent of time suggests, however, that the indicators provide a good pulse of the coincident state of economic activity.

Inventory-to-shipments ratio. The real inventory-to-shipments ratio provides a good leading indicator of economic activity (Chart II-16). However, its predictive ability still falls short of financial variables, such as the term structure. Still, the inventory shipments ratio accurately called seven of the last eight recessions. The ratio has risen above its twentieth percentile just prior to or during recessions more than 70 percent of the time, suggesting it is less likely to give false signals than many other indicators, such as the stock market, the Canadian-U.S. interest rate spread, and M2 and the credit aggregates.

3. Testing the predictive power of various indicators

We have argued that reliable leading indicators should behave differently in advance of recession than elsewhere. As a result, an analyst can be more confident about an estimate of the probability of recession given the value of the indicator than an unconditional estimate of the probability of recession. In this section, we will make more precise comparisons of the distributions of each indicator across the three subsets of our sample, again using the information already provide in Charts II-1 through II-16. We will go on to examine the robustness of these results by examining if the innovations to each of the indicators behave differently in recession and in expansion.

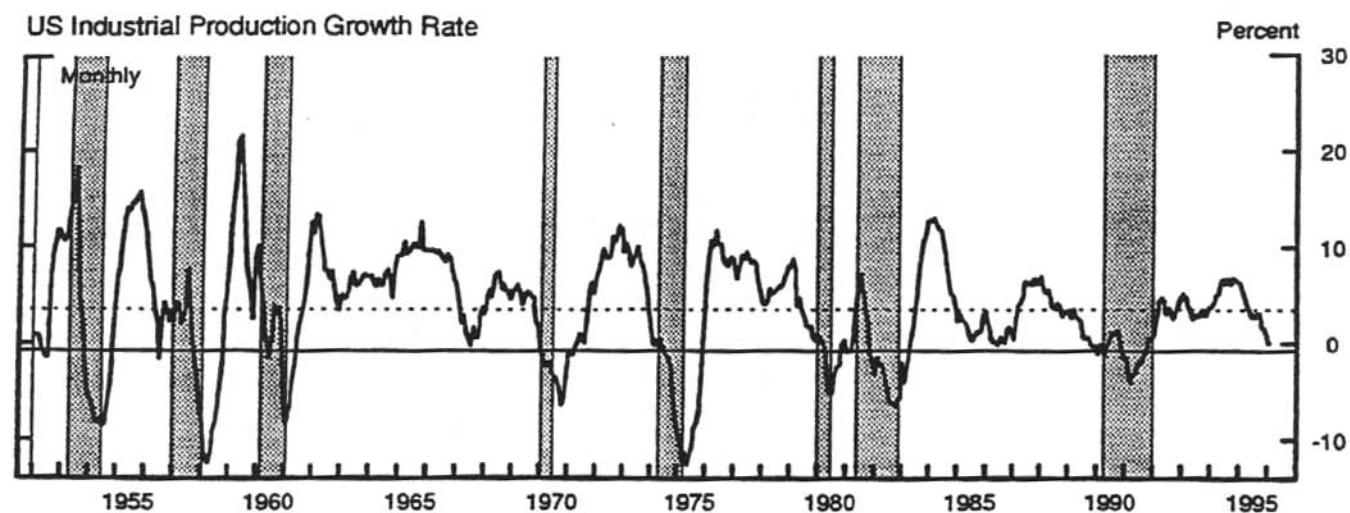
a. Testing the equality of distributions

The tests we apply to these conditional distributions are both parametric (a t-test of equality of means) and nonparametric statistics (Kolmogorov-Smirnov and the Wilcoxon Rank Sum tests). The t-test, of course, makes an explicit assumption about the underlying distribution of the data and can be quite sensitive to extreme values. The other two tests, in contrast, are nonparametric. The Kolmogorov-Smirnov statistic is simply the largest spread between the cumulative density functions of the two

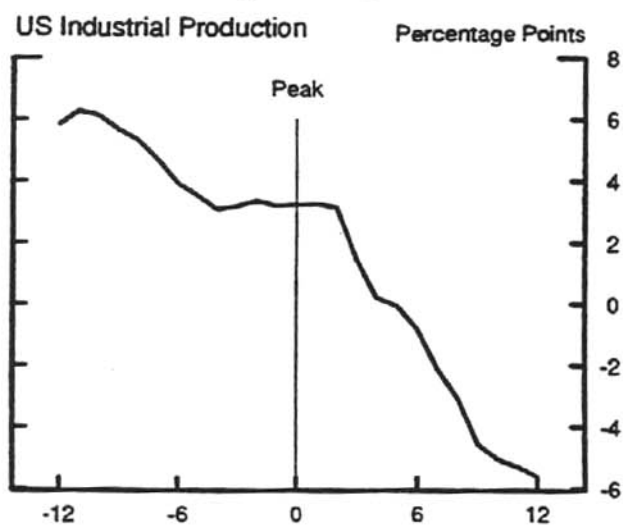
CHART II-12

CANADA

BEHAVIOR OF U.S. INDUSTRIAL PRODUCTION GROWTH AROUND ECONOMIC PEAKS IN CANADA



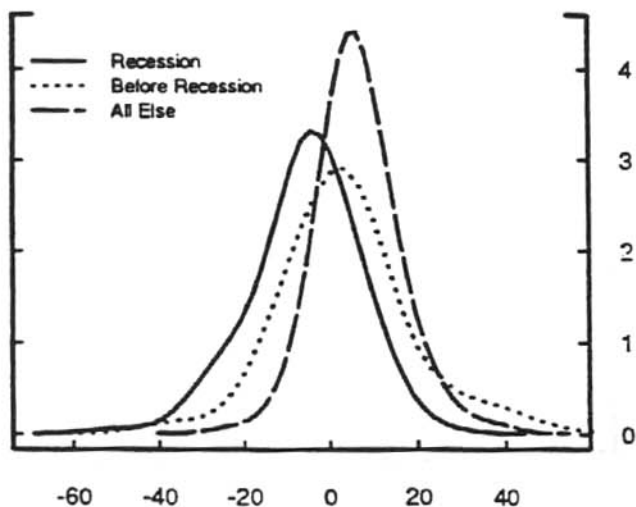
Average of All Cycles



Signals

Time Period: Jan. 1952 to Jan. 1996	
Threshold percentile	20
Percent of those signals:	
Within 12 months before peak	11
In recession	53
Outside 12 months before peak and recession	36
Number of turning points accurately called	4
Number of turning points missed	4

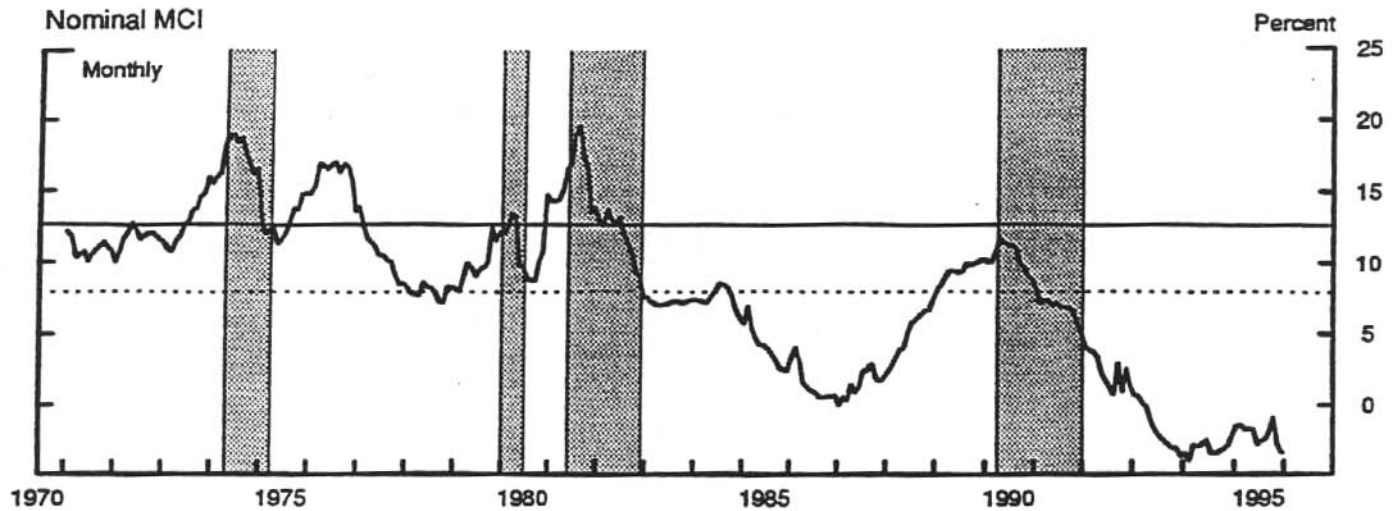
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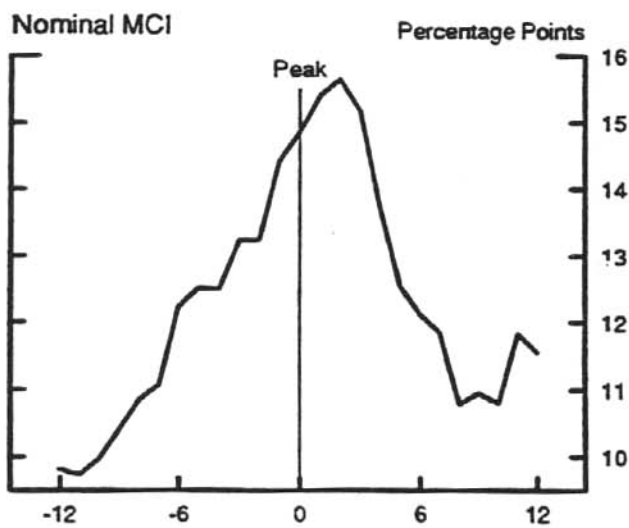
Summary Statistics

	During Recession	Before Recession	All Else
Mean	-5.84	4.49	6.35
Median	-4.91	3.76	5.97
Variance	143.41	314.21	83.64
Skewness	-0.65	1.27	0.33
Kurtosis	1.21	4.29	1.77

BEHAVIOR OF NOMINAL MCI AROUND ECONOMIC PEAKS IN CANADA



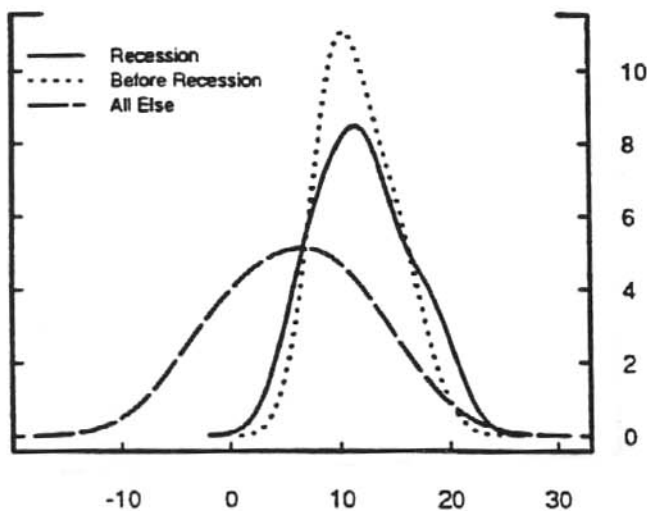
Average of All Cycles



Signals

Time Period: Jan. 1971 to Dec. 1995	
Threshold percentile	80
Percent of those signals:	
Within 12 months before peak	28
In recession	38
Outside 12 months before peak and recession	33
Number of turning points accurately called	2
Number of turning points missed	2

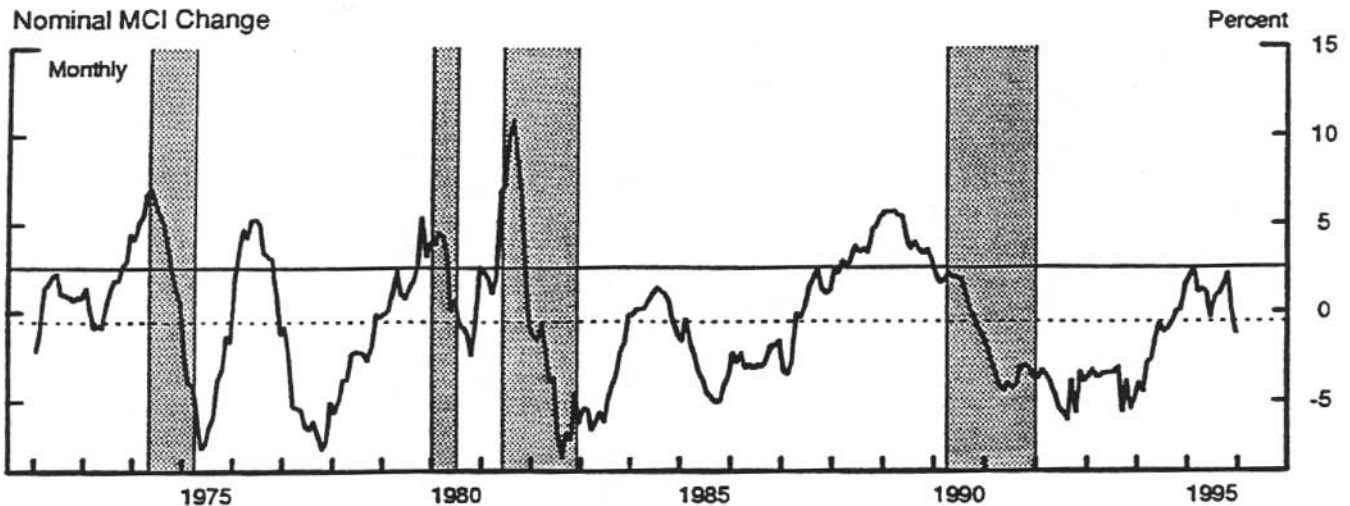
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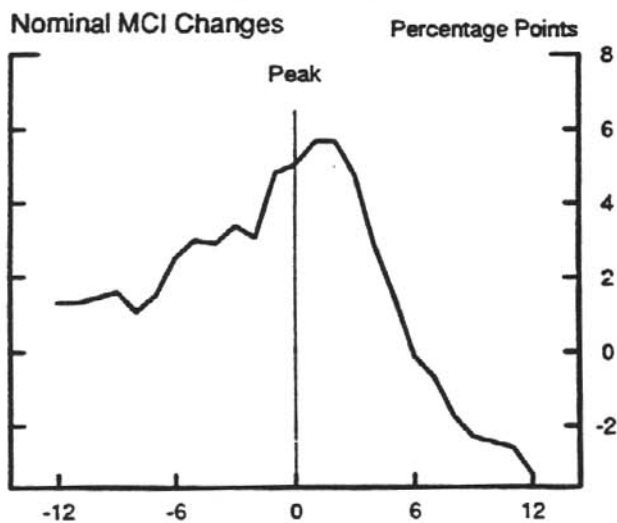
Summary Statistics

	During Recession	Before Recession	All Else
Mean	12.03	11.66	5.94
Median	12.03	10.15	7.07
Variance	15.6	7.38	31.2
Skewness	0.28	0.65	0
Kurtosis	-0.84	-0.85	-0.97

BEHAVIOR OF NOMINAL MCI CHANGES AROUND ECONOMIC PEAKS IN CANADA



Average of All Cycles



Signals

Time Period: Jan. 1972 to Dec. 1995

Threshold percentile 80

Percent of those signals:

Within 12 months before peak 38

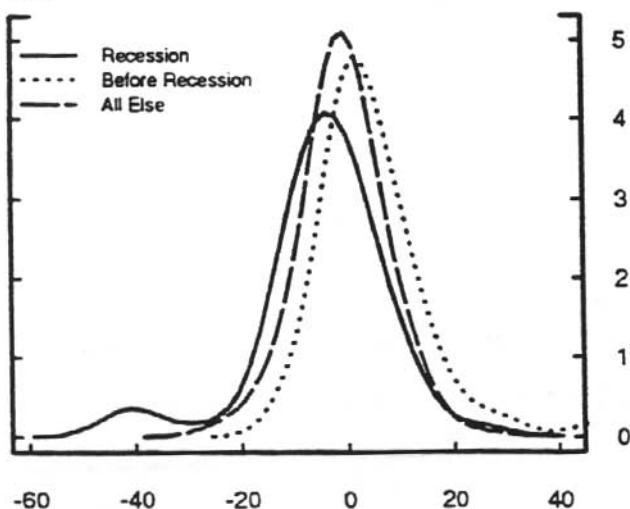
In recession 26

Outside 12 months before peak
and recession 36

Number of turning points
accurately called 4

Number of turning points
missed 0

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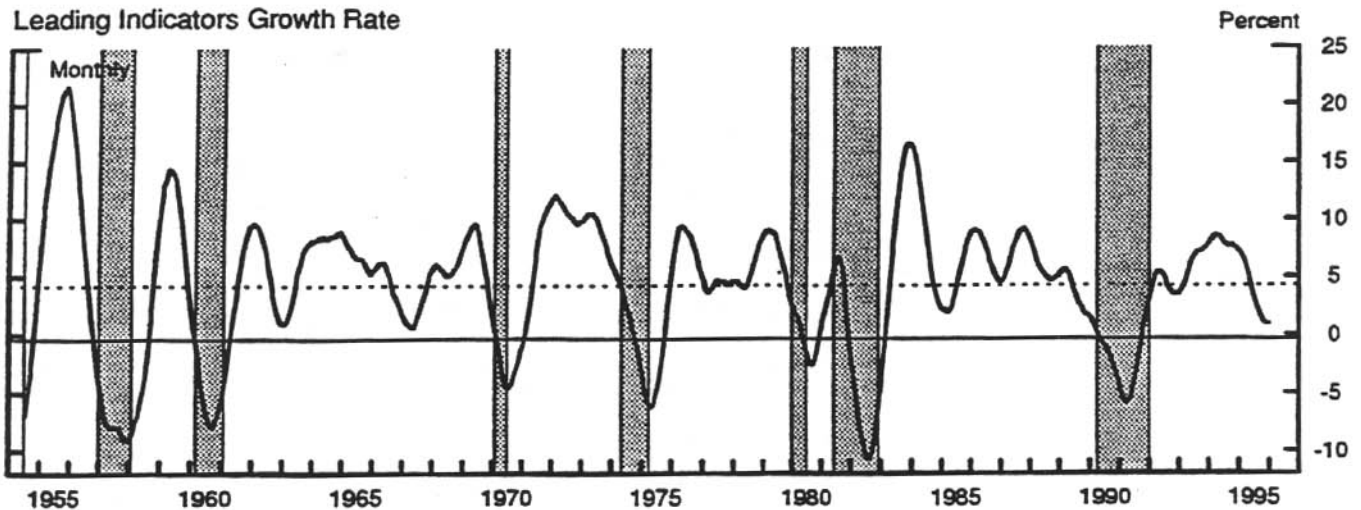


Summary Statistics

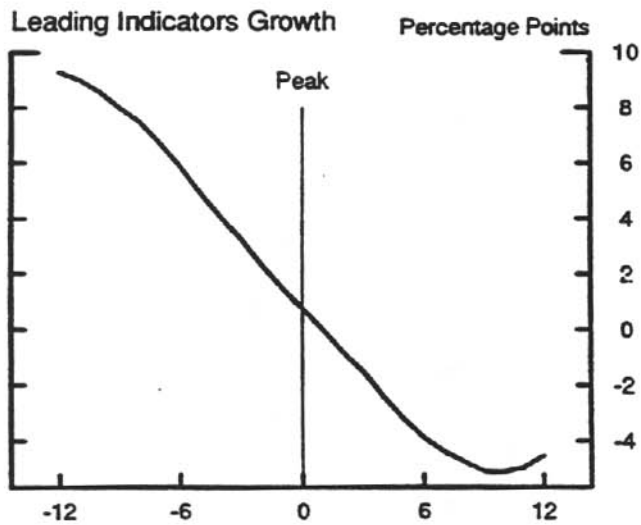
	During Recession	Before Recession	All Else
Mean	-4.6	4.83	-0.75
Median	-3.3	1.86	-0.84
Variance	140.05	102.08	59.46
Skewness	-1.19	1.92	-0.11
Kurtosis	3.38	6.2	1.16

CANADA

**BEHAVIOR OF LEADING INDICATORS GROWTH
AROUND ECONOMIC PEAKS IN CANADA**



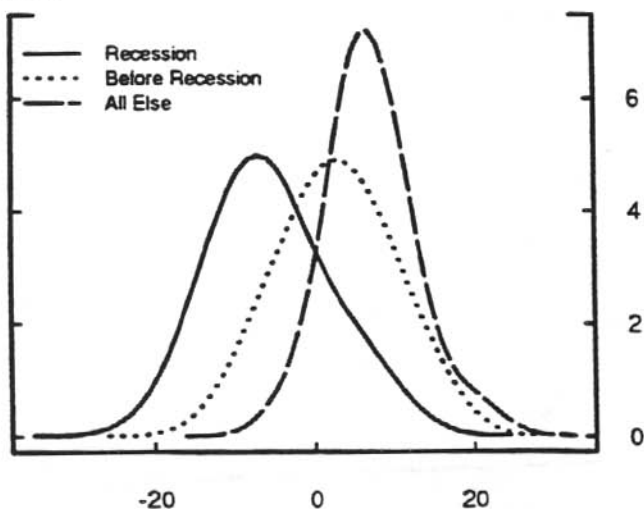
Average of All Cycles



Signals

Time Period: Jul. 1954 to Dec. 1995	
Threshold percentile	20
Percent of those signals:	
Within 12 months before peak	8
In recession	64
Outside 12 months before peak and recession	28
Number of turning points accurately called	2
Number of turning points missed	5

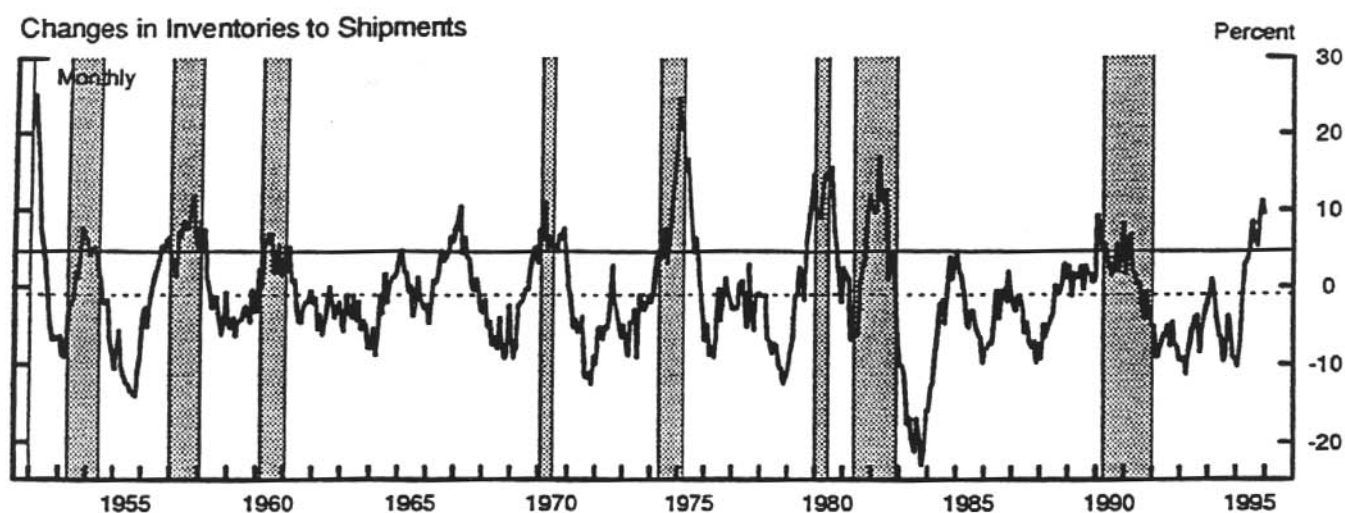
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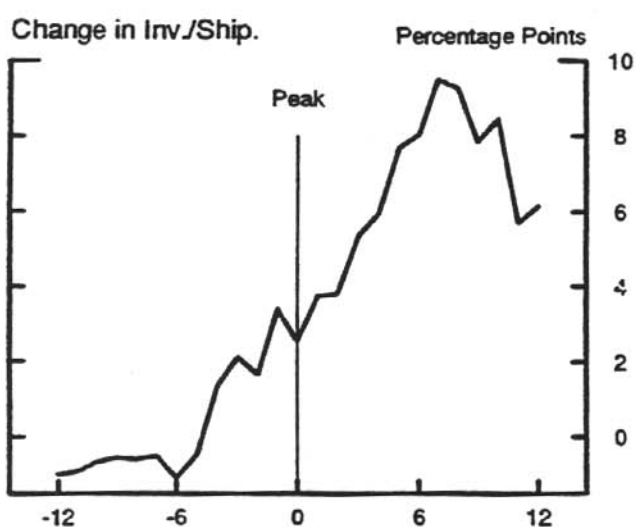
Summary Statistics

	During Recession	Before Recession	All Else
Mean	-5.46	2.73	7.16
Median	-6.27	2.46	6.79
Variance	48.06	41.41	27.37
Skewness	0.35	-0.03	0.41
Kurtosis	-0.26	-0.62	0.81

BEHAVIOR OF CHANGES IN INVENTORIES TO SHIPMENTS AROUND ECONOMIC PEAKS IN CANADA



Average of All Cycles



Signals

Time Period: Jan. 1952 to Dec. 1995

Threshold percentile 80

Percent of those signals:

Within 12 months before peak 20

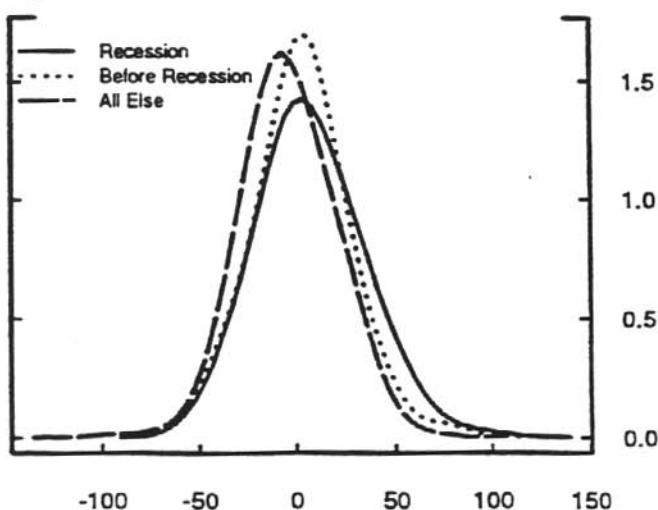
In recession 52

Outside 12 months before peak and recession 28

Number of turning points accurately called 7

Number of turning points missed 1

PDF



Summary Statistics

	During Recession	Before Recession	All Else
Mean	7.02	2.61	-4.17
Median	3.58	3.96	-5.85
Variance	614.4	510.04	450.44
Skewness	0.5	0.28	-0.08
Kurtosis	0.61	0.89	0.93

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samples and has an exact distribution that can be calculated readily. In the Wilcoxon Rank Sum procedure, the two samples are pooled and ordered by rank. The test statistic compares the sum of the ranks of the two separate samples and has a distribution that is approximately normal for large numbers of observations.

Table II-4 presents the marginal significance levels of the test of equality of means (columns 1 and 4), of the Kolmogorov-Smirnov test (columns 2 and 5), and the Wilcoxon Rank Sum (columns 3 and 6). To test whether a variable is a leading indicator, these tests compare monthly data within the twelve months prior to the onset of a recession (columns 1 to 3) to the observations during economic expansion not directly preceding a recession. Similarly, to test whether the variable is a coincident indicator (columns 4 to 6), the test compares the observations during recessions (defined from peak to trough, as in Table II-2) to the observations during economic expansion not directly preceding a downturn.

The results suggest we can drop several variables from our earlier list of potential leading indicators, as we cannot reject the null hypothesis of equality of distributions (at the five percent significance level). It turns out that changes in real stock prices, real M2 growth, real credit growth, changes in the multilateral and bilateral exchange rate, the Canada-U.S. treasury bill spread, and U.S. industrial production do not act differently in the twelve months before an economic contraction than they do during sustained economic expansions. Many of these variables, however, can be included in the list of potential coincident indicators. As columns 4 to 6 highlight, the three variables that drop out from the coincident list are real credit growth and changes in the bilateral and multilateral exchange rates.

b. Extracting the effects of history

As has long been known, at least since Slutsky (1937), the current movement in an economic time series may in part reflect the lagged effect of its earlier movements. In Slutsky's terms, that is the distinction between the impulse--the news in an index--and the propagation mechanism--or the dynamics associated with lagged adjustments to news. As a result, simple comparisons of the level or change in a series may unfairly penalize those time series that have very inertial dynamics. In principle, shocks to such variables could have important consequences for the business cycle, but because they move in a smooth manner, our technique would not necessarily detect the signal. In recognition of this, we investigated if the variables in question retained their signaling ability if purged of their own recent history.

We proceeded in two steps: in the first, each variables was regressed against a constant term, a time trend, and twelve lags; in the second, the residuals from intermediate regression were subjected to the same equality of distributions tests that were described earlier. As shown in Table II-5, this exercise added several more casualties to the list of variables that do not classify as leading indicators: the Canadian commercial paper spread,

the Canada-U.S. ten-year treasury spread; the level and change in the real MCI; and the composite leading indicator. The composite leading indicator is a good example of Slutsky's principle at work. Statistics Canada averages some of the entries in the index, which explains why its growth in Chart II-15 evolves smoothly. The first-stage regression, controlling for that smoothness through lagged values of the index, extracts the news from that time series. In fact, there is little news to be had that bears on predicting turning points. The index of leading indicators, judging from line 15 in the table, is a coincident indicator of recession. Hence, at this stage we have narrowed the number of potential leading indicators to: the Canadian term structure; real M1 growth; the U.S. term structure; the level and change in the nominal MCI; and the change in the ratio of real inventories to shipments.

However, the first-stage regression, before the second stage of parametric and nonparametric testing, can be made more general than an autoregression, permitting the examination of the influences of other variables on the indicators. The section that follows examines this issue by focussing on the influence of domestic and U.S. monetary policy.

4. The sources of business-cycle variation

Focusing strictly on a univariate approach, a variable may emerge as a reliable leading indicator by one or more of the criteria discussed in the preceding sections. However, that variable's ability to forecast economic activity may stem directly from its ability to accurately portray the current stance of monetary policy (domestic or foreign) and not from any information about the phase of the business cycle that is idiosyncratic to the variable. Such a variable may be of limited use to policymakers, who are already aware of the current stance of monetary policy. To examine which of the macroeconomic and financial time series analyzed are actually providing information about monetary policy in Canada or the United States, we revisit the two-step procedure outlined in the previous section.

a. Canadian monetary policy and the indicators

To extract the systematic effect of domestic monetary policy, we regressed each of the indicators on a constant term and twelve lags of the Canadian three-month treasury bill rate. In the second step, we examined whether the residuals from that regression still retained their ability to signal turning points by behaving differently in the months leading up to a recession and "normal" expansion periods. The results of this exercise are reported in Table II-6. These regressions result in a further winnowing of the list of potential leading and coincident indicators. The most notable item in the table reports the demise of real M1 as a leading indicator. While both the accounting exercise in Chart II-4 and the preceding univariate analysis suggested that changes in real M1 were a reliable indicator of future economic activity, M1's ability to discriminate between expansions and contractions appears to have stemmed from the lagged effect of domestic interest rates and not from intrinsic information about, say, the demand for money. As shown by line 4 in the table, the residuals

from a reduced form regression of the change in real M1 on a constant and twelve lags of the Canadian short rate are indistinguishable in expansion and recession. At best, after extracting the effects of domestic monetary policy, real M1 might be considered a useful coincident indicator. The other casualty from this exercise was the change in the ratio of real inventories to shipments, which behaves the same in advance of recession and in sustained economic expansions once the systematic element of Canadian monetary policy is extracted.

b. U.S. monetary policy and the indicators

Given that the Canadian economy is so closely linked to that of the United States, we next broadened our analysis to gauge the systematic effect of U.S. monetary policy on each indicator. We regressed each of the indicators on a constant term and the current and twelve lags of the U.S. three-month treasury bill rate, with Table II-7 summarizing the results. 1/ The results in this table bear witness to the close links between Canada and the United States. Only four of the original sixteen variables behave differently in expansion than before recession, judging by the standard of a five-percent significance level across the three tests given in columns 1 through 3. Among the variables not included among those four is the change in the nominal MCI, which appears to be neither a leading nor coincident indicator once controlling for the effects of Federal Reserve policy. With the change in the nominal MCI falling by the wayside, only the domestic and foreign yield curves and the level of the nominal MCI, out of the original eighteen, provide information about impending recessions that is not already known from their own lagged behavior and the stances of domestic and foreign monetary policies.

5. Comparing indicators

Table II-8 provides a final reckoning of our findings regarding the usefulness of the various indicators in predicting major turning points in economic activity. The first two columns of the table summarize the key features of the accounting exercise documented in Charts II-1 through II-16. The first column presents the percent of turning points accurately predicted, while the second gives the "noise-to-signal" ratio, or the proportion of false signals (signals given when the economy was neither in a recession nor about to enter one) to accurate signals given in the twelve months prior to the onset of recession. Hence, the lower the ratio in column 2, the better the indicator. Columns 4 through 6 summarize the results of the various versions of the parametric and nonparametric tests. An "X" denotes a variable with a distribution that differs significantly in the twelve months before recessions from that in economic expansion,

1/ Because it can be argued plausibly that U.S. monetary policy within a month is not influenced by that month's developments in Canada, these first-stage regressions included the current U.S. short rate. In the regressions of the previous subsection, the current value of the Canadian short rate was omitted to guard against simultaneity bias.

according to the five percent critical value of both the Wilcoxon Rank Sum and Kolmogorov-Smirnov tests.

The "top-tier" indicators combine three features: they capture most of the turning points; false signals are rare (a ratio less than unity in column 2 would capture this); and the variable behaves differently prior to recessions, even when controlling for other factors, such as domestic and foreign monetary policy. The term structure in Canada and in the United States are the only two indicators of our set that fulfill these criteria. This, perhaps, is not surprising, since the yield curve not only conveys information about the current stance of monetary policy, but also reflects market expectations about future policy (monetary and fiscal) as well. The level of the MCI, although it behaves differently in advance of recessions fails to meet the first two criteria.

A "second-tier" indicator (from the vantage point of someone who already has knowledge about the stance of current monetary policy), is one which fulfills the first two criteria discussed above, but may not provide any additional information over and beyond reflecting what policy is doing. Changes in the nominal MCI, real M1, and to a lesser extent, the real inventory-shipments ratio fall into this category. The first two have the decided advantage over the real inventory-shipments ratio in that they provide twice the lead time (see Charts II-4, II-13, and II-16). The remaining thirteen indicators fail to meet two or more of our criteria.

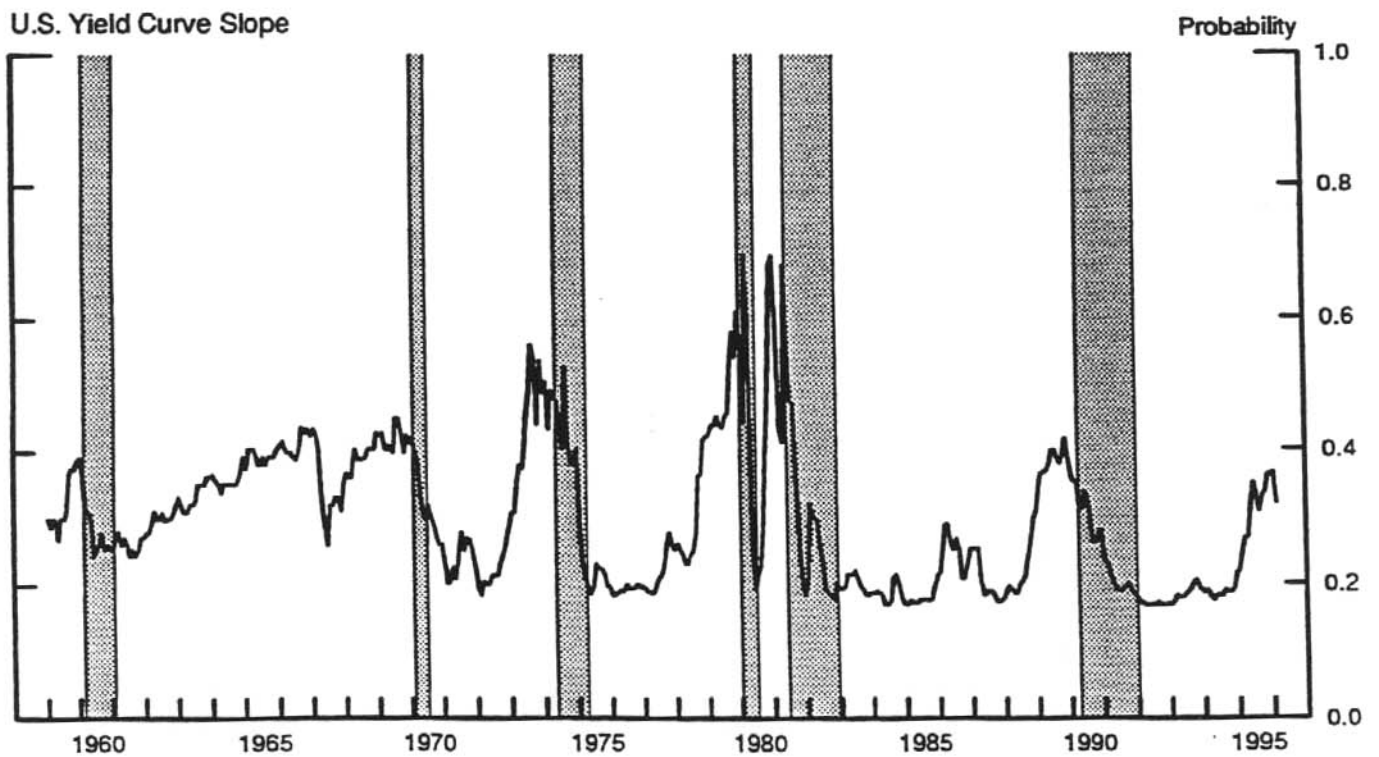
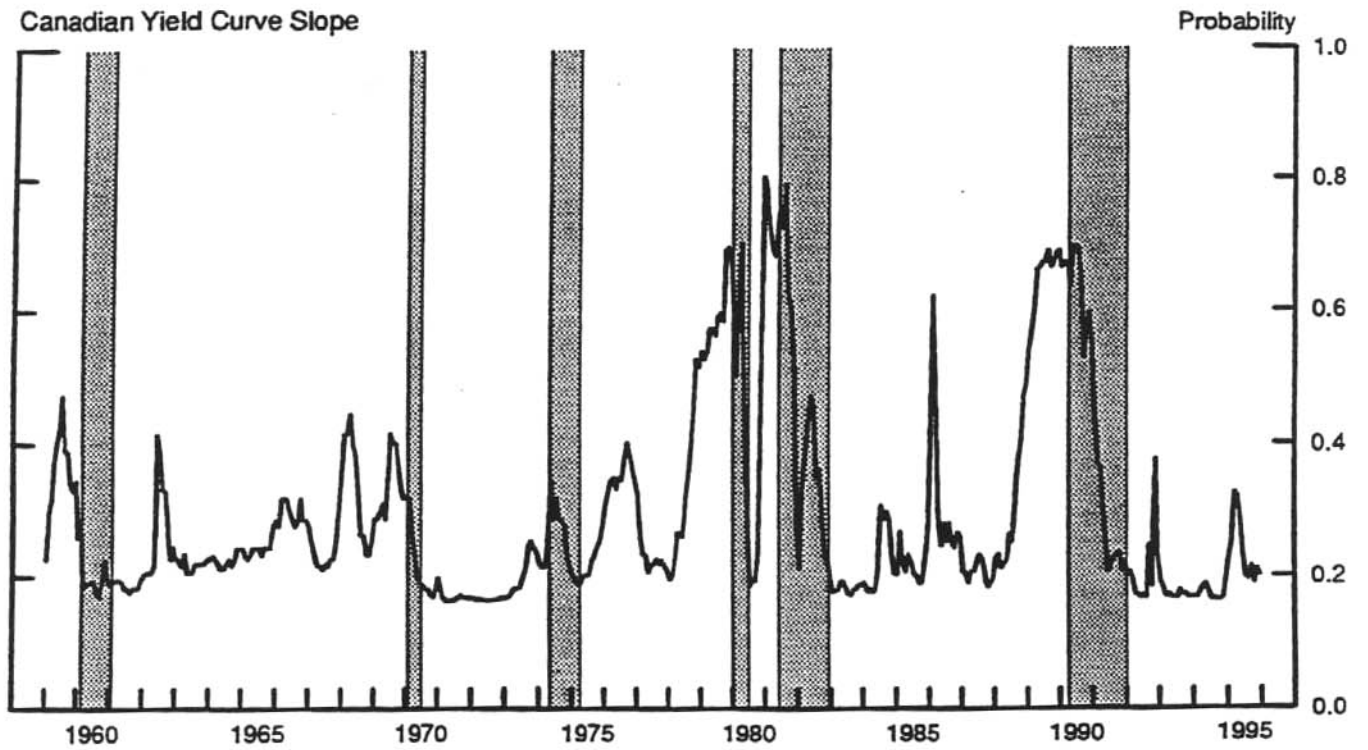
We can turn to the definition of conditional probabilities once again, this time to form time varying estimates of the probability that the Canadian economy is about to enter into recession. In terms of equation (1), we are interested in the conditional probability of being within twelve months of recession, given the slope of the term structure, or $Pr[B|I]$. Of course, we will have two estimates, because we have two term structures--from Canada and from the United States--that appear to have leading-indicator abilities. We can evaluate the three smoothed estimates of joint distributions in the lower left panels of Charts II-1 and II-12 for Canadian and U.S. rates, respectively, $Pr[I \cap B]$, $Pr[I \cap R]$, and $Pr[I \cap E]$, to track how that probability moved over time as the slope of the yield curve shifted. The results are plotted in the two panels of Chart II-17. As one would expect from leading indicators, both indicators tend to move well above the unconditional probability of entering recession in advance of a turning point. Indeed, in most cases, the two term structures put the chance of entering recession at better than one-half before the cyclical peak. The flattening of the yield curves in Canada and the United States in early 1995 raised some warning flags, but conditional probabilities remain below 30 percent.

6. Concluding comments

The main results that emerge from examining Canadian and U.S. data over a period that spans the seven post-war recessions are summarized as follows:

CANADA

IMPLIED PROBABILITY OF ENTERING RECESSION



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First, measures of the slope of the yield curve appear to offer the most timely readings on recession. This confirms the earlier findings of Clinton (1994) and Cozier and Tkacz (1994) for Canada and Hu (1993) for the G-7 countries. In the past few decades, an inverted term structure-- particularly at short to intermediate maturities--led most economic contractions while providing relatively few false alarms.

Second, reflecting the high degree of integration in the two economies, the term structure in the United States emerges as a reliable leading indicator of Canadian economic turning points. Indeed, its performance is comparable to the Canadian term structure, in both the number of turning points accurately called and the relatively low incidence of false signals. The yield curve offers information about the stage of the business cycle even after controlling for the stance of domestic and foreign monetary policy, highlighting the role played by market expectations.

Third, the level of the nominal MCI does appear to contain unique information, over and beyond that contained in its own lags or readings on domestic and foreign monetary policies. However, a forecaster should use it at his or her own peril: it has signaled only one half of the recessions since 1972 and its warnings are more often noise than not. The change in the nominal MCI does much better, although its signalling ability comes from summarizing changes in monetary policy.

Fourth, the commercial paper-treasury bill spread, which has been much lauded as a superior leading indicator for the United States (by Stock and Watson (1989) among others), calls accurately most of the turning points in economic activity in Canada. However, like stock prices, this spread tends to be noisy, setting off considerably more warnings than warranted by subsequent developments. Moreover, some of the news that makes the spread useful in predicting downturns appears related to United States, not Canadian, monetary policy.

Fifth, confirming the results of earlier studies (Hostland, Poloz, and Storer (1988) and Muller (1992)) changes in real M1 do better in predicting future economic activity than M2 or the credit aggregates. However, what this literature did not investigate was whether M1 had intrinsic leading indicator properties or whether its predictive power stemmed exclusively from capturing the stance of domestic or U.S. monetary policy. Our results suggest that, once the effects of domestic or U.S. monetary policy are controlled for, M1 has little residual explanatory power.

Sixth, the leading composite indicator is not much of a leader, as it has missed most of the postwar turning points; after controlling for domestic monetary policy, it provides no additional signaling information. Indeed, the index behaves more as a coincident indicator would.

Seventh and last, our investigation offers support for a traditional view of the monetary transmission mechanism in Canada, much as was found by Duguay (1994). Both the interest-rate and exchange-rate channel of monetary policy show through in the data, in that both short- and long-term interest

rates (through the yield curve slope and the MCI) and exchange rates (embodied in the MCI) do move ahead of economic downturns. The exchange rate by itself, however, is too volatile an indicator to systematically signal the major turning points. In contrast, real domestic credit is completely acyclic, suggesting that if there is some truth to the credit view, it must work its effect on economic activity subtly.

Table II-1. Canada: The Indicator Literature on Canada

Hostland, Poloz, Storer (1988): 46 Monetary aggregates, quarterly data, 1969:Q1 to 1986:Q4

GDP and other nominal and real measures of economic activity are regressed against the various monetary aggregates to weed out subset that is informative according to the final prediction error (FPE) criterion. Granger causality tests are performed to assess the information content of alternative aggregates. The main conclusion that emerges is that narrow aggregates (i.e. M1) are a better leading indicator of nominal income, whereas the broader aggregates were a coincident indicator; real M1 is found to be a good leading and coincident indicator of real income. Interest rates, equity prices, and exchange rates are added to the bivariate framework; they conclude that the financial variables add significant information, and reduce but not eliminate the information content of M1.

Milton (1988): 25 credit aggregates, quarterly data, 1971:Q1 to 1985:Q4

The same vector autoregression selection criteria methodology as Hostland, Poloz, Storer (1988). Several measures of credit, including residential mortgage, household, and business credit are informative about real spending, but most of the relationship is either contemporaneous or with very short lags (one to two quarters); the credit aggregates are outperformed by M1 and M2.

Mishkin (1989): The yield curve, 10 OECD countries, monthly data, 1973:M3 to 1986:M12

Changes in inflation are regressed against the slope of the slope of the lagged term structure. Mishkin finds little evidence that the term structure helps predict future changes in inflation. However, he finds the nominal term structure contains evidence on the real term structure.

Muller (1992): Monetary and credit aggregates, quarterly data, 1971:Q1 to 1989:Q4

The same indicator models of Hostland, Poloz, Storer (1988) and Milton (1988). The main conclusions are: the predictive ability of real M1 1 to 2 quarters ahead is confirmed; consumer bank credit as well as M2 predict GDP deflator movements; many of the credit aggregates are lagging indicators of economic activity and; despite the financial innovation of the 1980s, these results appear to be robust.

Bu (1993): The yield curve, G-7 countries, for Canada it is quarterly data, 1957:Q1 to 1991:Q4

Changes in real GDP are regressed against the lagged yield spread. The results indicate that the yield spread is significant in almost all the subsamples for all seven countries and that, particularly for Canada and the United States, its predictive ability has increased since the mid-1970s. A forecasting model based on real stock returns underperforms the yield curve in five of the countries, including Canada. The theoretical model developed indicates that expectations of higher growth will produce higher long-term interest rates and a steeper yield curve.

Cozier and Tkacz (1994): 12 measures of the yield curve, quarterly data, 1961:Q1 to 1991:Q4

As in the earlier studies, the approach is parametric and involves regressing the real activity variable of interest on lagged values of the term structure and other potential leading indicators. The term structure is found to be a significant predictor of economic activity, particularly consumption two years or less ahead and investment at longer time horizons. The inclusion of other financial variables (real M1, stock prices, and interest rates) does not reduce the predictive ability of the term structure. Indeed, it is real M1 that becomes insignificant. The inclusion of the U.S. term structure in the model does not add much to its predictive ability over short horizons, but significantly improves the fit over longer horizons.

Clinton (1994-95): The yield curve, quarterly data, 1961:Q1 to 1991:Q4

Very similar approach and methodology to Cozier and Tkacz (1994). The main results include: the yield curve outperforms other indicators, particularly at longer time horizons; the peak relationship with output occurs about one year ahead; the yield curve is a better predictor of aggregate demand than its components; the U.S. yield curve is not significant in the regressions; the yield curve is not, however, a good predictor of inflation and is outperformed by M2.

Table II-2. Canada: Chronology of Turning Points
in Canada During the Post World War II Period

Peak	Trough
May 1951	December 1951
May 1953	June 1954
January 1957	January 1958
March 1960	January 1961
February 1970	June 1970
May 1974	March 1975
January 1980	June 1980
June 1981	November 1982
April 1990	December 1991 ^{1/}

Memorandum items

Percent of months since 1958:

• within twelve months of recession	17
• in recession	15
• all else	68

Source: Statistics Canada.

^{1/} As yet, there is no official date for the 1990-91 recession trough; while GDP ceased to contract earlier in 1991, production and employment did not bottom out until December of that year.

Table II-3. Canada: Variables Used to Forecast Turning Points in Canada

Financial

Rates and Prices

1. 10-year government bond note less 3-month treasury bill rate
2. 3-month corporate less treasury bill rate
3. Real Toronto Stock Exchange Index (TSE)

Quantities

4. Real M1
5. Real M2
6. Real Domestic Credit

International

7. G-10 Weighted Exchange Rate
8. U.S.-Canadian Dollar Exchange Rate
9. 3-month Canadian treasury less U.S. treasury bill rate
10. 10-year Canadian treasury less U.S. treasury note yield
11. U.S. Industrial Production
12. U.S. treasury 10-year note less 3-month U.S. treasury bill rate

Composite

13. Nominal Monetary Conditions Index (MCI)
14. Change in MCI

Real-side

15. Index of Leading Indicators
 16. Real Inventories to Shipments
-

Table II-4. Canada: Signaling Ability of Various Indicators 1/

	Is the Indicator:					
	Leading			Coincident		
	Equal Means (1)	K-S (2)	WRS (3)	Equal Means (4)	K-S (5)	WRS (6)
Financial						
10-year note less 3-month bill	--	--	--	--	--	--
3-month corporate less 3-month bill	--	0.01	0.01	--	--	--
Real Toronto stock exchange	0.19	0.27	0.43	--	--	0.01
Real M1 growth	--	--	--	--	--	--
Real M2 growth	0.13	0.40	0.31	--	0.012	0.02
Real domestic credit growth	0.61	0.58	0.66	0.26	0.09	0.21
International						
G-10 exchange rate growth	0.03	0.05	0.06	0.19	0.38	0.21
US\$/Can\$ exchange rate growth	0.03	0.10	0.05	0.59	0.40	0.90
Canadian 3-month less U.S. 3-month bill rates	0.46	0.19	0.47	--	--	--
Canadian 10-year less U.S. 10-year note yields	0.01	--	--	--	--	0.01
U.S. industrial production	0.15	--	0.01	--	--	--
U.S. 10-year less U.S. 3-month bill	--	--	--	--	--	--
Composite						
Nominal MCI	--	--	--	--	--	--
Nominal MCI changes	--	--	--	--	0.01	0.02
Real side						
Leading indicators growth	--	--	--	--	--	--
Real inventories to shipments growth	0.04	0.03	0.04	0.01	--	0.03

1/ Marginal significance levels of test of equality of means (columns 1 and 4), of Kolmogorov-Smirnov test (columns 2 and 5), and of Wilcoxon Rank Sum test (columns 3 and 6). These tests compare the monthly data within twelve months of recessions (columns 1, 2, and 3) and during recessions (columns 4, 5, and 6) to the observations during economic expansion not directly preceding a downturn.

Table II-5. Canada: Signaling Ability of Various Indicators,
After Extracting Information About Their Own Histories 1/

	Is the Indicator:					
	Leading			Coincident		
	Equal Means (1)	K-S (2)	WRS (3)	Equal Means (4)	K-S (5)	WRS (6)
Financial						
10-year note less 3-month bill	--	--	--	0.09	0.05	0.13
3-month corporate less 3-month bill	0.02	0.11	0.08	0.90	0.23	0.77
Real Toronto stock exchange	0.40	0.31	0.78	0.02	--	0.02
Real M1 growth	--	--	--	0.04	0.01	0.04
Real M2 growth	0.51	0.33	0.88	0.03	0.02	0.09
Real domestic credit growth	0.54	0.72	0.57	0.16	0.10	0.08
International						
G-10 exchange rate growth	0.10	0.10	0.19	0.57	0.59	0.61
US\$/Can\$ exchange rate growth	0.17	0.31	0.39	0.96	0.40	0.82
Canadian 3-month less U.S. 3-month bill rates	0.45	0.19	0.20	0.20	0.22	0.34
Canadian 10-year less U.S. 10-year note yields	0.90	0.32	0.76	0.07	--	0.09
U.S. industrial production	0.17	0.02	0.03	--	--	--
U.S. 10-year less U.S. 3-month bill	--	--	--	--	--	--
Composite						
Nominal MCI	--	--	--	0.53	0.65	0.80
Nominal MCI changes	--	0.01	0.01	0.01	0.01	0.02
Real side						
Leading indicators growth	0.01	0.02	0.02	--	--	--
Real inventories to shipments growth	0.05	0.01	0.04	0.01	0.01	0.01

1/ Residuals from the regression of each variable against a constant term, a time trend, and twelve lagged values of the variable. Marginal significance levels of test of equality of means (columns 1 and 4), of Kolmogorov-Smirnov test (columns 2 and 5), and of Wilcoxon Rank Sum test (columns 3 and 6). These tests compare the monthly data within twelve months of recessions (columns 1, 2, and 3) and during recessions (columns 4, 5, and 6) to the observations during economic expansion not directly preceding a downturn.

Table II-6. Canada: Signaling Ability of Various Indicators, After Extracting Information About Canadian Monetary Policy 1/

	Is the Indicator:					
	Leading			Coincident		
	Equal			Equal		
	Means	K-S	WRS	Means	K-S	WRS
	(1)	(2)	(3)	(4)	(5)	(6)
Financial						
10-year note less 3-month bill	--	--	--	--	0.02	0.01
3-month corporate less 3-month bill	--	--	--	--	--	--
Real Toronto stock exchange	0.83	0.69	0.82	0.05	--	0.07
Real M1 growth	0.32	0.27	0.47	0.03	--	0.02
Real M2 growth	0.09	0.40	0.20	0.07	0.41	0.44
Real domestic credit growth	0.71	0.75	0.68	0.97	0.23	0.89
International						
G-10 exchange rate growth	0.17	0.06	0.29	0.82	0.55	0.90
US\$/Can\$ exchange rate growth	0.30	0.64	0.60	0.68	0.30	0.85
Canadian 3-month less U.S. 3-month bill rates	--	--	--	0.43	0.04	0.41
Canadian 10-year less U.S. 10-year note yields	--	--	--	--	--	0.02
U.S. industrial production	0.12	--	0.04	--	--	--
U.S. 10-year less U.S. 3-month bill	--	--	--	--	--	--
Composite						
Nominal MCI	--	--	--	--	--	--
Nominal MCI changes	--	--	--	0.10	0.37	0.37
Real side						
Leading indicators growth	--	0.11	0.03	--	--	--
Real inventories to shipments growth	0.73	0.73	0.90	0.13	0.03	0.15

1/ Residuals from the regression of each variable against a constant term and twelve lags of the Canadian three-month bill rate. Marginal significance levels of test of equality of means (columns 1 and 4), of Kolmogorov-Smirnov test (columns 2 and 5), and of Wilcoxon Rank Sum test (columns 3 and 6). These tests compare the monthly data within twelve months of recessions (columns 1, 2, and 3) and during recessions (columns 4, 5, and 6) to the observations during economic expansion not directly preceding a downturn.

Table II-7. Canada: Track Record of Potential Leading Indicators
Points in Canada

	<u>Accounting Exercise</u>		Does the variable behave differently in advance of recessions?			
	Percent of turning points called	Noise to-signal ratio 1/	<u>Intrinsically</u>	<u>After Extracting:</u>		
				<u>Own less</u>	<u>Monetary Policy in:</u>	<u>United</u>
	(1)	(2)	(3)	(4)	<u>Canada</u>	<u>States</u>
					(5)	(6)
Financial						
1. 10-year treasury note less 3-month treasury bill rate	83	0.62	X	X	X	X
2. 3-month corporate less treasury bill rate	83	3.32	X		X	
3. Percent Change in Real Toronto Stock Exchange Index (TSE)	66	6.71				
4. Real M1 Growth	83	0.39	X	X		
5. Real M2 Growth	--	--				
6. Real Domestic Credit Growth	17	14.00				
International						
7. 6-10 Weighted Exchange Rate	50	2.52				
8. U.S.-Canadian Exchange Rate	50	4.07				
9. 3-month Canadian treasury less U.S. treasury bill rate	44	1.47			X	
10. 10-year Canadian treasury less U.S. treasury note yield	83	3.33	X		X	
11. U.S. Industrial Production	50	3.27	X		X	X
12. U.S. treasury 10-year note less 3-month U.S. treasury bill rate	86	0.67	X	X	X	X
Composite						
13. Nominal Monetary Conditions Index (MCI)	50	1.18	X	X	X	X
14. Change in the nominal MCI	100	0.95	X	X	X	
Real-side						
15. Index of Leading Indicators	40	3.50	X			
16. Inventories to Shipments	88	1.40	X	X		X

Source: Charts II-1 through II-16 and Tables II-5 through II-8.

1/ The dashed line next to M2 indicates that the noise to signal ratio is infinite, since this indicator has not sent any signals in advance of recession, see Chart II-5.

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III. Inflation in Canada: An Assessment of its Determinants 1/

1. Introduction

This chapter presents a vector autoregressive (VAR) model that explains the response of price inflation in Canada to the business cycle, the rate of change in the exchange rate, and the rate of change in unit labor costs. 2/ We find that all three variables have a significant effect on the inflation rate, but that the most important determinant of the inflation rate is the excess demand gap. The medium-term effect of exchange rate depreciation is commensurate with the share of imports in the basket of goods used to calculate the CPI. The results suggest that the relatively low rate of inflation in recent years, despite the significant currency depreciation, was the result of the weakness in the Canadian economy and the decline in unit labor costs over most of the recent period.

This chapter proceeds as follows. Section 2 presents the estimation methodology and describes the data. Section 3 summarizes the main results and Section 4 concludes.

2. Estimation methodology

Previous empirical studies of Canadian inflation have focused mostly on the single-equation Phillips curve relationship. For example, Duguay (1994), Hostland (1995) and Amano and Macklem (1995) all relate Canadian inflation to a measure of the output gap, adding various other explanatory variables. This paper differs from these earlier studies by including in a vector autoregression (VAR) changes in unit labor costs as a direct determinant of inflation, in addition to the output gap and changes in the exchange rate. 3/ Furthermore, we employ a technique that allows us to impose a structure on the contemporaneous correlations among the variables.

The major benefit of the VAR approach is that all variables in the system are treated as potentially endogenous and the number of exclusion restrictions is kept to a minimum. We estimate the following system using quarterly seasonally-adjusted data:

$$X = B(L) X(t-1) + CZ + u \quad (1)$$

1/ Prepared by S. Erik Oppers and Alun Thomas.

2/ The measure of inflation used is the percentage increase in the CPI excluding food and energy.

3/ Unit labor costs represent wage costs, the exchange rate proxies imported costs, and the output gap proxies a cyclical markup of prices over costs. We chose to analyze the exchange rate over import prices because we are interested in isolating the effect of the recent exchange rate depreciation on inflation.

X is a vector composed of the CPI inflation rate excluding food and energy (ΔCPI), the percentage change in unit labor costs (ΔULC), the percentage change in the trade weighted nominal exchange rate (ΔE), and the excess demand gap (EDGAP, defined as the log of output minus the log of potential output). 1/ u is a vector of reduced-form errors and Z is a vector of exogenous variables affecting the inflation rate: a dummy for the first quarter of 1991, when the Goods and Services Tax was introduced; and a variable that captures movements in indirect taxes. 2/

In the VAR approach, the contemporaneous relationships between the variables in the X vector are manifested in the correlations of the errors (u vector) across equations. We use the method described by Bernanke (1986) to identify the contemporaneous relationship between the endogenous variables of the model. This requires assumptions about the contemporaneous correlations between the endogenous variables.

The excess demand gap and the percentage change in the exchange rate are assumed not to be affected contemporaneously by shocks to other variables. The percentage change in unit labor costs is assumed to be contemporaneously affected by its own shocks and by shocks to excess demand. Shocks to the inflation rate and the percentage change in the exchange rate are assumed to have no contemporaneous effect on the percentage change in unit labor costs. Inflation is assumed to be contemporaneously affected by shocks to all the variables in the model. These restrictions were not rejected by a likelihood ratio test and are summarized below.

Matrix of Identifying Restrictions

Variable	Contemporaneous effect on:			
	ΔCPI	ΔE	ΔULC	EDGAP
ΔCPI	yes	no	no	no
ΔE	yes	yes	no	no
ΔULC	yes	no	yes	no
EDGAP	yes	no	yes	yes

1/ All variables, except the nominal exchange rate, are seasonally adjusted. We use the percentage change in the price level (the inflation rate), the percentage change in the exchange rate, and the percentage change in unit labor costs since conventional Dickey-Fuller and augmented Dickey-Fuller tests indicated that the log levels of these variables were not stationary.

2/ The indirect tax variable is the contribution of indirect taxes to inflation and is provided by the Bank of Canada. See Bank of Canada Review, September 1991, for more details.

3. Estimation results

The results are obtained in two stages. First, the coefficients in equation (1) are estimated. Then, using the coefficients of the reduced-form model, the Bernanke method is employed to examine the response of the inflation rate to shocks to the other variables in the system.

Hostland (1995) indicates that the inflation process in Canada may have changed over time. He identifies a period between the mid-1950s and the early 1970s when inflation was low and relatively stable and suggests that the period 1984-93 could be viewed as a similar stable inflation regime. We consider the stability of the reduced form coefficients of the inflation equation over the period 1978:4 to 1995:1 using a CUSUM squared test. 1/ Chart III-1 presents the test statistic and its confidence bands and indicates that the null hypothesis of parameter stability is rejected over the period 1981 - 1984. On the basis of these findings, which are consistent with the work of Hostland, the analysis was focussed on the period 1984:1 to 1995:1. 2/

The estimation results for the reduced form model are summarized in Table III-1. 3/ They indicate that a significant fraction of the variability of inflation and the excess demand gap was captured by the model. The F-tests of exclusion restrictions show that the excess demand gap has significant explanatory power in the inflation equation, but that the rate of change in the exchange rate and in unit labor costs had little individual explanatory power for inflation. The model was less successful in explaining the rate of change in the exchange rate and the rate of change in unit labor costs. 4/

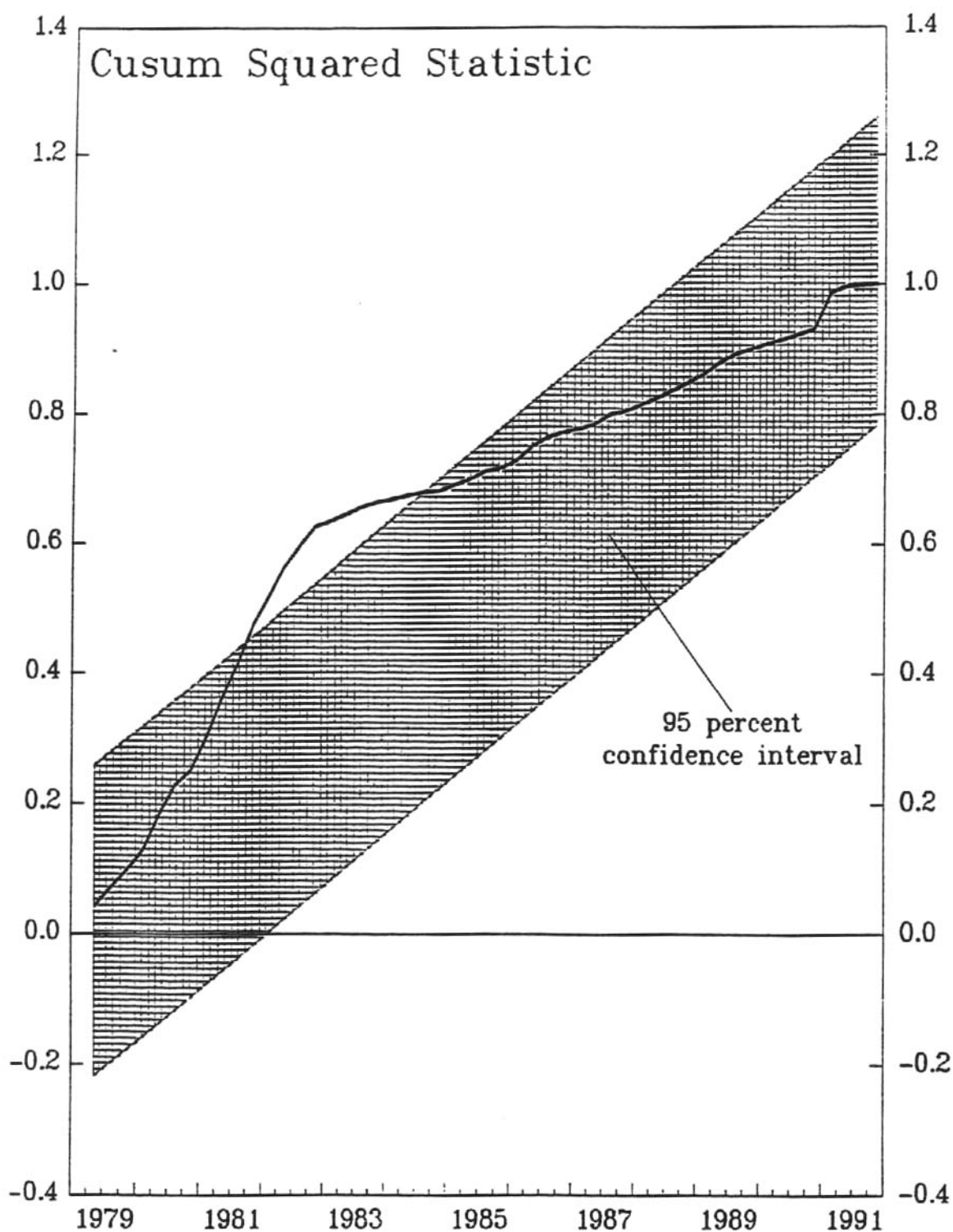
1/ The period considered starts in 1978:4 when the seasonally adjusted CPI became available. The CUSUM squared test involves a repeated calculation of the standardized ex-post prediction error adding a new observation for each calculation. The test statistic involves squaring and summing the standardized ex-post prediction error over all the observations and plotting it against confidence bands which depend on the degrees of freedom and on the chosen level of significance.

2/ Separate constant terms were included for the sub-periods 78:4-82:3, 82:4-91:1 and 91:2-95:1 to proxy the movement from a high to a low inflationary environment but this had no effect on the results of the CUSUM squared test.

3/ To select the lag length for the estimation, both the Akaike and the Schwarz statistics were considered. The Akaike statistic suggested 8 lags as appropriate, while the Schwarz statistic suggested only one lag. We chose to estimate the system with 2 lags in order to achieve a parsimonious specification, while allowing for a reasonably rich dynamic structure.

4/ The low explanatory power of the exchange rate equation is consistent with the empirical finding that structural models of the exchange rate do not perform well in the short run. See, for instance, Meese and Rogoff (1983).

STABILITY OF INFLATION EQUATION



Sources: Statistics Canada (supplied by DRI); and Fund staff estimates.

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The impulse response functions for inflation, shown in Chart III-2, display the effect on the quarterly inflation rate of the following innovations: a permanent 10 percent depreciation of the currency (equivalent to a one period ΔE shock), a temporary excess demand shock of 2 percent that persists for 8 quarters; and a permanent 1 percent increase in unit labor costs (equivalent to a one period ΔULC shock). 1/

The first panel shows the effects of a permanent 10 percent depreciation of the Canadian dollar on the inflation rate and the price level. The impact effect on the quarterly inflation rate is in the range of 0.4 to 0.5 percentage points (1.6 to 2.0 percentage points at an annual rate) in the first two quarters. Subsequently, after falling slightly below the baseline for 2 quarters, the inflation rate remains about 0.1 percentage point (0.4 percentage point at an annual rate) above its baseline for about six quarters before returning to the baseline over the medium term. After three to four years, the price level has risen by 2 percent in response to the shock. This is roughly the estimate of the import content of the CPI, indicating full pass-through of exchange rate changes. 2/

The effects of a 2 percent excess demand shock sustained for 2 years, both on excess demand itself and on the inflation rate, are shown in the second panel of Chart III-2. Due to its persistence, the excess demand gap rises 5 percentage points above its baseline after 5 quarters. It is eliminated two quarters after the exogenous shock disappears, turning negative in the subsequent quarter. The change to the inflation rate is similar to the change in the excess demand gap, peaking after 6 quarters at around 0.5 percentage point (2.1 percentage points at an annual rate). Inflation falls below baseline as the economy moves into a situation of excess supply, returning to the baseline in the long run, indicating the absence of a long-run trade off between a temporary excess demand shock and the inflation rate. 3/

Finally, a permanent 1 percent increase in unit labor costs leads to a relatively strong response of price inflation. As shown in the third panel, after an impact effect of 0.05 percentage point (0.2 percentage point at an annual rate), the inflation rate response peaks at 0.15 percentage point (0.6 percent at an annual rate) after 4 quarters. It slowly diminishes towards zero over time generating a cumulative effect on the price level of just under 2 percent. An increase in unit labor costs thus leads to a magnified increase in the price level resulting from mutual feedback effects between both variables.

1/ The size of the shocks was roughly in line with the size of shocks experienced during the sample period.

2/ Duguay (1994) also finds a long-run increase in the price level of 2 percent in response to a 10 percent exchange-rate depreciation.

3/ This statistical result differs from the usual result in which shocks to the inflation rate are found to have permanent effects. This is because the specification in this paper includes two lags of the output gap which offset each other whereas most other specifications only include one lag.

Another way to quantify the relative importance of the explanatory variables on inflation is to look at the variance decomposition, which attributes forecast errors from the model to the various structural shocks. 1/ The tabulation below shows that in the first forecast quarter--when the standard error of the forecast for inflation is 0.16 percent--over 81 percent of the variance of the forecast can be attributed to inflation shocks themselves, and not to shocks in the other variables. In the long run, however, the most important source of shocks to inflation are excess demand shocks (60 percent), followed by idiosyncratic inflation shocks (17 percent), changes in unit labor costs (14 percent) and, finally, changes in the exchange rate (8 percent).

Variance Decomposition for Inflation

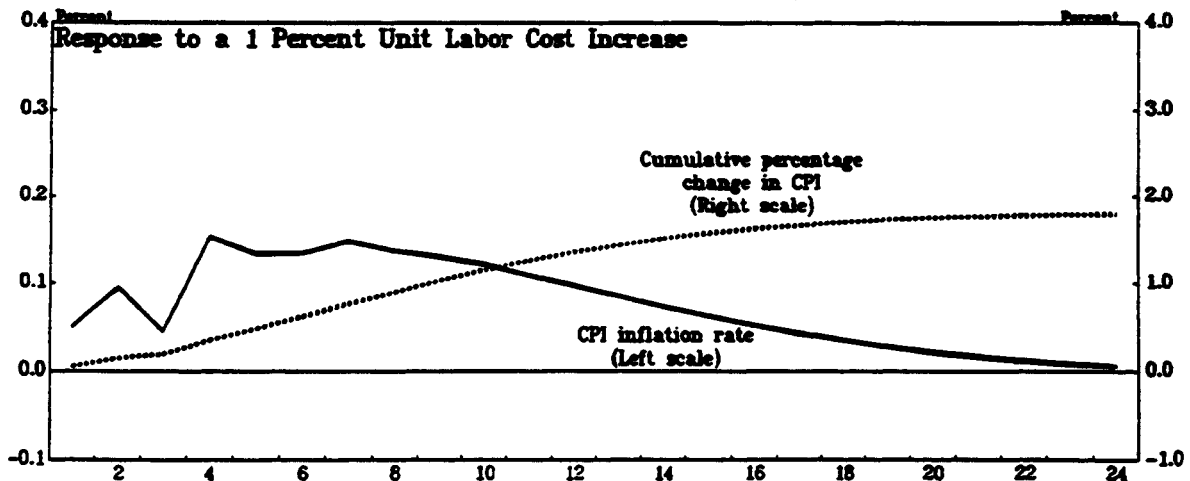
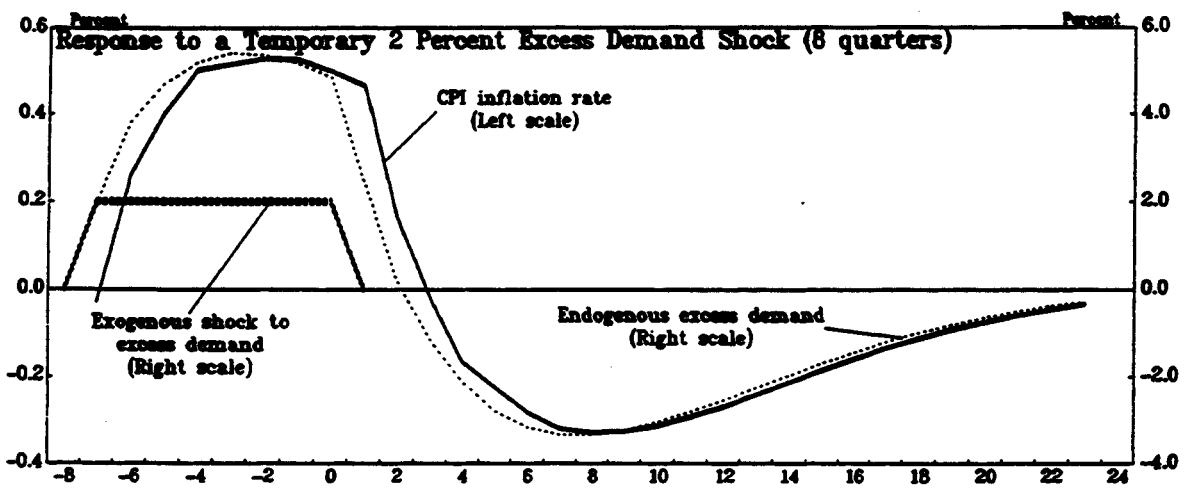
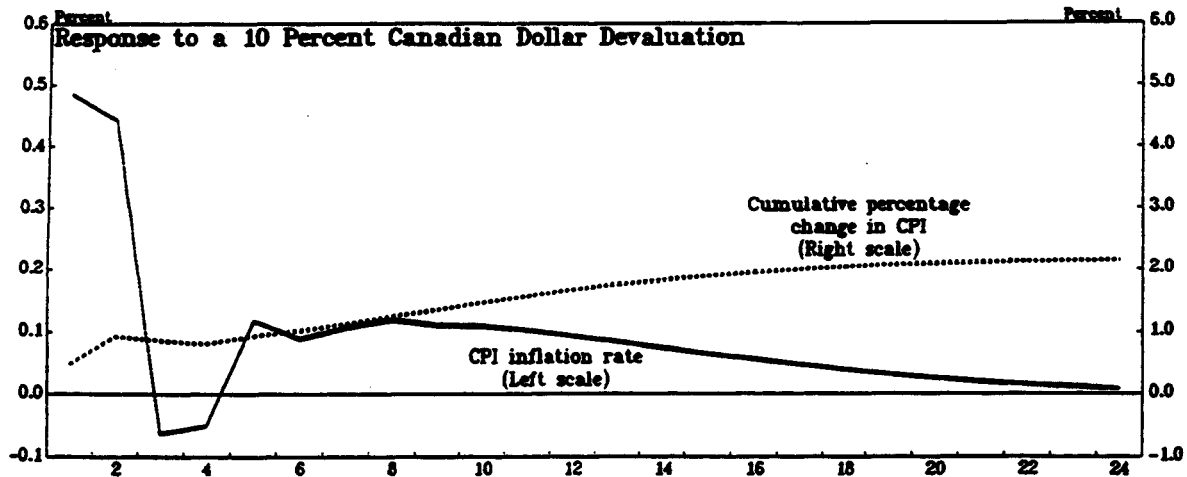
Quarters Ahead	Standard Error of Forecast	Share of error (in percent) due to innovations in:			
		<u>XACPI</u>	<u>XAULC</u>	<u>XAE</u>	<u>EDGAP</u>
1	0.0016	81.3	1.0	17.6	0.2
4	0.0022	42.7	7.2	16.6	33.4
8	0.0030	23.4	12.1	10.0	54.5
24	0.0035	17.3	14.5	8.2	60.1

The ability of the model to track movements in the inflation rate is shown in Chart III-3, which presents actual and fitted values within the sample period 1984:1 - 1995:1 and for two quarters following the sample period. The chart indicates that the actual and fitted values match each other closely over the whole period and that the estimated equation captures the recent rise in inflation well: the estimated equation predicted a 2.4 percent rise in the first quarter of 1995 and a 2.8 percent rise in the second quarter. In the third quarter the model captured the decline in the inflation rate to 1.6 percent.

1/ To calculate the variance decomposition, innovations in all the endogenous variables are introduced in the system for each step of the forecast period. The variability in the first period-ahead forecast therefore depends on how the first period's innovations feed through the system. The variability in the second period-ahead forecast not only depends on the second period's innovations, but also on how the first period's innovations keep feeding through the system. Over time, as some innovations fade faster than others, the composition of the variance of the forecast changes and settles down into a long-term pattern.

INFLATION RESPONSES TO VARIOUS SHOCKS 1/

(Relative to baseline)

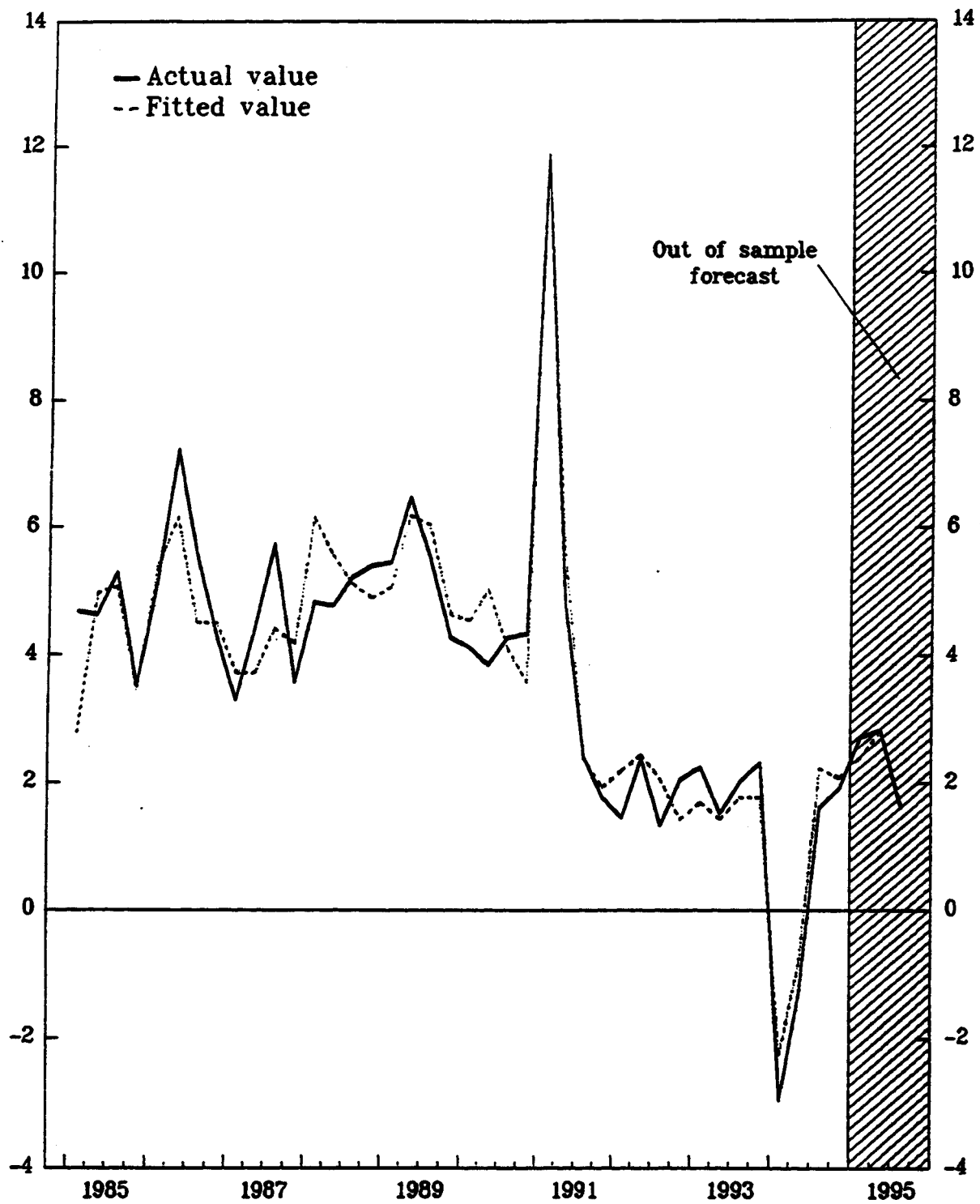


Sources: Statistics Canada (supplied by DRI); and Fund staff estimates.

1/ The x-axis represents the number of quarters after the shock.

CHART III-3

CANADA
CPI INFLATION RATE FORECAST
(In percent)



Sources: Statistics Canada (supplied by DRI); and Fund staff estimates.

4. Conclusion

The low inflation rate in Canada since 1991, maintained over a period in which the currency depreciated by over 20 percent, has led many observers to question the strength of the relationship between inflation and changes in the exchange rate. The framework used in this paper allowed us to look at this relationship while controlling for the cyclical position of the economy and changes in unit labor costs. The paper finds that the low inflation rate since 1991 can be attributed to a combination of effects, including the weakness in the economy in the early 1990s, modest declines in unit labor costs, and the pass-through of changes in the exchange rate.

In particular, we find that a 10 percent depreciation of the currency leads to a cumulative 2 percent rise in the price level after 3 to 4 years. This is roughly the estimate of the import content of the CPI and thus indicates full pass-through of exchange rate changes into changes in the price level over the medium term.

We find that the most significant determinant of inflation is the excess demand gap. A temporary excess demand gap of roughly 4 percent over ten quarters leads to a short-term increase in the inflation rate of 2 percentage points (at an annual rate). Over time, however, the inflation rate returns to zero.

Table III-1. Canada: Diagnostic Statistics 1/

Test statistic	Dependent variable			
	%ΔCPI	%ΔULC	%ΔE	EDGAP
R squared	0.9	0.56	0.3	0.96
Q test for autocorrelation	9.58	7.06	4.78	6.48
Exclusion restrictions				
%ΔCPI	2.17	0.94	0.41	0.34
%ΔULC	0.86	1.78	1.01	8.27 *
%ΔE	1.82	1.61	0.31	0.31
EDGAP	23.4 *	11.19 *	0.86	313.1 *

1/ An asterisk denotes a variable that is significant at the 10 percent level.

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IV. Uncertainty in the Fundamental Equilibrium Exchange Rate 1/

1. Introduction

The assessment of "misalignment" in exchange rates has been the focus of much recent interest. 2/ This interest has been spurred by the seemingly excessive variation of exchange rates relative to fundamentals, concerns about apparent misalignments among major currencies, and the desire to calculate parities for the Exchange Rate Mechanism of the European Monetary System. 3/ One way to gauge the degree of misalignment is by calculating the Fundamental Equilibrium Exchange Rate (FEER)--the exchange rate compatible with full employment and external balance. 4/ Recent studies have constructed FEERs using models ranging from simple partial-equilibrium trade models to full-blown macroeconomic models. 5/

Estimated FEERs depend on estimated parameters, and so like other estimates based on data, are subject to sampling uncertainty. This means that the estimates should not be taken too literally--or as Clark et al. (1994) state, "it is clearly more realistic to think of ranges rather than of point estimates in the assessment of exchange rates" (p. 20). Some earlier work has performed sensitivity analysis on FEERs, but sensitivity analysis does not link the inherent uncertainty in estimated parameters to uncertainty in FEER estimates. 6/ A confidence interval would be more useful, as it would quantify the estimation error and permit the user to decide whether the current exchange rate is a significant distance from equilibrium.

This paper calculates the sampling distribution of the FEER for Canada based on a simple model of trade. 7/ The analysis focuses on the

1/ Prepared by Charles Kramer.

2/ The notion of "misalignments" in market-determined exchange rates is controversial. The paper does not address this issue, but rather focuses on the methodological issue of whether a particular model of the equilibrium exchange rate can produce estimates that are precise enough to be useful.

3/ See for example Clark et al. (1994).

4/ Sometimes also referred to as a Desired Equilibrium Exchange Rate (DEER) so as to emphasize its normative nature.

5/ Examples include Goldman Sachs (1995), Chandler and Laidler (1995), Church (1992), and the papers in Williamson (1994). Other approaches to assessing movements in real exchange rates, including purchasing power parity, terms of trade, and productivity trends (Balassa-Samuelson), are discussed in Amano and van Norden (1995), Ronald MacDonald (1995), Asea and Corden (1994), and Isard and Symansky (1995).

6/ Some studies of FEERs that contain sensitivity analysis are discussed in Clark et al. (1994).

7/ Though the data employed are for Canada, nothing about the appropriateness of the exchange rate for the Canadian dollar is implied by or should be inferred from what follows.

uncertainty introduced by employing estimated trade elasticities. The estimated FEER shows a substantial range of variation that primarily reflects such uncertainty. The results suggest that FEER estimates should be treated with caution, as they may offer a fairly imprecise measure of misalignment.

2. The Fundamental Equilibrium Exchange Rate (FEER)

This paper follows the methodology outlined by Clark et al. (1994) and used by, *inter alia*, Chandler and Laidler (1995) in studying the equilibrium exchange rate for Canada. The three steps in calculating the FEER are sketched below.

The first step is to calculate the underlying current account, CA_u . This is done by adjusting the actual current account, CA_a , for foreign and domestic output gaps and the effects of changes in lagged real exchange rates, i.e.

$$\frac{CA_u}{Y} = \frac{CA_a}{Y} + \alpha_x \frac{X}{Y} YGAP^f - \alpha_m \frac{M}{Y} YGAP - \left[\beta_x \frac{X}{Y} + (\beta_m - 1) \frac{M}{Y} \right] * (R - RLAG) \quad (1)$$

where

$$RLAG = \frac{\theta_0 R + \theta_1 R_{-1} + \theta_2 R_{-2}}{\theta_0 + \theta_1 + \theta_2}; \theta_0 + \theta_1 + \theta_2 = 1.$$

α_x and α_m denote the elasticities of real exports and real imports with respect to foreign and domestic income; β_x and β_m denote the elasticities of real exports and real imports with respect to their relative prices; X , M , and Y denote nominal exports, imports and output; $YGAP^f$ denotes the export-weighted foreign output gap and $YGAP$ denotes the domestic output gap (both measured in differences from potential in logarithms, where a positive gap indicates output below potential); R denotes the logarithm of the real exchange rate (in this methodology, the multilateral real effective exchange rate); and $RLAG$ is a weighted average of current and past exchange rates.

Once the underlying current account has been calculated, the second step is to specify the equilibrium or desired current account, CA_e . For example, CA_e could be the current account consistent with a desirable ratio of net foreign assets to GDP, or the current account consistent with a particular model of saving and investment.

The third and last step is to consider the adjustment of the underlying current account to the equilibrium current account. This implies that the real exchange rate adjusts to its equilibrium value, R_e : 1/

$$\frac{CA_u}{Y} - \frac{CA_e}{Y} = [\beta_x \frac{X}{Y} + (\beta_m - 1) \frac{M}{Y}] (R_e - R),$$

or

$$R_e - R = \frac{\frac{CA_u}{Y} - \frac{CA_e}{Y}}{[\beta_x \frac{X}{Y} + (\beta_m - 1) \frac{M}{Y}]} \quad (2)$$

$(R_e - R)$ is the estimated degree of misalignment, which is the focus of this study.

3. The FEER as a statistical estimate

It is obvious that the estimated degree of misalignment is a function of unknown quantities, in particular of trade elasticities and the equilibrium current account. In practice, the equilibrium current account is replaced by an estimate based on judgement, and trade elasticities are replaced by statistical estimates. Thus the FEER is also a statistical estimate, and like other statistical estimates has a sampling distribution. If known, that sampling distribution could be used for formal hypothesis testing. For example, it could be used to construct a test that the estimated degree of misalignment is not significantly different from zero.

A closed-form distribution for the FEER that could be applied in a sample of any size would be ideal. At best, however, one might be able to derive an analytic approximation to the distribution of the FEER that is accurate in large samples. For example, given that the elasticities are normally distributed in large samples, the FEER estimate of misalignment will be normally distributed in large samples as well. 2/ However, it is hard to say when a sample is large enough for the approximation to be a good one. For the data used in this paper, some tests (not shown) imply that the approximation is poor--that the estimated FEER is not normally distributed. 3/

1/ For the sake of simplicity, this expression, like the previous one, is a comparative statics definition that ignores hysteresis effects (see Bayoumi et al. (1994)).

2/ This follows from the so-called 'delta method' of approximation. See Serfling (1980).

3/ Normality tests (see Epps and Pulley (1983)) rejected the null of normality at the one percent level for the simulated values of the FEERs presented later. Test results are available on request.

Since an analytic approximation to the distribution of the FEER is likely to be poor, the simulations proceeded by a different route, namely, by simulating repeated samples. That is, elasticities were drawn at random from specified distributions, and then used to calculate the FEER, just as would be done in an actual random sample. This process was repeated 10,000 times, generating elasticities at random 10,000 times and calculating 10,000 FEERs, under various assumptions about the equilibrium current account and other aspects of the model. The 10,000 FEER estimates for each case then yielded a picture of the sampling distribution of the FEER. More details on how this was done are in the following section.

4. Simulating the sampling distribution of the FEER

Calculating the FEER misalignment estimate required trade elasticities, a value for the equilibrium current account, and miscellaneous data such as imports, exports, and GDP. The source for each of these is described in turn.

Elasticities were generated at random by two methods. In the first method, the elasticities reflected the range of estimates typically encountered in the literature. Elasticities were drawn at random from uniform distributions, where the minimum and maximum of each distribution were fixed at the minimum and maximum elasticities for Canada shown in the survey of empirical trade models by Goldstein and Khan (1985). These ranges are shown in the tabulation below. The estimated elasticities from the recent study of the FEER for Canada by Chandler and Laidler (1995) fall in these ranges.

Ranges for Trade Elasticities 1/

	Parameter			
	Export Income Elasticity α_x	Export Price Elasticity β_x	Import Income Elasticity α_m	Import Price Elasticity β_m
Minimum	0.69	-1.10	0.90	-2.50
Maximum	1.97	-0.23	1.87	-0.20

As a second method, a bootstrap methodology was used: elasticities were drawn at random from an empirically-determined distribution of

1/ See Goldstein and Khan (1985), Tables 4.1 and 4.3.

estimates. 1/ This empirical distribution was created by simulating how trade elasticities would vary as they were re-estimated in repeated samples. The resulting FEER estimates reflect the sampling variability in estimated elasticities.

Three values of the equilibrium current account were specified: a surplus of one percent of GDP, balance (no deficit or surplus), and a deficit of one percent of GDP. The trade balance for 1994 that stabilizes the ratio of net international liabilities to GDP is estimated at about 1.5 percent of GDP. 2/ Hence, a range of (-1, +1) for the desired current account seems reasonable, and includes levels of the current account that would put external debt on a declining path as a percentage of GDP, which is one of the objectives of the Canadian authorities. 3/

Exports, imports, GDP, the current account, and the domestic output gap (all for 1995) were taken from the World Economic Outlook database. 4/ Estimates made by the Research Department were used for the foreign output gap and the weights on lagged exchange rates (θ_0 , θ_1 , and θ_2).

The simulations account for variability in elasticities and judgement about the equilibrium current account. However, no attempt was made to account for uncertainty in the measure of the output gap, nor for likely developments in fiscal policy or demographics. As such, the estimates presented below understate the uncertainty in FEER estimates.

5. Results

This section presents the results of the simulations. Four sets of simulations are presented below. The first set of simulations proceeded as described above. The second set of simulations imposed the Marshall-Lerner condition on the simulated elasticities. The third set of simulations added randomness in the equilibrium current account, and the final set of simulations examined the sampling distribution in the underlying current account.

1/ The Appendix briefly discusses the bootstrap methodology and explains its application to the problem at hand. See Davidson and MacKinnon (1993), Chapter 21, for a more detailed discussion of bootstrapping and simulation in econometrics.

2/ See Sheila MacDonald (1995).

3/ See The Economic and Fiscal Update, Department of Finance, Canada, December 6, 1995.

4/ Complete data for 1995 did not become available until after the simulations were performed, so some of the data employed were based on staff estimates. Some of the experiments were later repeated with complete data for 1995, and the results were qualitatively the same as the ones shown here--the FEER estimates showed a wide range of uncertainty.

a. The sampling distribution of the FEER

Chart IV-1 displays the simulated joint distribution of the estimated degree of misalignment ($R_e - R$) and the estimated underlying current account (CA_u), while Table IV-1 shows some statistics on the distribution of ($R_e - R$). 1/ Each simulation shows an overvalued real effective exchange rate on average. The median is higher than the mean in every case, implying positive skewness, and thus measuring significance in the usual way (a point estimate two standard deviations from zero) may not yield accurate inferences. Another measure of uncertainty, one that does not rely on the symmetry of the underlying distribution, is the percentile range. For example, the range between the 95th and 5th percentiles can be thought of as a 90 percent confidence interval for the estimate.

The bounds of the 90 percent confidence intervals (denoted by q_{05} and q_{95}) are shown in the last two columns of Table IV-1. The confidence intervals imply that even when using the uniform distribution for elasticities (cases A-C), the uncertainty in the estimated degree of misalignment is not negligible. When using the empirical distribution for elasticities (cases D-F), it is quite large indeed. For the case with an equilibrium current account deficit of 1 percent of GDP, with 90 percent confidence, the degree of required depreciation is between 18 percent and about 1 percent (using uniform elasticities) or between 67 percent and -45 percent (using empirically-distributed elasticities). 2/ In either case, discerning the degree of misalignment is difficult.

b. Sampling distribution of the FEER under the Marshall-Lerner condition

The experiments described in the previous section did not impose the Marshall-Lerner condition that a real appreciation worsens the current account. Although nothing in theory guarantees that the condition must hold, it is sufficiently well-entrenched as a stylized fact of empirical trade models that it is worthwhile to consider its implications. Hence, the experiments above were repeated, but using combinations of β_x and β_m for which $\beta_x + \beta_m$ was greater than unity.

1/ In some random draws, the denominator of the expression for the FEER (equation (2)) was very small. The subsequent large outliers in the results unduly influenced the descriptive statistics. To remedy this problem, 2.5 percent of the distribution of the FEER was trimmed from each tail (trimming the distributions of the elasticities did not reduce the number of outliers). This trimming means that the statistics will understate the true degree of imprecision in the FEER estimator, however.

2/ Since the Marshall-Lerner condition is not imposed at this stage, some of the random draws might imply that an appreciation is needed to reduce the current account deficit to its equilibrium level. The implications of imposing the Marshall-Lerner condition are explored in the next section.

Table IV-2 and Chart IV-2 display the results of the simulations with the Marshall-Lerner condition imposed (for ease of comparison with the previous experiments, the corresponding results for the unrestricted case are reproduced from Table IV-1). Imposing the Marshall-Lerner condition shifts the distribution of the estimated degree of misalignment to the left, as evidenced by the smaller (more negative) means and medians for the distributions. This is not surprising, as the Marshall-Lerner condition means that only depreciation (not appreciation) can close the gap between the underlying and equilibrium current accounts. Accordingly, the confidence intervals for the bootstrapped cases no longer bracket zero--indeed, unless the estimated underlying current account is quite volatile, they cannot bracket zero. Finally, while imposing the Marshall-Lerner condition makes the confidence intervals smaller, it does not make them small. The narrowest confidence interval brackets 20 percent overvaluation to about 2 percent overvaluation, while the widest confidence interval brackets 230 percent overvaluation to 17 percent overvaluation.

c. Sampling distribution of the FEER when CA_e is random

As noted, these experiments understate the true degree of uncertainty, by ignoring the uncertainty in estimates of output gaps, for example. There is also judgmental uncertainty about the desired current account. It would be useful to quantify this uncertainty by treating the desired current account as a random variable rather than a parameter. Hence, this uncertainty was simulated by drawing equilibrium current accounts at random from a uniform distribution with bounds equal to the maximum and minimum of the values used above (-1 and +1). The Marshall-Lerner condition is imposed for these simulations.

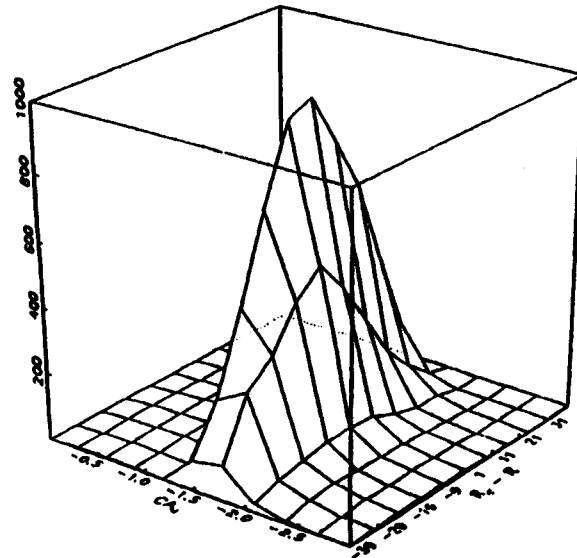
The simulations using a random equilibrium current account are presented in Table IV-3. Since the average equilibrium current account is zero in these simulations, they correspond to Cases B and E in Table IV-2 where the equilibrium current account is fixed at zero, and so are labeled Case B' and Case E' in the table. The means, medians and confidence intervals are scarcely affected by randomness in the equilibrium current account. The effect of uncertainty in the judgmental estimate of the equilibrium current account seems small relative to the effect of uncertainty in the elasticity estimates.

d. Sampling distribution of the underlying current account

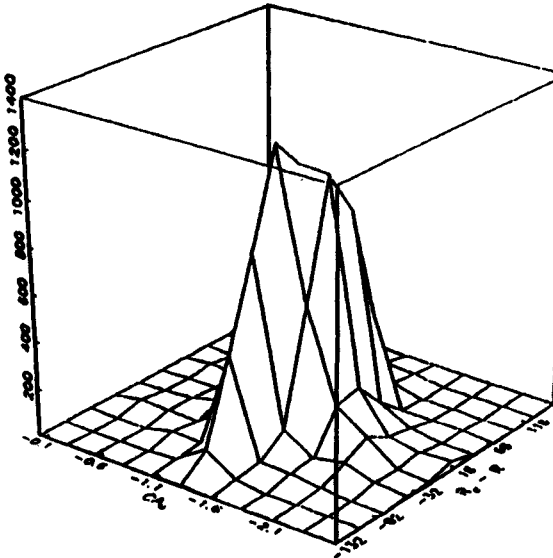
It is also useful to isolate the degree of uncertainty in the underlying current account. Table IV-4 presents descriptive statistics for the distribution of the underlying current account (since CA_e is not used in estimating the underlying current account, there are only two cases, one for each type of distribution for the elasticities). Without the Marshall-Lerner condition imposed, the 90 percent confidence interval for the estimated underlying current account is about (-2.9, -1.7) for the case with uniformly-distributed elasticities and about (-2.4, -1.9) for the case with bootstrapped elasticities, in both cases well on the deficit side. In each case, there is a significant distance between the estimated underlying

JOINT DISTRIBUTION OF ESTIMATED DEGREE OF MISALIGNMENT
AND ESTIMATED UNDERLYING CURRENT ACCOUNT

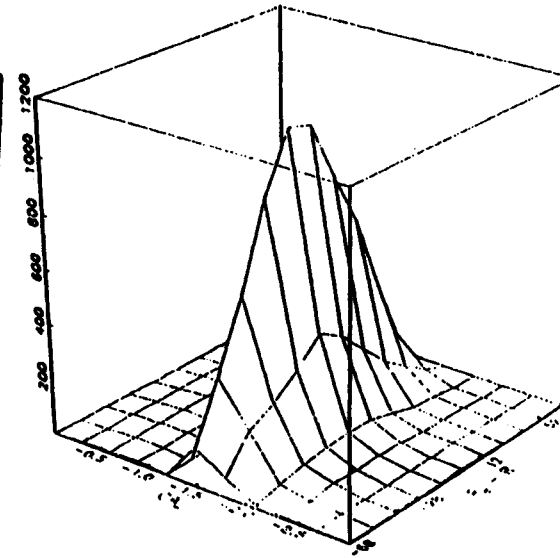
Elasticities from $U(a,b)$, $CA_0 = -1$



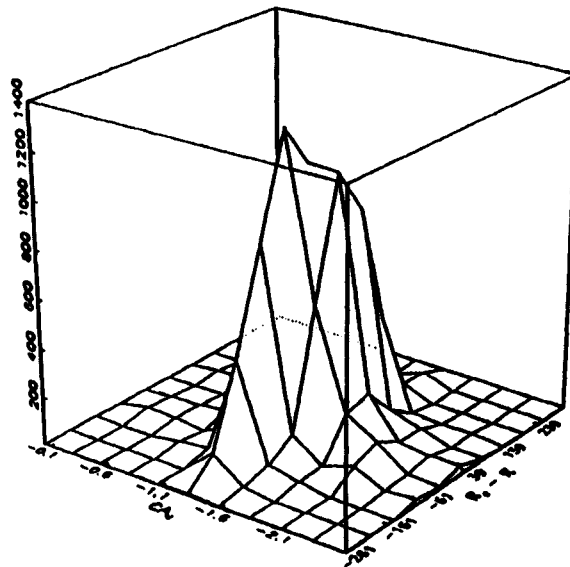
Bootstrapped Elasticities, $CA_0 = -1$



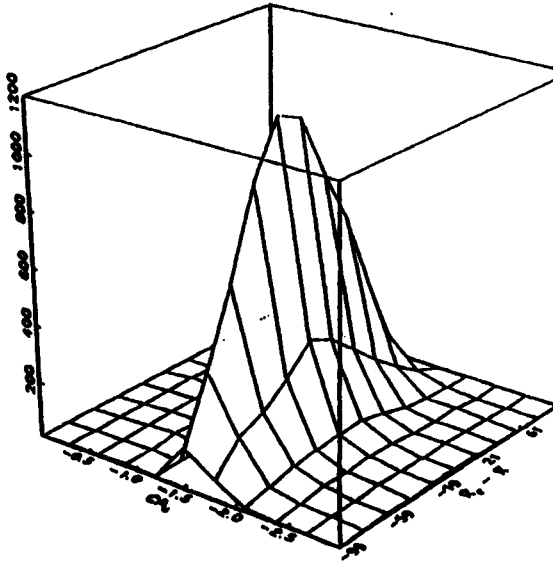
Elasticities from $U(a,b)$, $CA_0 = 0$



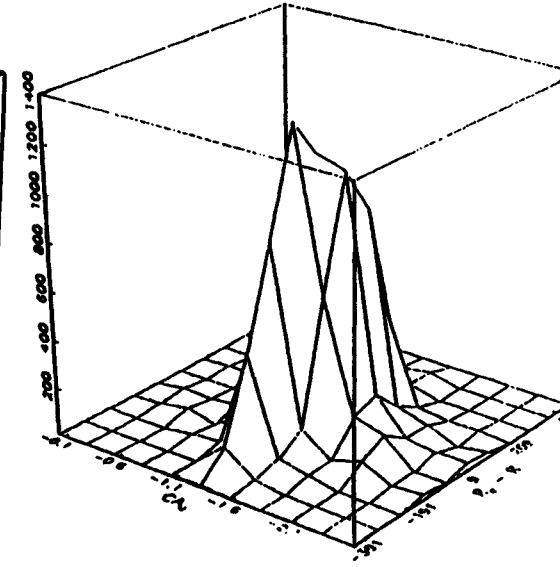
Bootstrapped Elasticities, $CA_0 = 0$



Elasticities from $U(a,b)$, $CA_0 = 1$



Bootstrapped Elasticities, $CA_0 = 1$



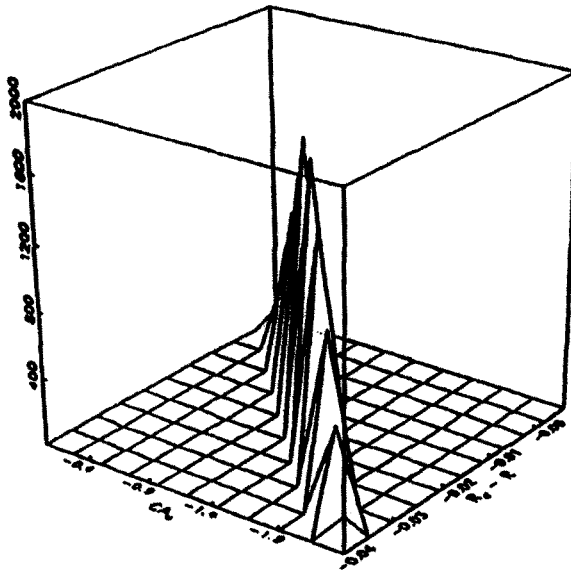
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CHART IV-2

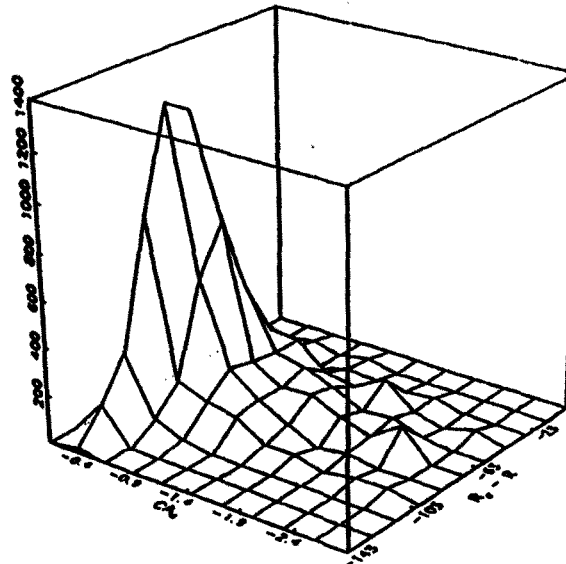
CANADA

JOINT DISTRIBUTION OF ESTIMATED DEGREE OF MISALIGNMENT AND ESTIMATED
UNDERLYING CURRENT ACCOUNT, WITH MARSHALL-LERNER CONDITION IMPOSED

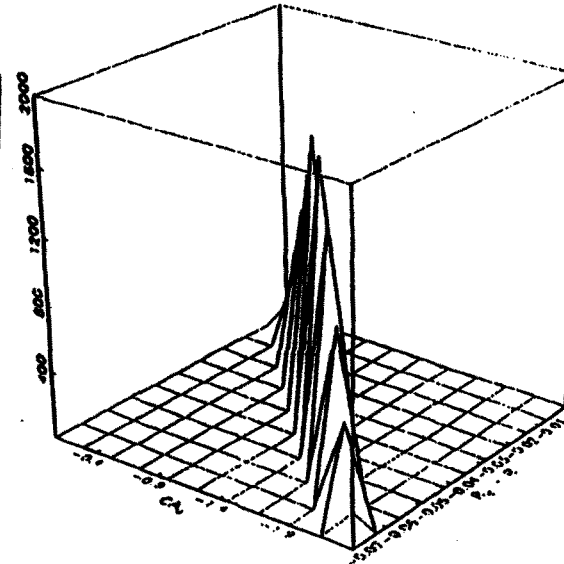
Elasticities from U(a,b), $CA_0 = -1$



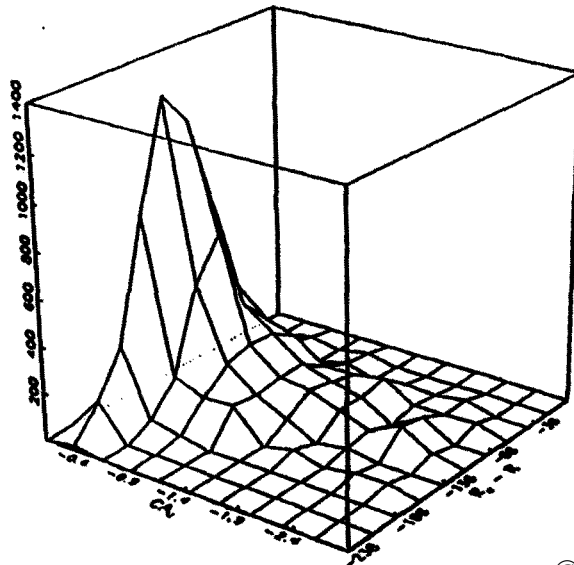
Bootstrapped Elasticities, $CA_0 = -1$



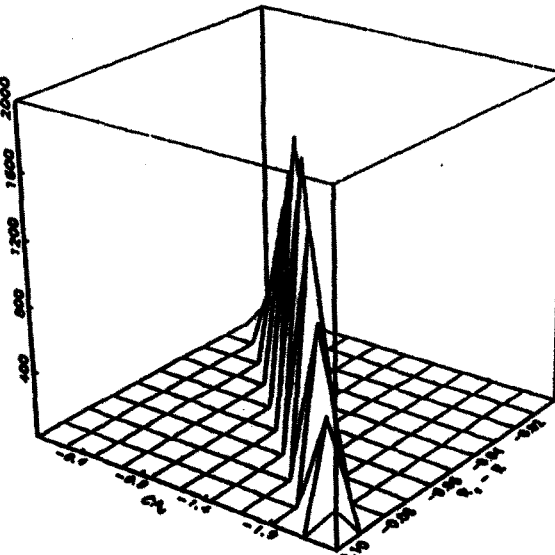
Elasticities from U(a,b), $CA_0 = 0$



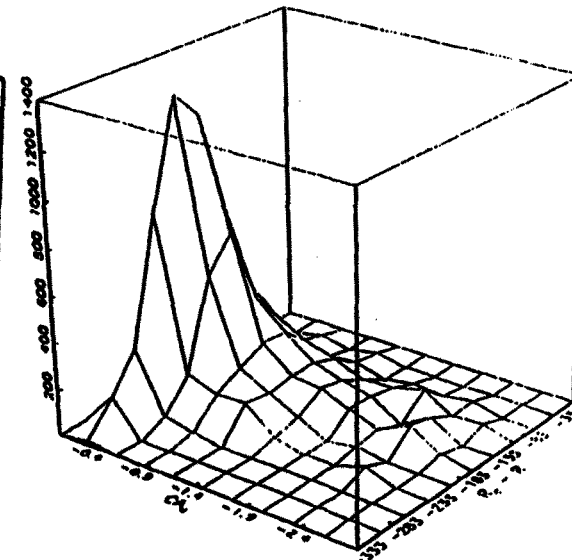
Bootstrapped Elasticities, $CA_0 = 0$



Elasticities from U(a,b), $CA_0 = 1$



Bootstrapped Elasticities, $CA_0 = 1$



current account and the equilibrium current accounts specified above; for example, a deficit of one percent of GDP lies above these confidence intervals. This means that the estimated misalignment is insignificant not because the estimated current-account adjustment is insignificant, but because the FEER's dependence on estimated elasticities makes it imprecise.

6. Conclusions

Since the FEER is a function of both sample data and judgement, the point estimate that emerges from the procedure should be treated with caution. The results described above suggest that the uncertainty about the point estimate is very large, even when the degree of implied adjustment in the current account is significant. Most of this uncertainty comes from the use of estimated trade elasticities. Accounting for judgmental uncertainty in the specification of the equilibrium current account only slightly magnifies the variability of the FEER estimates.

The variability in the FEER estimates for Canada is large enough that it is often impossible to tell whether the real exchange rate is overvalued or undervalued with any precision. As a result, the usefulness of misalignment indicators based on such trade models seems questionable. Even given the relative simplicity of the model relative to some others used to produce FEERs, large apparent misalignments can be small relative to sampling uncertainty.

Construction of Empirical Distribution for Trade Elasticities

In constructing a simulated distribution for the FEER, trade elasticities were "bootstrapped" or resampled from empirical distributions for $(\hat{\alpha}_X, \hat{\beta}_X)$ and $(\hat{\alpha}_M, \hat{\beta}_M)$. The bootstrap technique constructs an estimate of the distribution of some statistic of interest by repeatedly sampling subsets of the data--in effect, treating the sample as if it were the population. The estimated distribution can then be used to perform inference. Bootstrapping is valuable when little is known about the distribution of a statistic in small samples. ^{1/}

The first step in creating the empirical distribution for elasticities was to estimate representative elasticities. This required data on exports and imports at constant prices, the relative prices of imports and exports, and foreign and domestic income at constant prices. The relative price of exports was measured by the ratio of the Canadian export price deflator (converted to U.S. dollar terms) to export-weighted partner-country export prices in U.S. dollar terms. The relative price of imports was measured by the ratio of the import price deflator to the consumer price index. Domestic income was measured by real GDP, and foreign income was measured by an index of export-weighted partner-country real GDP. All data were quarterly, and the sample covered 1971:I to 1995:II.

Since the series showed evidence of unit-root nonstationarity and cointegration, the Stock and Watson (1993) estimator was used to estimate the elasticities. Starting with 8 leads and 8 lags in the short-run adjustment mechanism, insignificant short-run coefficients were trimmed to yield a parsimonious model that passed tests for autoregressive conditional heteroskedasticity, a structural break at mid-sample, and tests for autocorrelation, after a correction for first-order autoregressive (AR(1)) disturbances.

The rest of the procedure followed Li (1994). The sample of import elasticities was generated as follows (the export elasticities were generated in an analogous fashion). Denote by M the dependent variable (imports in constant-dollar terms), and denote by Z a vector containing the independent variables (the relative price of imports and domestic income at constant prices). ^{2/} Residuals (e_t), estimated coefficients (δ, π), and an estimated AR(1) coefficient ρ were calculated by estimating the model

^{1/} See Davidson and MacKinnon (1993), Chapter 21, for a discussion of bootstrapping and related topics.

^{2/} M and Z were expressed in logarithms.

$$M_t = \mu + \sum_{j=-p}^P \delta_j \Delta Z_{t+j} + \pi Z_t + e_t, \quad e_t = \rho e_{t-1} + u_t, \quad u_t \text{ i.i.d.} \quad (A1)$$

with $P > 0 > p$ (P leads and p lags). The series $s_t = \Delta Z_t$ was calculated as well.

Next, drawing at random with replacement from the estimated disturbances $(\hat{u}_t)_{t=1}^T$ and from the shocks $(s_t)_{t=1}^T$, synthetic series $e_t^* = \hat{\rho} e_{t-1}^* + \hat{u}_t$ and $Z_t^* = Z_{t-1}^* + s_t$ were constructed. These were used in turn to construct M_t^* by replacing (δ, π) with $(\hat{\delta}, \hat{\pi})$, e_t with e_t^* , and ρ with $\hat{\rho}$ in equation (A1). The parameters (δ, π) were then re-estimated from the synthetic data M^* and Z^* , yielding estimates (δ^*, π^*) from fitting

$$M_t^* = \mu^* + \sum_{j=-p}^P \delta_j^* \Delta Z_{t+j}^* + \pi^* Z_t^* + e_t^*,$$

again with an AR(1) correction. This process was repeated 1000 times for each equation, yielding 1000 simulated estimates of α_x , β_x , α_m , and β_m .

These estimates were sampled at random for each of the 10,000 trials where $R_e - R$ was calculated. The samples were drawn in matched pairs: that is, if the 100th estimated α_x and the 200th estimated α_m were chosen for a particular estimate of $R_e - R$, then the 100th estimated β_x and the 200th estimated β_m were chosen as well. This scheme preserved the dependence between α_x and β_x and the dependence between α_m and β_m . Chart IV-3 summarizes the results of the bootstrapping experiment, showing the distributions of the estimated import and export elasticities.

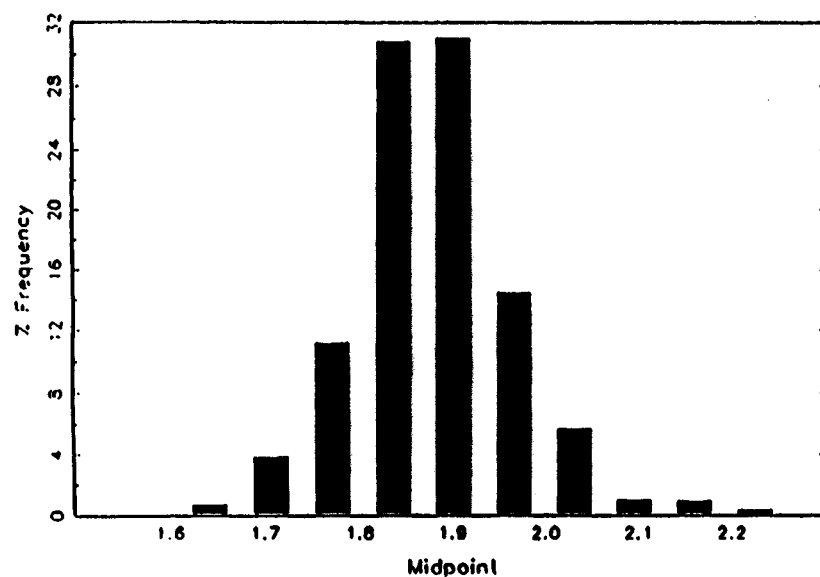
Table IV-1. Canada: Estimates of the Degree of Real Misalignment

	Mean	Median	90 Percent Confidence Interval
<u>Case A</u> Elasticities: Chosen from uniform distribution CA _e : Fixed at -1	-4.35	-3.17	(-17.35, -0.72)
<u>Case B</u> Elasticities: Chosen from uniform distribution CA _e : Fixed at 0	-7.73	-5.60	(-30.39, -2.00)
<u>Case C</u> Elasticities: Chosen from uniform distribution CA _e : Fixed at 1	-11.11	-8.02	(-43.76, -3.25)
<u>Case D</u> Elasticities: Bootstrapped from simulated values CA _e : Fixed at -1	-0.96	6.32	(-66.55, 45.23)
<u>Case E</u> Elasticities: Bootstrapped from simulated values CA _e : Fixed at 0	-2.32	11.76	(-130.70, 84.17)
<u>Case F</u> Elasticities: Bootstrapped from simulated values CA _e : Fixed at 1	-3.69	17.11	(-190.09, 127.89)

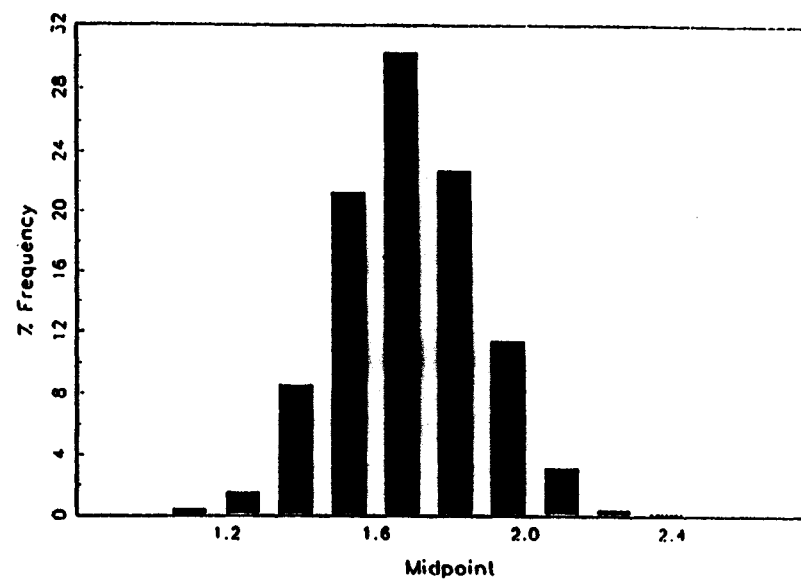
CANADA

DISTRIBUTION OF SIMULATED IMPORT AND EXPORT ELASTICITIES

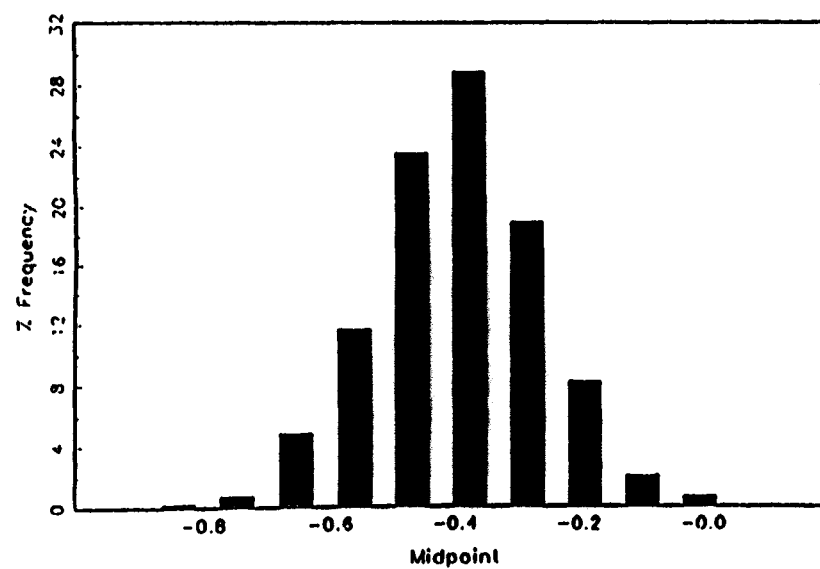
Distribution of estimated export income elasticities



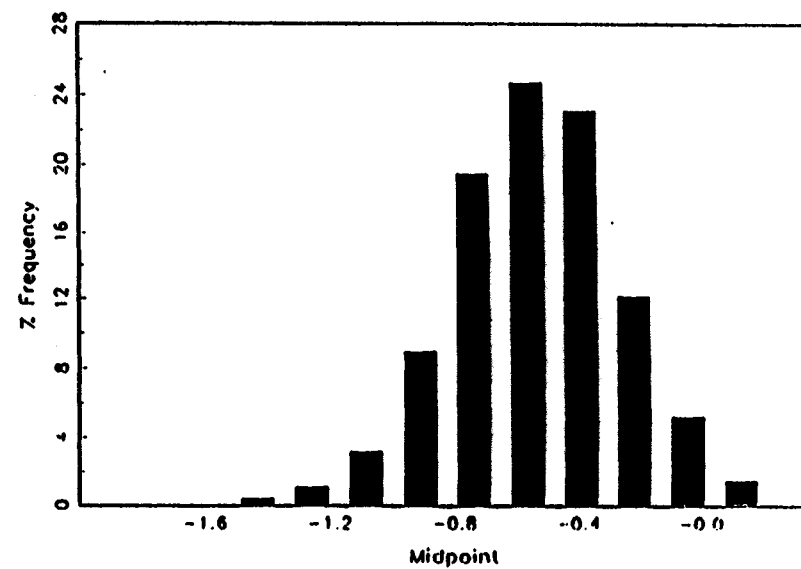
Distribution of estimated import income elasticities



Distribution of estimated export price elasticities



Distribution of estimated import price elasticities



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Table IV-2. Canada: Sensitivity of Estimates of the Degree of Real Misalignment to Imposition of the Marshall-Lerner Condition ^{1/}

	Mean	Median	90 Percent Confidence Interval
Case A			
Elasticities: Chosen from Uniform distribution			
CA _e : Fixed at -1			
Without Marshall-Lerner	-4.35	-3.17	(-17.35, -0.72)
With Marshall-Lerner	-6.39	-3.65	(-20.46, -1.73)
Case B			
Elasticities: Chosen from Uniform distribution			
CA _e : Fixed at 0			
Without Marshall-Lerner	-7.73	-5.60	(-30.39, -2.00)
With Marshall-Lerner	-11.54	-6.55	(-37.03, -3.33)
Case C			
Elasticities: Chosen from Uniform distribution			
CA _e : Fixed at 1			
Without Marshall-Lerner	-11.11	-8.02	(-43.76, -3.25)
With Marshall-Lerner	-16.68	-9.46	(-53.55, -4.86)
Case D			
Elasticities: Bootstrapped from simulated values			
CA _e : Fixed at -1			
Without Marshall-Lerner	-0.96	6.32	(-66.55, 45.23)
With Marshall-Lerner	-30.44	-19.88	(-89.31, -7.29)

^{1/} The corresponding cases from Table IV-1 are reproduced here for ease of comparison.

Table IV-2 (concluded). Canada: Sensitivity of Estimates of the Degree of Real Misalignment to Imposition of the Marshall-Lerner Condition ^{1/}

	Mean	Median	90 Percent Confidence Interval
Case E			
Elasticities: Bootstrapped from simulated values			
CA _e : Fixed at 0			
Without Marshall-Lerner	-2.32	11.76	(-130.70, 84.17)
With Marshall-Lerner	-51.83	-33.00	(-157.22, -12.20)
Case F			
Elasticities: Bootstrapped from simulated values			
CA _e : Fixed at 1			
Without Marshall-Lerner	-3.69	17.11	(-190.09, 127.89)
With Marshall-Lerner	-73.22	-46.79	(-228.09, -17.15)

^{1/} The corresponding cases from Table IV-1 are reproduced here for ease of comparison.

Table IV-3. Canada: Sensitivity of Estimates of the Degree of Real Misalignment to Uncertainty about Equilibrium Current Account ^{1/}

	Mean	Median	90 Percent Confidence Interval
<u>Case B</u> Elasticities: Chosen from uniform distribution CA _e : Fixed at 0	-11.54	-6.55	(-37.03, -3.33)
<u>Case B'</u> Elasticities: Chosen from uniform distribution CA _e : Chosen from uniform (-1,1) distribution	-11.71	-6.56	(-37.12, -2.69)
<u>Case E</u> Elasticities: Bootstrapped from simulated values CA _e : Fixed at 0	-51.83	-33.00	(-157.22, -12.20)
<u>Case E'</u> Elasticities: Bootstrapped from simulated values CA _e : Chosen from Uniform (-1,1) distribution	-51.72	-32.94	(-162.01, -10.66)

^{1/} For all cases, the Marshall-Lerner condition is imposed. The corresponding cases (B and E) from Table IV-2 are reproduced here for ease of comparison.

Table IV-4. Canada: Estimates of the Underlying Current Account

	Mean	Median	90 Percent Confidence Interval
Case A			
Elasticities: Chosen from uniform distribution			
Without Marshall-Lerner	-2.30	-2.31	(-2.90, -1.70)
With Marshall-Lerner	-2.24	-2.24	(-2.57, -1.92)
Case B			
Elasticities: Bootstrapped from simulated values			
Without Marshall-Lerner	-2.10	-2.09	(-2.36, -1.85)
With Marshall-Lerner	-2.46	-2.47	(-2.69, -2.25)

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V. Recent Trends in Personal Saving in Canada ^{1/}

1. Introduction

The personal saving rate in Canada rose from about 13 percent in the late 1960s to 24 percent in 1982, before falling to about 14 percent in 1987. It remained at about this level until 1993, but dropped further to a low of 8 percent in 1995. These developments have raised concerns that an attempt by households to increase their saving rates to more normal levels would have an adverse effect on domestic demand in Canada. There also are concerns that if the decline in the household saving rate is permanent, it could contribute to a deficiency in domestic investment, reduce future living standards, and increase Canada's reliance on foreign saving.

This paper briefly reviews recent trends in the saving rate and examines the factors that may have contributed to the recent decline, including the possible effects of the reduction in inflation and demographic shifts. It concludes that the decline in the saving rate appears to be largely related to the transition to a low inflation environment since the early 1980s. When the saving rate is adjusted to take into account the depreciation of nominal assets that is due to inflation, the decline appears less pronounced. Section 2 discusses issues related to the measurement of the effects of inflation, Section 3 examines the statistical properties of the saving rate and its relationship with a number of other economic variables, and Section 4 offers concluding remarks.

2. Recent trends in the saving rate

Chart V-1 illustrates the sharp rise in the personal saving rate that occurred between 1970 and 1982. During this period, the personal saving rate rose from about 10 percent to about 22 percent of disposable income, before trending downward to about 14 percent during the period 1992-1987, in part because of the cyclical recovery. The saving rate remained at about this level for five years, but declined further during 1994 and 1995 to 8 percent.

A number of measurement issues are relevant for assessing these trends. ^{2/} In particular, the concept of household saving in the national accounts is intended to provide a measure of household accumulation of financial and nonfinancial assets. However, the national accounts data for the personal sector are estimated as a residual from the activities of the other sectors that are easier to measure. As a result, the data for the personal sector include measurement errors from elsewhere in the national accounts. Moreover, the personal sector includes the activities of the

^{1/} Prepared by Alun Thomas and Christopher Towe.

^{2/} For a more detailed discussion, see Dagenais (1989). These issues are reviewed for the case of the United States by the Congressional Budget Office (1993) and Bradford (1990).

unincorporated business sector, since this sector is not accounted for elsewhere in the national accounts. The unincorporated business sector encompasses private non-profit institutions, trustee pension plans, and the investment activities of life insurance companies. As a result, employers' contributions to pension plans and the investment income of life insurance companies and trustee pension plans are included in personal income. These flows increase the measured amount of saving, even though the household sector may not have discretion over these flows. 1/

An additional factor impinging on the usefulness of the conventional national accounts measure of saving is that it does not factor in the depreciation of physical assets owing to wear and tear. In addition, no account is taken of the erosion of the real value of financial assets as a result of inflation. Chart V-1 shows that depreciation of the personal sector's physical assets has been a significant component of the saving rate, but does not explain the decline since 1982. The net saving rate--i.e., personal saving net of depreciation--shows roughly the same decline because depreciation has been a relatively constant share of disposable income averaging about 5 percent since the mid-1960s.

However, the effect of inflation on the personal sector's financial assets has been considerably more volatile. In particular, Chart V-1 also shows an estimate of the inflationary bias of the conventional measure of the saving rate. 2/ As can be seen, the inflationary component of personal saving rose sharply up to the late 1970s and fell significantly thereafter, owing to the rise and subsequent decline in inflation. This suggests that a significant portion of the rise in the saving rate to 1982, and much of its subsequent decline, was related to a similar rise and fall in the inflation rate.

The inflation-adjusted measure of saving still has a number of drawbacks. For example, the national accounts do not include the capital gains on physical and financial assets as income and therefore may underestimate saving. 3/ A particular example would be the case of financial assets whose price could be affected by changes in nominal interest rates and inflation. The measure in question also treats the full amount of purchases of consumer durables as consumption in the year that they were purchased, thereby understating saving.

1/ Clift (1988) suggests, however, that these flows are relatively small and do not affect overall personal saving trends.

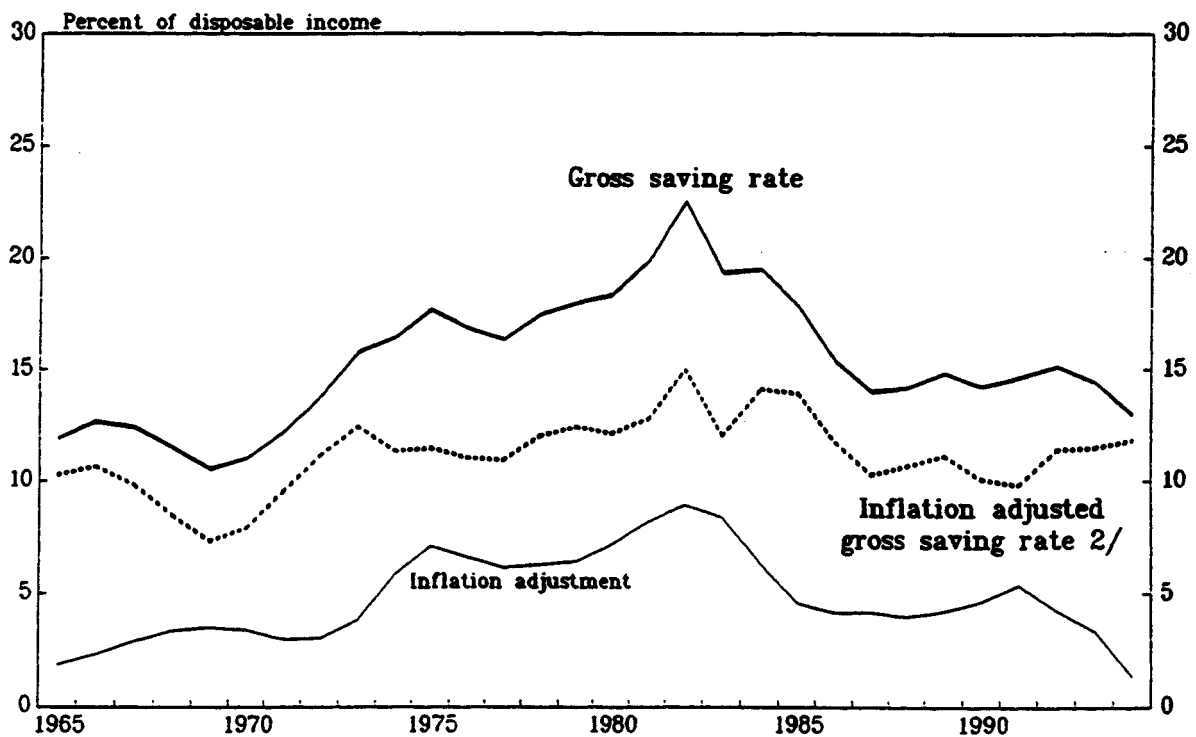
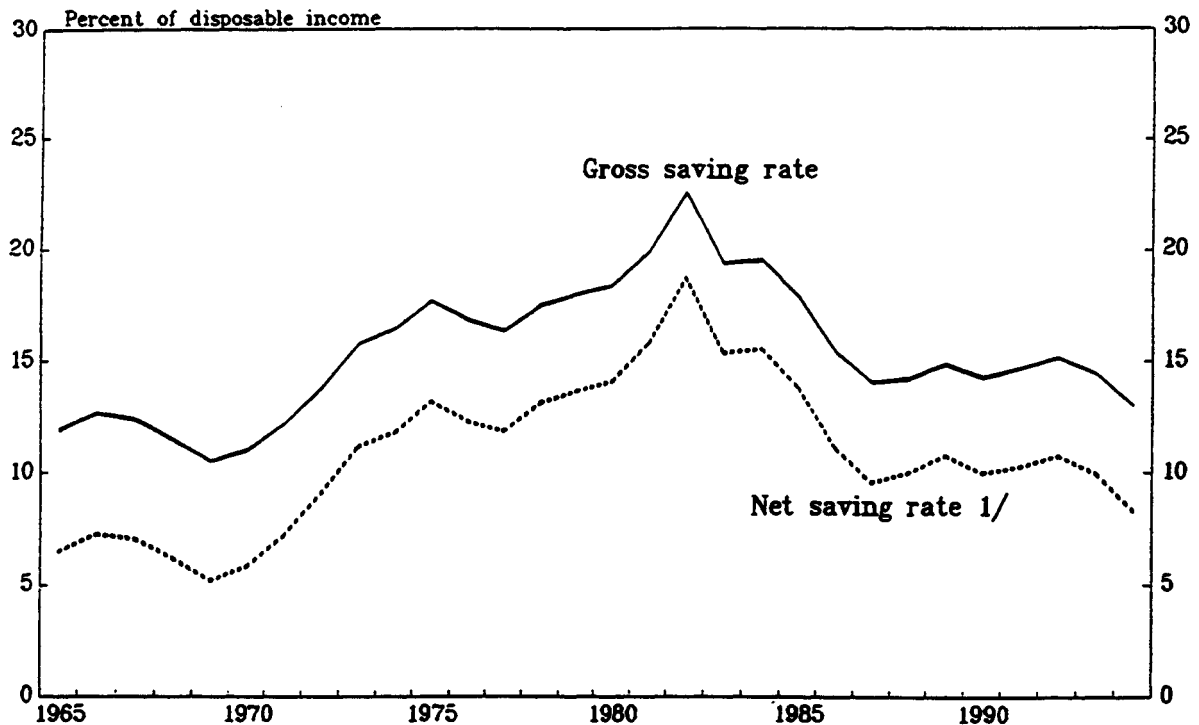
2/ The inflation adjustment is calculated by adjusting saving and disposable income by the product of a moving-average of inflation and net financial assets (excluding stocks and foreign assets). For a further discussion of this type of adjustment in the case of Canada see Lau (1993).

3/ A number of authors have noted that national accounts measures of saving also are understated because personal consumption includes outlays for education, which could instead be considered an investment. This issue is beyond the scope of the present paper and is not addressed (for a detailed discussion see Macklem (1994)).

CANADA

NATIONAL ACCOUNTS MEASURES OF PERSONAL SAVING RATES

(In percent of disposable income)



Sources: Statistics Canada (supplied by DRI); and Fund staff estimates.

1/ As a share of disposable income less depreciation.

2/ As a share of disposable income less inflation adjustment. The inflation adjustment is equal to a three-year moving average of CPI inflation times net financial assets less stocks and foreign investments.

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An alternate measure of saving that addresses these problems (and also accounts for depreciation) can be derived from data on the personal sector's balance sheet by defining saving as the change in households' real net worth. Chart V-2 shows this measure of saving as a share of disposable income and does not indicate any downward trend in the saving rate over time. The factors underlying the shifts in saving behavior are examined in greater detail in the next section.

3. Factors affecting the saving rate

A number of recent studies have focused on explaining movements in household consumption behavior in Canada rather than saving. 1/ Macklem (1994) finds a long-run or cointegrating relationship between real per capita consumer expenditures, disposable income, and total wealth, and concludes that changes in the unemployment rate and changes in the consumer price deflator help explain short-term movements in real consumption. Lamy (1995) supplements Macklem's analysis by adding a long-term interest rate and the dependency ratio to the cointegrating vector and finds that the yield curve, the unemployment gap, and indirect taxes provide additional explanatory power for short-run movements in consumer expenditures (net of rent) in Canada.

Chart V-3 illustrates the correlation between a number of variables described above and the saving rate as measured by the national accounts. This chart suggests that the relationship between this measure of the saving rate and the real short-term interest rate (the nominal rate less the CPI inflation rate) is relatively weak. Similarly, the saving rate does not appear to be strongly correlated with a measure of demographic trends (the share of the population aged 45 to 65), real disposable income growth, and the net household worth as a share of disposable income. However, the saving rate, defined from the household balance sheet, appears to bear a negative contemporaneous relationship with real interest rates and to be positively correlated with the growth of disposable income (Chart V-4). This possibility is explored further below.

1/ Carroll and Summers (1987) compared private saving rates in Canada and the United States and explain 80 percent of the variation as a result of differences in income growth, wealth-GDP ratios and government saving. They also concluded that tax incentives had an important effect on differences between saving rates. Bovenberg and Evans (1993) find that movements in real per capita consumer expenditures in the United States are well explained by movements in personal disposable income and net wealth. Ostry and Levy (1995) examine the behavior of saving in France and find that income growth, inflation, demographics, and interest rates have the expected effect. Bayoumi (1993) examines household saving and the effect of financial market deregulation in the United Kingdom.

a. Data issues

As Macklem (1994) notes, research into household saving/consumption behavior has tended in recent years to focus on searching for long-run relationships between saving (or consumption) and selected macroeconomic variables. In large part, this reflects the fact that the data in question have been found to be nonstationary--i.e., do not show signs of mean reversion. This means that conventional statistical methods cannot be used to test the relationship between short-run movements in the level of saving and the level of other (nonstationary) macroeconomic variables. It also admits the possibility that the level of saving may be related in the long-run to the level of variables such as income, interest rates, etc. while its short-run movements are driven by, among other things, deviations from this long-run relationship.

As a preliminary to a multivariate analysis of the saving rate, the time series properties of the data are examined. Table V-1 illustrates a series of tests on various measures of the saving rate, as well as on other variables often thought to influence saving behavior. The tests confirm that most of the variables considered are nonstationary. Notably, the national accounts measure of the saving rate was nonstationary, even when measured in real terms on a per capita basis. However, the various balance sheet measures of saving did not exhibit the same property. In particular, the change in net wealth expressed either as a share of disposable income or on a real per capita basis appeared to be stationary.

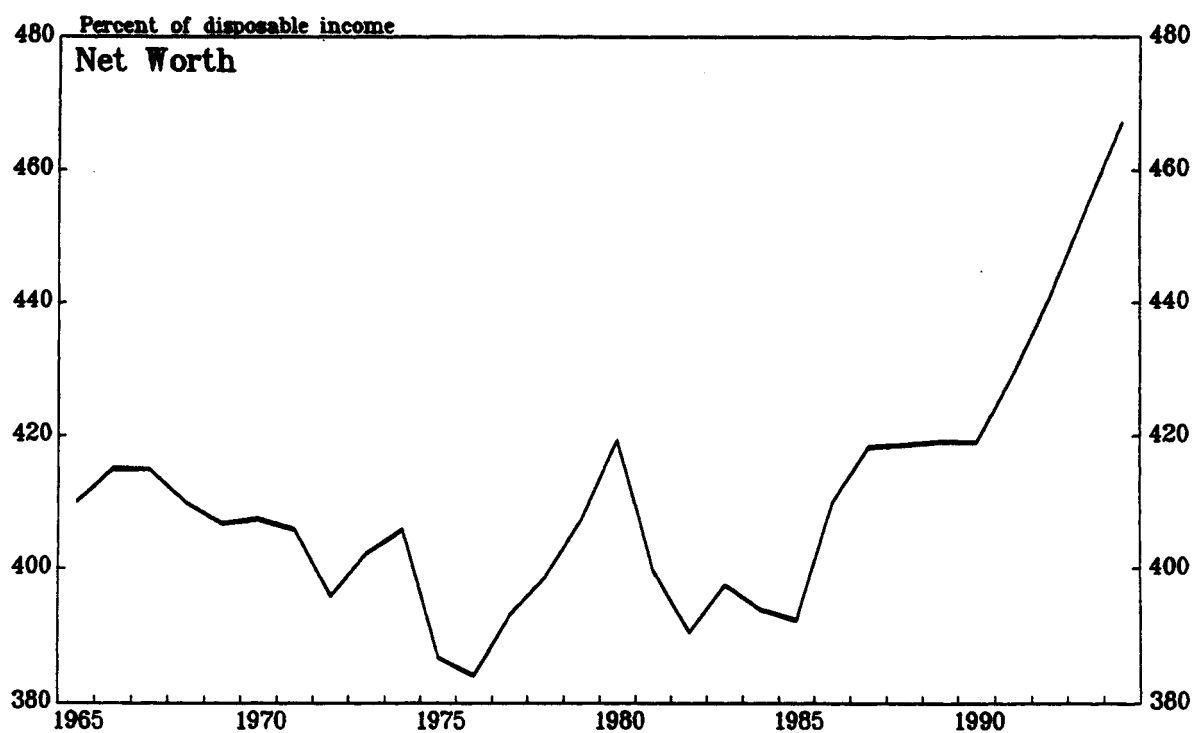
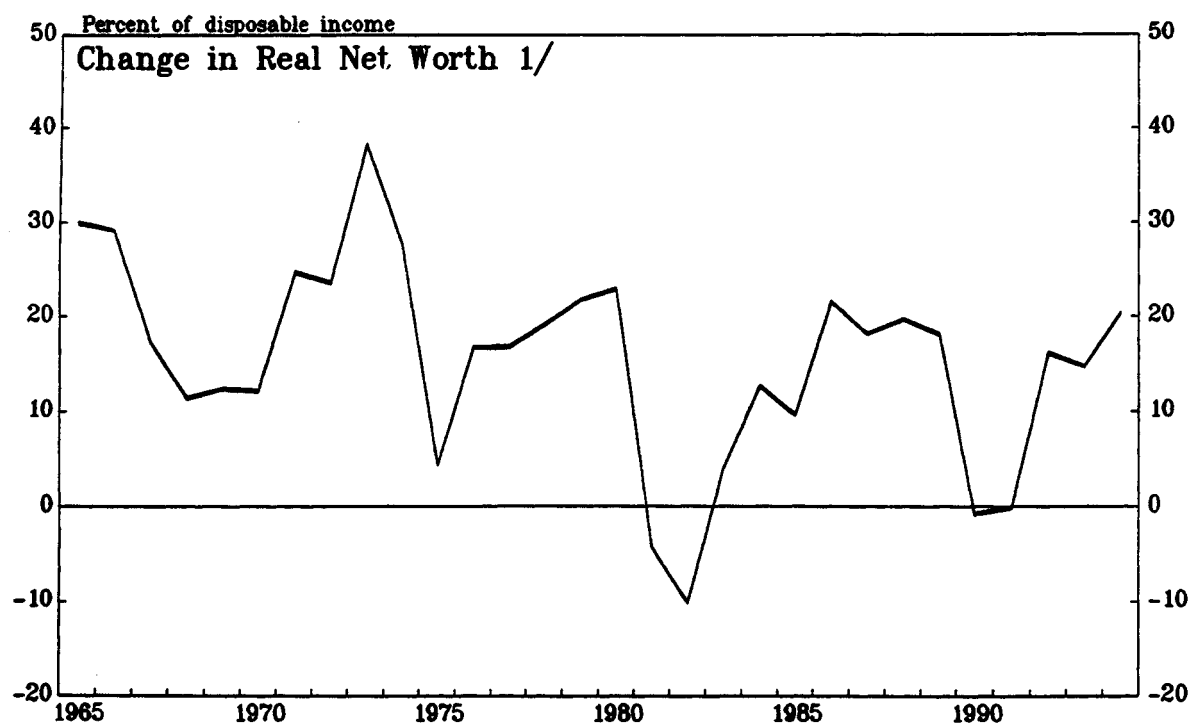
The stationarity of the saving rate as measured by the change in household net wealth suggest that this measure of the saving rate does not have to be examined in the context of a cointegrated or long-run relationship. Instead, the behavior of the saving rate and the possibility that it has experienced a structural break can be examined within the framework of a standard partial-adjustment model.

b. Multivariate analysis

The factors that have affected the short-run evolution of the saving rate--defined on the basis of the household balance sheet--are examined in this section. The discussion above suggests that household saving is likely to be related to the evolution of income, real interest rates, and demographic variables. In particular, the permanent income hypothesis suggests that households tend to save and consume constant fractions of their permanent income, and that fluctuations in the saving rate would therefore result mainly from transitory fluctuations in income.

Consumer theory suggests that the effect of changes in interest rates on the level of saving is ambiguous. An increase in interest rates raises the return on saving, thereby encouraging a substitution away from consumption, but also increases the return on current saving thereby reducing the need to forego current consumption to finance future consumption. As regards demographic variables, life cycle models of saving suggest that as the share of the population aged 25 to 65 increases, saving

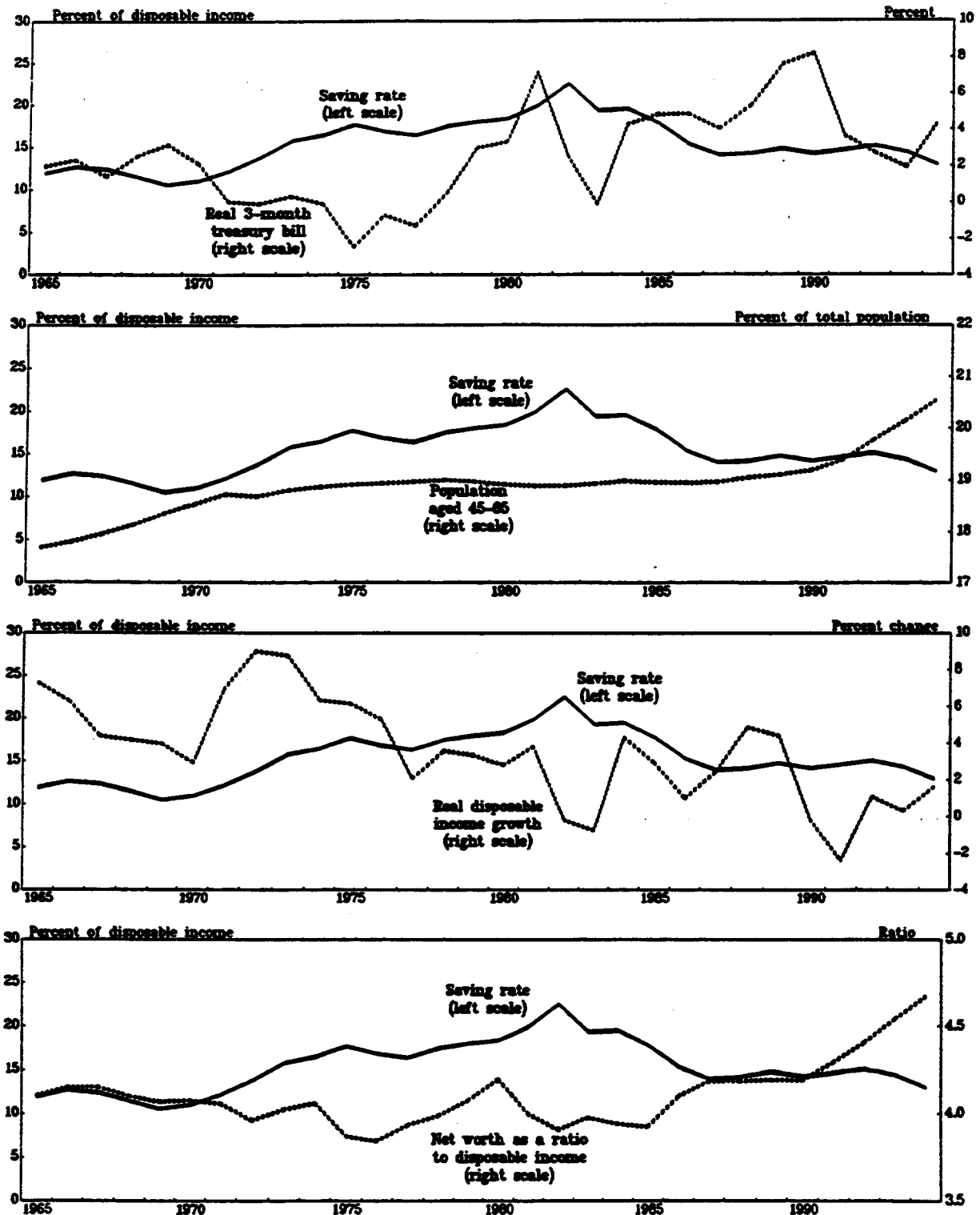
BALANCE SHEET MEASURES OF PERSONAL SAVING RATE



Sources: Statistics Canada (supplied by DRI); and Fund staff estimates.

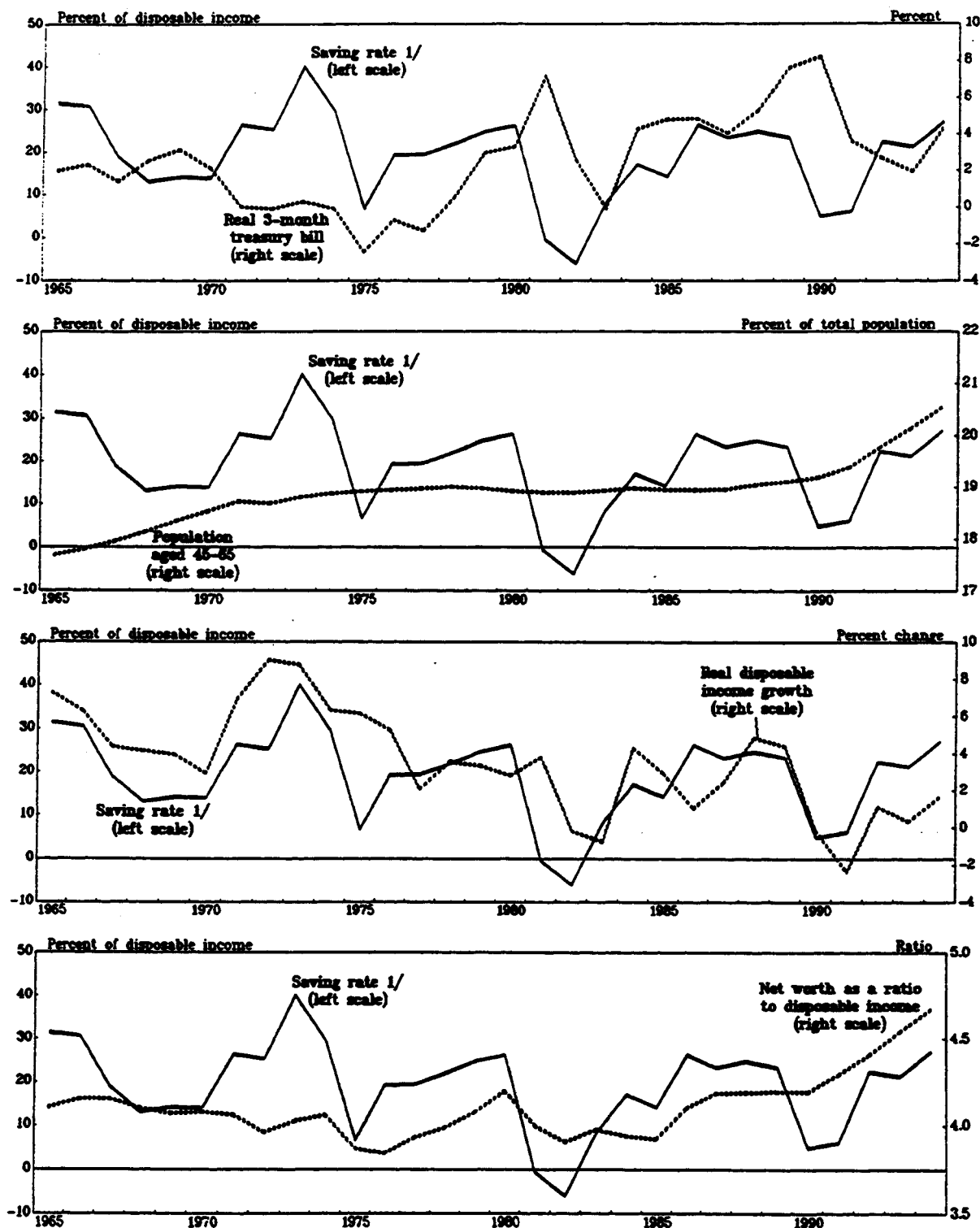
1/ Real disposable income.

DETERMINANTS OF THE NATIONAL ACCOUNTS MEASURE OF THE SAVING RATE



Sources: Statistics Canada (supplied by DRI); and Fund staff estimates.

DETERMINANTS OF THE BALANCE SHEET MEASURE OF THE SAVING RATE



Sources: Statistics Canada (supplied by DRI); and Fund staff estimates.

1/ Measured as the change in real net worth as a percent of real disposable income.

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tends to increase because this age cohort saves in order to provide for retirement.

In order to test these hypotheses and to examine the possibility of a structural break in saving behavior, an equation was estimated relating the change in real household net worth as a share of real disposable income ($\Delta W/Y$) to the real short-term interest rate (r^{tb}) and the percentage change in real per capita disposable income ($\% \Delta Y$). ^{1/} In addition, the possible effect of demographic variables on saving behavior was considered by including variables measuring the share of the population aged 25 to 45 and the share of the population aged 45 to 65. Lagged values of the dependent variable also were included on the assumption that households adjust their portfolios gradually to shocks, either because of uncertainties regarding their permanence or because of adjustment costs.

The results for the period 1966Q4-1995Q3 are summarized below. ^{2/}

$$\Delta W/Y = 1.641 + 0.533 \Delta W_{-1}/Y_{-1} - 0.127 r^{tb}_{-1} + 0.384 \% \Delta Y$$

(4.07) (7.22) (2.02) (2.91)

$$R^2 = 0.47$$

$$ARCH(3) = 0.57$$

$$RESET(2) = 0.87$$

$$LM(4) = 3.83$$

$$White(6) = 4.79$$

$$Chow(82:3) = 9.98$$

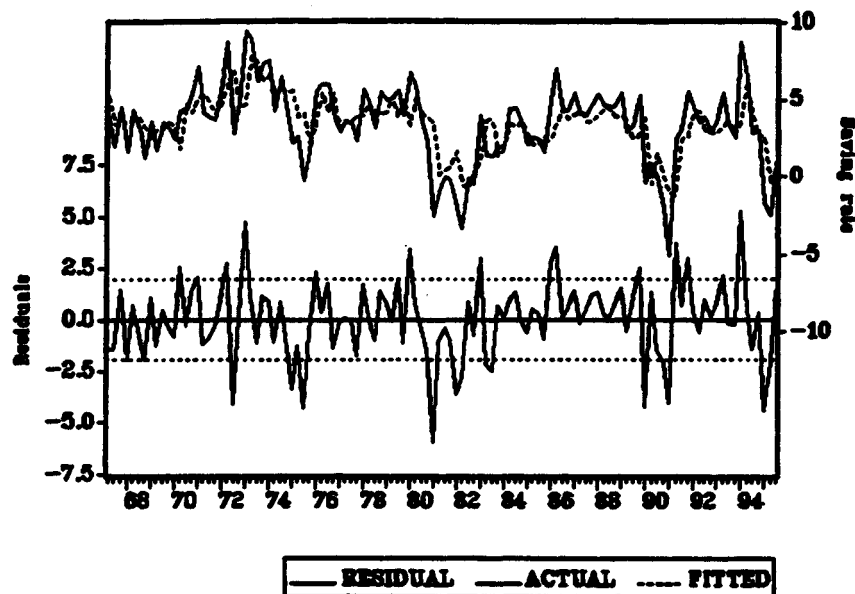
The fit of the estimated equation was relatively low, partly reflecting the definition of the dependent variable, which included the effects of changes in asset prices. Tests on the residuals of the equation rejected the hypothesis of autocorrelation and heteroskedasticity. The Ramsey RESET test also rejected the possibility of more general

^{1/} Ostry and Levy also use the growth of income as a determinant of the saving rate. In this case, the $\% \Delta Y$ variable could be considered a proxy for transitory income, which avoids the need for a more complicated trend/cycle decomposition. Note that r^{tb} is included as a regressor, despite showing signs of nonstationarity, on the assumption that over the long run its variance is bounded. Moreover, Macklem (1994) assumes that the real interest rate is stationary even though the ADF test does not reject the null hypothesis of a unit root.

^{2/} Absolute values of t-statistics are shown in parentheses. The LM(4) statistic tests for fourth-order autocorrelation and is asymptotically distributed $\chi^2(3)$; the ARCH(4) statistic tests for autoregressive conditional heteroskedasticity and is asymptotically distributed $\chi^2(4)$; the White statistic tests for heteroskedasticity and is distributed $\chi^2(8)$; the Chow statistic tests for a structural break at 1982Q3 and is distributed F(4, 108); and the RESET statistic tests for model mis-specification and is distributed $\chi^2(3)$.

mis-specification errors. 1/ Demographic variables were not found to be significant determinants of the saving rate.

Saving Rate Regression



The results confirm a strong and positive relationship between household asset accumulation and the change in real per capita disposable income. Moreover, the significance of the estimated coefficient seems consistent with the effects of income found in other studies of saving and consumption behavior. 2/ The results also suggest a relatively large negative effect of the real interest rate on the saving rate--a one percentage point increase in the real short-term rate would reduce the saving rate by 0.13 percentage point. The long-run coefficient of r^{tb} is 0.27, and a Wald test rejected the hypothesis that it equaled zero at the

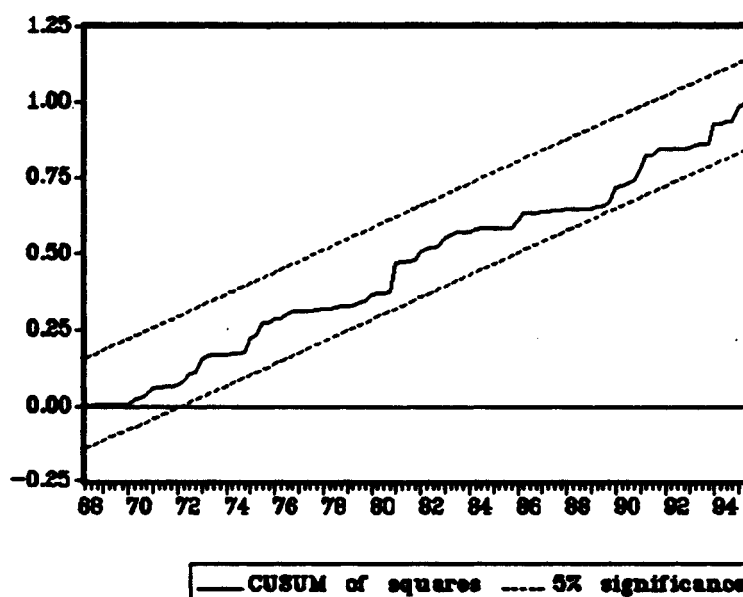
1/ In particular, the result of this test relieves concern about the possibility of simultaneity between saving and disposable income.

2/ For example, Macklem finds that the coefficient on income is 0.74 in Canada and Bovenberg and Evans (1992) find an income coefficient of 0.82 for the United States. The long-run coefficient on ΔY was 0.82 and significantly different from zero at the 95 percent confidence level. However, the interpretation of this coefficient is problematic since ΔY reverts to trend, and is assumed to proxy temporary deviations of Y from potential.

95 percent confidence level. ^{1/} Other specifications were examined but did not appreciably change this result. For example, the long-term interest rate was not found to be a significant determinant of the saving rate, and the estimated coefficient was not affected by including the interest rate in nominal terms.

The possibility that the saving rate as defined above was subject to the same structural break exhibited by the national accounts measure is examined by performing a Chow test, with a break at 1982Q3. The hypothesis of a structural break is not rejected at the 5 percent confidence level. However, when the equation was estimated separately over post- and pre-1982Q3 periods, the coefficients did not differ appreciably. Moreover, examination of the recursive residuals showed no significant evidence of a structural break. However, when the equation was re-estimated with a zero-one dummy variable with a break at 1982Q3, the coefficient estimate for the dummy was positive and significantly different zero at the 95 percent confidence level, suggesting an upward shift in the saving rate.

Cumulative Sum of Squared Residuals



The fact that the estimated coefficient on the interest rate was negative was somewhat surprising--multi-country studies generally find a positive relationship between saving and the real rate of interest (for

^{1/} Lamy (1995) reports a positive coefficient, but this is with respect to the long-term interest rate.

example, see Ogaki, Ostry, and Reinhart (1995) or Masson, Bayoumi, and Samiei (1995)). However, the evidence in favor of a positive interest rate effect tends not to be robust; for example, Bosworth finds a positive interest rate effect on saving in his time series regressions, but a negative coefficient in his cross-country estimates.

In order to examine this issue further, the saving rate equation was re-estimated using as the dependent variable the national accounts measure of saving less the inflation adjustment described above. 1/

$$\text{sadj}/Y = 0.373 + 0.883 \text{sadj}_{-1}/Y_{-1} + 0.122 r^{tb}_{-1} + 0.672 \Delta Y$$

(0.85) (21.52) (4.50) (11.43)

$$\begin{array}{ll} R^2 = 0.84 & LM(4) = 11.35 \\ ARCH(3) = 0.50 & White(6) = 4.17 \\ RESET(2) = 0.54 & Chow(82:3) = 1.28 \end{array}$$

The results in this case were similar to those for the saving rate defined from the perspective of the household balance sheet except that the coefficient on the real interest was positive. 2/ One possible explanation for the difference in the interest sensitivity could be that the balance-sheet measure of saving treats purchases of consumer durables as saving rather than consumption.

For example, Ogaki and Reinhart (1995) suggest that estimates of the intertemporal elasticity of substitution have been biased downward because they ignored the effect of changes in interest rates on the demand for durables. In particular, they argue that an increase in interest rates will tend to cause a substitution toward saving, but will also increase the demand for consumer durables. An implication of their work is that the interest elasticity of a measure of saving that treats the purchase of durables as saving will tend to have a lower (and possibly negative) interest elasticity than the conventional measure of saving.

4. Concluding remarks

The purpose of the analysis was principally to examine the factors that led to the decline in the national accounts measure of the saving rate, and the results suggest a number of observations. First, while the national accounts measure of the saving rate has declined sharply since 1982, a large portion of the decline can be related to the reduction in inflation.

1/ The inflation-adjusted national accounts saving rate was found to be stationary (see Table V-1).

2/ A further difference was that in this case the hypothesis that the errors were autocorrelated could not be rejected, and the Chow test rejected the hypothesis of a structural break in 1982.

Adjusting the measures of household income and saving by the amount of capital losses resulting from inflation leads to a saving rate that is considerably more stable. A more comprehensive measure of the saving rate that accounts for the effect of inflation, depreciation, purchases of consumer durables, and changes in asset prices--the change in real household net worth as a share of disposable income--also shows little evidence of a decline after 1982.

Second, the fact that conventionally defined saving rates are nonstationary was confirmed. However, unlike the national accounts measure, the saving rate defined on the basis of the change in real household net worth was found to be stationary. This suggests that the latter measure of saving exhibits a long-run relationship with real disposable income.

The multivariate analysis indicated that the saving rate defined from the household balance sheet is positively related to the rate of growth of real disposable income and negatively related to the real rate of interest. Unlike the results of other studies, demographic variables did not appear to have had a significant effect on the saving rate. While there still was some evidence that the saving rate exhibited a structural break in 1982, the evidence would point toward an increase rather than a decrease in the saving rate since that year.

The negative sign on the interest rate coefficient also was unusual, and contrasted with a positive relationship between the interest rate and the saving rate that is defined using the national accounts (adjusted for the effect of inflation). One explanation for the difference was that the balance sheet measure of saving treated the purchases of consumer durables as saving, which would tend to be negatively related to changes in interest rates.

Table V-1. Canada: Stationarity Tests

	ADF Statistic ^{1/}	Lags	Period
Personal saving measures			
Saving as percent of disposable income	1.29*	1	65:3-95:3
Real saving per capita	0.92*	1	66:3-95:3
Inflation adjusted saving as percent of disposable income	3.68	0	66:4-95:3
Disposable income			
Real disposable income	0.64*	0	66:3-95:3
Real disposable income per capita	0.10*	1	66:3-95:3
Population			
Share of population aged 25 to 45	1.19*	8	67:2-95:3
Share of population aged 45 to 65	1.19*	8	67:2-95:3
Share of population aged 25 to 65	1.43*	8	67:2-95:3
Inflation			
4-quarter CPI inflation rate	2.46*	5	68:4-95:3
Interest rates			
3-month treasury bill	2.41*	1	65:3-95:3
3-month treasury bill less inflation	2.43*	4	68:2-95:3
Net wealth			
Net wealth as share of disposable income	0.06*	8	67:2-95:3
Real net wealth per capita	2.22*	1	66:3-95:3
Change in net wealth	1.58*	0	66:4-95:3
Change in real net wealth	4.27	3	62:2-95:3
Change in real net wealth per capita	5.38	0	66:4-95:3
Change in real net wealth as a share of real disposable income	5.36	0	66:4-95:3

Source: Fund staff estimates. The source of the data is Statistics Canada (supplied by DRI); all data was seasonally adjusted.

^{1/} An asterisk denotes that the hypothesis of stationarity was rejected at the a 95 percent confidence level. The ADF tests were conducted using a constant and a time trend. The lag length was determined sequentially by testing the significance of more restrictive specifications (see Campbell and Perron (1991) for a discussion).

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VI. Unemployment Insurance Reform 1/

1. Introduction

The Canadian unemployment insurance (UI) system was set up in 1940 with the narrow objective of providing temporary income replacement for unemployed individuals. During the 1950s and 1960s, its mandate was broadened to provide for additional longer term income support. 2/ However, the adverse effects of the UI system became apparent with the rise in structural unemployment during the 1970s. In response, the authorities imposed restrictions on the UI program in order to limit its adverse impact on labor market adjustment. In particular, the benefit rate was lowered, entrance requirements became more stringent, and greater emphasis was placed on "active" labor market policies. 3/

In October 1994, the Government issued a policy paper on UI reform that discussed two approaches to reducing the generosity of UI and improving labor market incentives: (1) making the program less generous for all claimants; and (2) distinguishing between short- and long-term users. In December 1995, the Government presented to Parliament a proposed reform entitled the Employment Insurance Act that combined some elements of both approaches.

The Government's proposals are described and reviewed in the discussion below. Section 2 describes the current UI system and the Government's proposed reform, and section 3 provides an evaluation of the proposals.

2. The current system and the 1995 proposal

Under the current system, benefits are provided to workers who have recorded between 12 and 20 weeks of insurable employment during the year preceding unemployment; the duration of benefits varies between 14 and 50 weeks (Table VI-1). 4/ The maximum weekly benefit for most claimants is equal to 55 percent of average weekly insured earnings received during the previous employment qualification period. For claimants with low insured earnings, the replacement rate is 60 percent. The maximum level of insurable earnings is adjusted according to the average increase in wages and salaries over an 8-year period.

The 1995 UI reform proposal contained a number of changes to the UI system designed to improve the efficiency of the labor market. For

1/ Prepared by Alun Thomas.

2/ For a discussion, see SM/95/81, pp. 66-77.

3/ The OECD defines active labor market policies as policies that aim at improving access to the labor market and jobs, job-related skills, and labor market functioning.

4/ Both eligibility requirements and the duration of entitlement depend on the unemployment rate in the claimant's province.

example, the reform would increase incentives to seek part-time work by basing UI benefits on hours worked rather than on the number of weeks worked, and by abolishing the minimum hours requirement. It also would reduce benefits for previous claimants so as to discourage frequent use of the system. Outlays for active labor market programs funded by the UI premium also would increase and focus on five areas: wage subsidies, earnings supplements, self-employment assistance, job creation partnerships, and skills loans and grants. In addition, a reserve would be built up in the UI fund that would permit fixing the UI premium rate over the cycle, thus avoiding the need to raise premiums during an economic downturn. These measures are described in more detail below.

a. Changes to UI benefits

Under the proposed reform, employees would qualify for unemployment insurance coverage on the basis of the number of hours worked (420-700 hours depending on the regional unemployment rate) rather than on the number of weeks worked (previously 12-20 weeks). In addition, the reform would eliminate the disqualification of those working less than 15 hours per week for a single employer. As a result, these measures would extend UI coverage to an estimated 500,000 part-time workers and reduce the disincentive for searching for part-time work while unemployed.

Currently, the unemployment insurance benefit is based on an employee's average weekly earnings while working, so that claimants in areas of high unemployment may receive benefits based on earnings over 12 weeks of work. The proposed reform would base the UI payment on earnings calculated over a fixed period of 16 to 20 weeks prior to becoming unemployed. Therefore, claimants who work for only a proportion of the fixed period would automatically receive less benefits. The effect of this proposal would be to reduce benefits for those having been unemployed just prior to the previous 12-week period. However, because of its potentially adverse impact in areas of high unemployment, this change would be phased in over six years.

The reform would make a modest distinction between frequent and infrequent users. The basic UI replacement rate would be kept at 55 percent for occasional users of the program. For frequent users, the replacement rate would be cut by 1 percentage point for every 20 weeks of benefits collected in previous years up to a maximum of 5 percentage points. Means-testing of benefits would also be made more stringent by reducing the level of annual earnings at which the income test begins to apply from \$63,570 to \$48,570 for occasional users and to \$39,000 for frequent users. Benefit history for determining the intensity of past use of the UI program would begin in July 1996, implying a relatively slow phase-in of these measures.

The loss of benefits to low-income families as a result of the tightening of eligibility requirements partly would be offset by a new income supplement. This supplement would be provided to UI claimants with children and whose family income is below \$26,000 (the current system

supplements the replacement rate of low-wage claimants by 5 percentage points).

b. Changes to UI financing

The unemployment insurance system is self-financing and currently operates roughly on a pay-as-you-go basis, requiring increases in payroll taxes during periods of economic weakness. To address concerns that this feature of the system has exacerbated cyclical downturns, the reform would build a reserve in the UI account deemed sufficient to finance benefits during a recession at a stable premium rate. ^{1/}

Another undesirable feature of UI financing is that the formula on which the maximum amount of insurable earnings (MIE) is based has caused the MIE to grow much faster than average wages; by 1995 the MIE was \$42,380 per year and exceeded the average industrial annual wage by 40 percent. Because premiums are capped at the MIE, this divergence between MIE and the average wage has penalized high-wage workers who are infrequent UI claimants. To address this concern, the Government has included in its reform package a proposal to reduce the MIE to \$39,000 in 1996 and freeze it at this level until the year 2000.

c. Changes to labor market programs

The UI reform package includes a commitment to improve job search assistance and to replace the numerous employment programs that are currently offered with five back-to-work benefit programs. The proposed reform would create a National Employment Service that will provide centralized information on re-employment possibilities for UI recipients. This information will be provided through job centers and kiosks featuring advanced on-line job-matching services. According to the Government, this service is expected to be sufficient to secure re-employment for most recipients; for those who need additional assistance to return to work, the Government is offering the following benefit programs: wage subsidies, earnings supplements, self-employment assistance, job-creation partnerships, and skills loans and grants.

Wage subsidies (up to 50 percent of the wage and lasting up to a year) would encourage employers to hire individuals who have little on-the-job experience. (The program is estimated to cover 60,000 persons at a cost of \$3,000 per person.) Employee earnings supplements would provide income supplements to low paid employees. The purpose of the supplement would be to encourage UI recipients facing reduced earnings to leave the UI system before their benefits expire, in order to gain job experience and raise the likelihood of permanent employment.

^{1/} The premium rate for workers also was reduced from \$3.00 for every \$100 of insurable earnings in 1995 to \$2.95 in 1996.

Self-employment assistance would build on the existing self-employment program by providing increased assistance in planning and setting-up a business. Participants would continue to receive UI benefits for up to one year while establishing their new business. This program is intended to build on the success of the previous self-employment program, in which 40 percent of beneficiaries hired additional employees and, on average, one additional job was created per participant. 1/

Job-creation partnerships would employ UI recipients on community-based public projects (this program is expected to provide about \$500 million for 80,000 recipients). Skills loans and grants would provide UI claimants with resources to attend accredited institutions to develop job skills. To be eligible, the claimant will have to show initiative by presenting a personal career plan to the authorities and be prepared to contribute his or her funds toward the cost of training. This program requires the recipient to initiate the grant process instead of passively accepting training assistance as in the current system.

In addition to these initiatives, the federal government plans to withdraw from labor market policies that overlap with the provinces' responsibilities for education and labor market training. To accomplish this change the federal government will phase-out the practice of pre-purchasing enrollment positions at community colleges and will withdraw from financing workplace-based training. Moreover, the federal government is considering giving control over its proposed employment programs to provincial governments or working with the provinces to harmonize the proposed federal programs with those at the provincial level.

3. A preliminary assessment of the reform proposals

The reform intends to correct policies that have hindered labor market adjustment in the past by tightening eligibility conditions and redirecting programs from passive income support to active labor market support.

a. Changes in UI benefits

The reform is likely to reduce disincentives for part-time work by providing employees with unemployment insurance irrespective of the number of hours worked in a particular week. As a result, employers would be less prone to limit the hours of part-time workers in order to avoid paying UI premiums. In addition, raising the number of weeks of work over which UI benefits are based could reduce the mis-recording of earnings and link insurance benefits more directly to true income earned.

The distinction between frequent and occasional users of the system also is a step forward in returning to the initial intention of the UI program to provide temporary income replacement during periods of unemployment. However, the proposed changes are relatively modest compared

1/ See Government of Canada (1995).

to the options that were considered in the 1994 policy paper. These included reducing the benefit rate by 1 percentage point for every two weeks of benefits (rather than for every 20 weeks that was stipulated in the proposal) and eliminating the regional variations in entitlement (which was untouched apart from reducing the maximum duration of benefits from 50 weeks to 45 weeks).

Regional extended benefits have been criticized in a number of studies for perpetuating temporary employment patterns and discouraging inter-provincial job search. ^{1/} However, recent research has cast some doubt on this conclusion. For example, Prasad and Thomas (1995) have failed to identify any change over time in relative unemployment rates between regions that are net beneficiaries of the system of regional extended benefits and those that are net contributors.

The 1994 discussion paper suggested that differentiating the cost of insurance for high risk employees and employers would improve the efficiency of the system. The reform would apply this criterion to employees by distinguishing between frequent and occasional users. However, no adjustment would be made to employers' contributions. Feldstein (1973) has argued that the lack of risk-based premium rates is likely to encourage firms to respond to demand shocks through temporary lay-offs rather than through changes in wages and hours. Subsequent empirical analysis has confirmed this view. Topel (1983) estimates that incomplete experience rating in the United States may account for 30 percent of all temporary layoffs. Corak (1994) finds that peaks in the hazard rate (the probability that an individual finds employment) in Canada occur just prior to the exhaustion of UI benefits.

Moreover, the lack of experience rating tends to subsidize cyclical industries. According to Corak and Pyper (1994), the net beneficiaries of the UI system in Canada are concentrated in the construction, forestry, and agricultural sectors. Conversely, firms in the community, business and services sector pay a higher premium than otherwise. The subsidized sectors are heavily concentrated in the Atlantic Provinces, and enterprises in these sectors tend to be smaller than in other sectors. Therefore, the introduction of experience rating would reduce distortions to the economic structure of this region and to the size of businesses.

The proposed changes to the system's generosity are modest and are therefore unlikely to have a significant effect on employment. However, it should be noted that the system's generosity has fallen continuously since 1977 as a result of previous reform measures and that the effects of changes

^{1/} See, in particular, Royal Commission on the Economic Union and Development Prospects for Canada (1985), C.D. Howe Institute (1994), SM/94/97 and SM/95/81.

in UI generosity on employment are difficult to quantify because of the difficulty in isolating its effects on structural unemployment. 1/

b. Evaluation of active labor market policies

The efficacy of active labor policies in promoting employment is subject to considerable debate. For example, a drawback of wage subsidies is the potential for deadweight (that is, the expenditure is spent on people who would have found employment anyway) and displacement (when the subsidized workers crowd out other employees). Snower (1994) notes that, even in the case of well-designed programs, about 50 percent of the employment gain represents deadweight and displacement.

The evidence is somewhat more encouraging for self-employment assistance. A study by Benus et al. (1993) of these programs in the United States indicates that they significantly increase unemployed workers' chances of starting a successful business. Benus et al. also found that these programs increase the total amount of time spent employed and raise earnings. However, Katz (1994) suggests that these programs also are subject to deadweight losses. In particular, only 2-5 percent of UI recipients in the United States choose to avail themselves of this type of program and participants tend to be more highly educated and have higher previous earnings than typical UI recipients.

Job creation partnerships have had the least success in generating net employment gains and generally lead to the phenomenon of churning, in which UI recipients alternate between periods of community work and unemployment (see Bellman and Lehmann, 1990 for a study on similar schemes in Germany and Jackman and Lehmann, 1990) for a study on the United Kingdom). However, in areas such as the Atlantic Provinces, which have a large number of seasonal industries, these partnerships can help in stabilizing employment patterns. 2/

1/ Recent estimates suggest that reducing the replacement rate by 1 percentage point would have the effect of lowering the structural unemployment rate by 0.005-0.01 percentage point (see the estimates in SM/95/81, Van Rijckeghem, 1993 and Robidoux and Dea, 1994). Assuming that frequent users (i.e., those that have received benefits at least 3 times in the past 5 years) represent 40 percent of all users and that their behavior is representative of all claimants, the measures would reduce the average replacement rate by about 2 percentage points over the medium term. On this basis, the proposed reform would lower the structural rate by less than 0.1 percentage point. Of course, the assumption that frequent users are representative is very strong and tends to bias downwards the effect of UI generosity.

2/ In fact, an additional three-year Jobs Fund of \$300 million has been created for the Atlantic Provinces to ease the adjustment process in these provinces. The fund will support job creation by encouraging joint partnership initiatives between the federal and provincial governments, the private sector and local communities.

A large number of commentators caution that skills loans and grants may not be cost-effective. 1/ In particular, a large proportion of the unskilled are already old and therefore would not continue working for long enough to pay off the investment in training. In addition, the unskilled may have been initially poorly educated, making retraining harder and more costly. An additional argument for education subsidies is that they offset imperfections in credit markets that inhibit poorer segments of the population from financing schooling and training. However, questions have been raised regarding this hypothesis. For example, Murray and Herrnstein (1994) find that after controlling for a score on a combined achievement and ability test, measured family income plays only a small role in explaining school attainment.

Another factor that needs consideration in an assessment of active labor market programs is the fact that these programs are funded by the UI payroll tax. This tax, which is now \$2.95 per \$100 of insurable earnings, is considered to have a sizable adverse effect on employment. For example, in the OECD's Interlink model every percentage point increase in the payroll tax "temporarily" increases the structural unemployment rate by the equivalent of 4 percentage points for one year. The Canadian Government's 1994 discussion paper also estimates that a 15 cent reduction in the UI premium rate would increase employment by 25,000 to 30,000 over a two-year period. 2/

1/ Katz (1994) concedes that "it has proven difficult to improve the labor market prospects of youth who drop out of high school." Evaluations of the major U.S. government programs offering relatively short-term skills training to disadvantaged out-of-school youth--the Comprehensive Employment and Training Act (CETA) and Title II of the Job Training Partnership Act (JTPA)--indicate that they have not succeeded in raising youth employment or earnings. Moreover, the JOBSTART program, while raising the educational attainment of participants, did not raise the earnings of participants in the first four years following entry into the program (Cameron and Heckman, 1993). The job training experience of disadvantaged adults is a little more favorable, in that both CETA and JTPA Title II training programs have succeeded in raising earnings significantly for women. However, the most successful program combined on-the-job training with job search assistance rather than short-term classroom training (Bloom et al., 1994). The difficulty of effectively improving the marketability of dropouts and the apparent high returns to formal schooling serve to underscore the importance of improving education incentives earlier in the life cycle (see Buckberg and Thomas, 1994 for more details).

2/ Government of Canada (1994).

Table VI-1. Canada: Unemployment Insurance Reform Proposals

	Current System	Reform Proposals
Coverage	Employees working at least 15 hours per week or who earn 20 percent of Maximum Insurable Earnings.	All employees except self-employed.
Eligibility requirement	<p>Eligibility is based on the number of weeks of insurable employment during the last 52 weeks.</p> <p>The eligibility requirement depends on the regional unemployment rate. The standard requirement of 20 weeks is reduced (to a minimum of 12 weeks) by one week for every percentage point that the regional unemployment rate exceeds 6 percent.</p>	<p>Between 420 and 700 hours of insurable employment in last 52 weeks.</p> <p>The eligibility requirement would still be adjusted according to regional unemployment rates.</p>
Benefits <ul style="list-style-type: none"> • Replacement rate • Average weekly earnings • Duration 	<p>55 percent of average weekly earnings for most claimants; 60 percent of average weekly earnings for claimants with "low insured earnings" and dependents.</p> <p>Calculated on the basis of the previous 12-20 weeks of work, depending on the level of the regional unemployment rate.</p> <p>The minimum benefit period is 14 weeks. However, benefits are extended up to 50 weeks in regions of high unemployment.</p>	<p>55 percent for occasional claimants; benefit rate reduced by 1 percentage point for every 20 weeks of benefits collected in previous years (up to a maximum of 5 percentage points); family income supplement provided to claimants with children and family income below \$26,000.</p> <p>Calculated over a fixed period of 16-20 weeks, depending on the level of the regional unemployment rate.</p> <p>The minimum benefit period would remain at 14 weeks, but the maximum period would be reduced to 45 weeks in regions of high unemployment.</p>
Employment programs	39 Federal programs.	Employment programs to be focused in five areas: wage subsidies, employee earnings supplements, self-employment assistance, job-creation partnerships, and skills loans and grants. Programs run either federally or jointly with provincial governments.
Financing	Premiums paid on income up to Maximum Insurable Earnings of \$42,380 per year; premium set according to a statutory rate based on a three-year average of UI costs; premium rate rises during periods of economic weakness.	Maximum Insurable Earnings set at \$39,000 over 1996-2000; premium rate would be stabilised once a reserve in the UI account has been built sufficient to finance benefits over the business cycle.

Source: Government of Canada, From Unemployment Insurance to Employment Insurance: A Supplementary Paper, (Ottawa, 1994); and A 21st Century Employment System for Canada (Ottawa, 1995).

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VII. The Canada Pension Plan: Problems and Policies 1/

1. Overview

In the next century, the Canada Pension Plan (CPP) will face severe fiscal pressures from changing demographics. 2/ Since the CPP's inception in 1966, life expectancy has increased by 3.1 years and is expected to increase by another 1.5 years by 2030. Fertility rates have approximately halved and are not expected to show much increase in coming years. 3/ As a result, a substantial decline in the ratio of workers to pensioners (the support ratio) is anticipated. In addition, the enrichment of benefits and increased payments under its disability provisions since 1966 have put further pressure on the plan's finances. 4/ These trends mean that even if contribution rates rise in the future as currently scheduled, the CPP's assets will be exhausted in 2015. 5/ It is estimated that in order to maintain the current benefit structure, the contribution rate will have to increase from 5.6 percent in 1996 to 14.2 percent by 2030. 6/

The financial strains on the plan have been further aggravated by higher real interest rates and lower real wage growth than anticipated at the plan's inception. Expectations that wages would grow rapidly and interest rates would remain low meant that it was reasonable to initially finance the CPP on a pay-as-you-go (PAYG) basis with a small asset base. Today, with lower growth in real wages and higher real interest rates than anticipated 30 years ago, the original strategy for the plan's financing no longer appears sustainable. 7/

The future burden on a pension plan is summarized in its unfunded liability--the present value of the difference between expected future contributions and future outlays, net of current assets. 8/ The CPP's

1/ Prepared by Etienne de Callatay and Charles Kramer.

2/ The CPP covers residents of all provinces but Quebec. Quebec has a separate but very similar pension plan (the Quebec Pension Plan or QPP). The simulations here cover the combined finances of the QPP and CPP; the same policies are assumed to apply to both of them.

3/ See Department of Finance Canada (1996), p. 17, and Office of the Superintendent of Financial Institutions (1995), pp. 33-4.

4/ See Department of Finance Canada (1996), p. 16.

5/ Ibid., p. 49.

6/ Ibid., p. ii.

7/ Ibid., p. 18.

8/ Since the Canada Pension Plan is operated on a PAYG basis, the calculation assumes that future contributions are made at the actuarially-fair rate. In this case, the actuarially fair rate is defined as the contribution rate that would equalize the present value of future contributions and benefits for individuals presently aged 18 years. For a more detailed explanation, see Office of the Superintendent of Financial Institutions (1995), p. 99.

unfunded liability is estimated to be 71 percent of GDP. Under the current schedule of rates, Canada's Department of Finance projects that the unfunded liability will grow by about \$50 billion per year. The actuarially-fair contribution rate is about 10-11 percent, almost twice the present rate. ^{1/}

These calculations clearly indicate that some changes in the plan's provisions will be needed. This paper simulates the effects of various reform options, including increasing workers' contributions, reducing benefits, and raising the age of retirement. ^{2/} The simulations show that substantial changes in benefits or contributions will be needed to keep the plan from accumulating large debts.

2. How the CPP operates

The Canadian public system of old-age support (including the CPP, the Old-Age Supplement (OAS), the Guaranteed Income Supplement (GIS), and the Spouse Allowance Program (SAP)) is designed to ensure a modest level of income for the elderly. The CPP is an earnings-related plan, whose coverage is mandatory for income earners, including the self-employed. The OAS is a flat-rate, taxable monthly benefit with a clawback of benefits for those earning more than about 1 1/2 times the average industrial wage. The GIS is a means-tested benefit paid to single pensioners with income lower than about \$11,000 or married couples with income lower than about \$14,500, while the SAP is a benefit to needy widows and widowers. Private pension plans form the third tier of the pension system in Canada. Hence, like the pension systems of a number of other countries, the Canadian system combines elements of forced saving, social welfare, and incentives for private long-term savings.

Since the focus of this chapter is the CPP, some of its details warrant explanation. ^{3/} Under current policies, workers contribute a fraction of income (the contribution rate) between a maximum (the year's

^{1/} Ibid., Annex D.

^{2/} A number of other studies have discussed the effects of reforms on the financial health of the CPP. Leibfritz et al. (1995) find that the CPP balance is negative in net present value terms even with the nominal replacement rate 10 percentage points lower, the contribution rate 3 percentage points higher, or the retirement age 5 years later; without adjustments, they estimate that the unfunded liability is between 58 and 188 percent of GDP (depending on the discount rate employed). James et. al. (1995) find that even with contribution rates rising steeply to peak at about 15 percent in 2006, it would take 35 years to eliminate the unfunded liability. Bayoumi (1994) finds that contribution rates for the CPP would have to approximately double in order to maintain the current structure of benefits.

^{3/} Details on the other aspects of the plan and discussion are available in Jobin et al. (1991), Burbidge (1987), and Department of Finance Canada (1996).

maximum pensionable earnings or YMPE) and a basic exemption (presently about 10 percent of the YMPE). Benefits on retirement are a fraction (the nominal replacement rate) of average earnings below the YMPE, where the average disregards up to seven years of lowest earnings and periods when the worker is disabled or raising a child. 1/2/ The YMPE is at the level of the average wage in industry and is indexed to average earnings growth. After retirement, benefits are indexed to consumer price inflation. Presently, the contribution rate is 5.6 percent, the YMPE is about \$35,000, and the replacement rate is 25 percent. The contribution rate and replacement rate are fairly low compared to those in other industrial countries. 3/

Finally, workers can retire between age 60 and age 70, but those retiring before age 65 face a reduction of benefits of 0.5 percent per month of retirement before age 65. Those retiring after age 65, by contrast, are rewarded with an additional 0.5 percent of benefits per extra month of work. 4/ The CPP also provides survivor's pensions, disability benefits, and other types of benefits, but those aspects of the CPP are not covered in the simulations presented below.

As with many public pension schemes, the system's finances are on a PAYG basis--today's contributions are not 'saved' for future retirees, but are used to pay today's retirees. The CPP maintains assets targeted at twice annual expenditures; these assets are currently about 2 1/2 times annual expenditures. The schedule of future contribution rates is adjusted under a mandated review of the CPP every five years to keep assets at about the target level. The most recent actuarial report shows the contribution rate rising by about 0.2 percentage points per year to peak at about 15 percent in 2030. 5/ In the baseline simulation presented below, however, we assume that the contribution rate remains constant at the current level. The baseline is thus somewhat more pessimistic than the CPP's own status-quo projections.

1/ Note that the replacement rate as a fraction of earnings below the YMPE is not necessarily the same as the replacement rate as a fraction of total earnings. To distinguish the two, we refer to the former as the nominal replacement rate and the latter as the effective replacement rate.

2/ The stipulation to disregard certain periods in the working years is known as the dropout provision.

3/ For a comparison of the social security systems of a number of countries, see U.S. Social Security Administration (1995).

4/ Participants can retire after age 70, but can no longer make contributions after that age (see Office of the Superintendent of Financial Institutions (1995), p. 23).

5/ For details, see Office of the Superintendent of Financial Institutions (1995).

3. Projected CPP finances under the baseline and alternatives

This section presents projections of the public pension system's finances. 1/ Baseline projections are presented first, to give a view of the magnitude of the problem and provide a basis for comparison. The baseline projections in Table VII-1 shows the financial status of the public pension system for the years 2000-2050 under the assumption that the contribution rate remains constant at 5.6 percent, the replacement rate remains at 25 percent, benefits are fully indexed to the CPI, and retirement can be taken without penalty at 65 years of age. 2/ Under these assumptions, the CPP moves quickly into a net liability position. Net liabilities total 150 percent of GDP in 2050, more than double the current ratio of public debt to GDP. The worsening of the net asset position coincides with the decline in the support ratio from 4 workers per pensioner to 1.7 workers per pensioner.

One option to stem the decline in the system's finances would be to increase the contribution rate. The second half of Table VII-1 shows the finances of the plan under the assumption that the contribution rate is increased immediately from 5.6 percent to 12.7 percent, a rate that ensures that net assets are the same ratio of GDP at the end of the projection period as at the beginning (8.9 percent of GDP). The constant contribution rate that restores the net asset ratio at the end of the projection horizon is known as the balancing rate. Though the net asset position is positive in 2050, the plan shows increasing assets as a proportion of GDP until 2023, and a gradual depletion of reserves thereafter. This implies that the higher contribution rate would not be sufficient to keep the net asset position at 8.9 percent of GDP after 2050.

Another option would be to lower the replacement rate. 3/ Table VII-2 contains projections for the system under the assumption that the nominal replacement rate is lowered to 19 percent from the present level of 25 percent. 4/ As under the baseline, the net asset position deteriorates over time, though to a smaller liability position of 95 percent of GDP in 2050. The second half of the table shows that the balancing rate would fall to 10.2 percent, somewhat lower than under the baseline but still

1/ As mentioned earlier, the projections cover both the CPP and the QPP.

2/ Table VIII-1 also shows employment, the number of pensioners, the average pension, and average wage under the baseline. See the Appendix for details of the computations and assumptions underlying the simulations.

3/ Whether the adjustment burden ought to fall on workers (through a higher contribution rate) or on pensioners (through a lower replacement rate) is not obvious. However, some argue that the distortionary effects of payroll taxes and the already-high tax burden in large industrial countries stand in favor of lowering benefits (see Masson and Mussa (1995)); the deadweight loss of payroll taxes in Canada has been estimated at about 30-40 cents per dollar of revenue collected (see Thirsk and Moore (1991)).

4/ The policy change simulated here affects new pensioners only--present pensioners are assumed not to be affected.

well over the current rate. Much larger reductions in benefits would be needed to keep the CPP from accumulating a large debt.

The fact that CPI inflation overstates increases in the cost of living has led some to suggest only partial indexation of benefits for public pension plans. 1/ Table VII-3 shows the effect of indexation to 80 percent of consumer price inflation. Given the baseline assumption of inflation equal to 3 percent, the effect is to lower indexation by about 0.6 percentage point per annum, or roughly the amount of bias estimated in the CPI. 2/ Partial indexation reduces outlays by only about one-tenth of one percent of GDP, so that the pension system still shows a large net liability position in the last year (about 137 percent of GDP). As a result, this option would allow only a modest decrease in the balancing contribution rate relative to the baseline (to 12.1 percent from 12.7 percent).

Another option currently under consideration is to increase the age for retirement with no penalty by two years (to 67). Table VII-4 shows the result of this change. The net asset position is still a large liability in the last year with no change in the contribution rate, and the balancing contribution rate is still high (11.4 percent) relative to the baseline. Hence, this measure would not ensure the plan's viability. 3/

4. Sensitivity to interest rates and productivity growth

The outlook for the pension system is sensitive to assumptions regarding the real interest rate (which affects the return on assets) and the growth rate of productivity (which affects both increases in the wage base for contributions and the growth rate of GDP). Table VII-5 shows the effects of lower productivity growth (1 percent per annum rather than 1.5 percent in the baseline). GDP growth is assumed to be linked to productivity growth, while benefits are indexed to the CPI, and so lower productivity growth increases expenditures as a percentage of GDP relative to the baseline. As a result, in the last year of the projection the net liability position is almost 30 percent of GDP larger than under the baseline. 4/ However, the balancing contribution rate is little changed

1/ See Department of Finance Canada (1996), page 33.

2/ Crawford (1993) puts the bias at somewhat less than 0.5 percentage point; Fortin (1990) gives a range of 0.5-1 percentage point.

3/ Moreover, the effectiveness of such measures is limited by the fact that workers can retire early. In Canada, the proportion of workers retiring after 65 is negligible (see Office of the Superintendent of Financial Institutions (1995), pp. 53-5). Early retirement is factored into the projections, as half of workers are assumed to retire at age 60, and half at age 65. However, no increase in the fraction of workers who choose early retirement is assumed under the increase in the penalty-free retirement age.

4/ The analysis in SM/96/7, p. 28, finds similar effects of slower GDP growth on other public pension schemes that index benefits to the CPI.

(the rate increases less than 0.1 percentage point). GDP is smaller in the last year of the projection than under the baseline, so less of an increase in the level of net assets is needed to restore the asset position as a percentage of GDP.

Table VII-6 shows the effects of lower real interest rates (2 percent instead of 3.5 percent). The assumption of a lower real interest rate actually improves the financial situation of the plan, because it implies a lower cost of servicing the net liability position. With the assumption of a lower interest rate, the net liability position in 2050 is about 35 percentage points of GDP lower than under the baseline. The balancing contribution rate is higher than under the baseline (14.2 percent rather than 12.7 percent), however. To ensure that assets in 2050 are the same as in 1995, the plan must accumulate assets early in the projection period. A lower real interest rate means that the return on those accumulated assets contributes less to the overall balance, so that primary revenues must contribute more.

5. Conclusions

The Canadian pension system faces serious challenges in the coming years. As with the pension systems of many other countries, these challenges largely stem from demographic shifts that will make it impossible for the system to maintain benefits at current contribution rates. If the present contribution rate of 5.6 percent were maintained, the system would move to a net liability position starting in 2013 and reach a net liability position of 150 percent of GDP in 2050. The simulations suggest that contribution rates would have to more than double to keep benefits at current levels. Maintaining the viability of the plan would require a large increase in contributions, a substantial cutback in benefits, or both.

Details of the Projections

The projections required macroeconomic and demographic assumptions. These are described below, and information on these assumptions is displayed in Table VII-7.

The projections employed macroeconomic assumptions about the labor market, growth, inflation, and real interest rates. Labor-force participation rates and unemployment rates for each gender and age cohort were assumed to remain the same as their current rates. They were applied to demographic projections (described below) to yield labor force and employment projections. Figures on the distribution of wage income by sex and age group were taken from Beach and Slotsve (1991), who provide data on 10-year age cohorts. Projections of growth in nominal wages from productivity growth and inflation were then used to generate average aggregate wage income, which in turn determined contributions and benefits. CPI inflation was projected at 3 percent per annum, with inflation as measured by the GDP deflator assumed equal to inflation as measured by the CPI. 1/ The growth rate of real GDP was determined by the growth rates of productivity (1.5 percent under the baseline) and the labor force. 2/ Real interest rates were projected at 3.5 percent, with nominal interest rates then determined by the projected inflation rate.

The demographic projections were taken from the World Bank's World Population Projections, 1994-95 Edition. These projections, by gender for 5-year cohorts, allow detailed modeling of the evolution of the population and labor force. As described above, in combination with labor-market assumptions they yield projections of the labor force and the retired population. Based on information provided in the most recent CPP actuarial report, half of the population is assumed to retire early at the age of 60, and half are assumed to retire at the penalty-free retirement age. The last line of Table VII-7 shows the increase in the elderly dependency ratio (defined as the number of persons age 65 or older divided by the population between 20 and 64 years of age) from 20.1 in 2000 to over 46 percent in the last year of the simulation.

1/ The results are inflation-neutral, except when limited indexation of benefits is simulated.

2/ It should be noted that with slowing growth in the labor force, this implies some slowing in real GDP growth over the long term from present levels. However, this is a natural consequence of anticipated demographic shifts. Indeed, the effect of such demographic shifts on growth is well-recognized and hardly limited to Canada (see for example "Is the Economy That Weak? First Factor in the Demographics," Business Week, February 26, 1996, p. 26).

Table VII-1. Canada: Baseline Projections of CPP Finances
(In percent of GDP)

	2000	2010	2020	2030	2040	2050
<u>(With contribution rate of 5.6 percent)</u>						
Revenue	1.2	1.2	1.2	1.2	1.2	1.2
Primary expenditures	1.8	2.3	3.1	4.0	4.2	4.2
Primary balance	-0.6	-1.1	-1.9	-2.8	-2.9	-3.0
Interest receipts/payments	0.4	-0.1	-1.1	-3.0	-5.8	-9.1
Balance	-0.3	-1.2	-3.0	-5.8	-8.7	-12.1
Net asset position	5.1	-3.0	-20.0	-51.8	-96.2	-150.3
<u>(With balancing contribution rate of 12.7 percent)</u>						
Revenue	2.7	2.7	2.7	2.7	2.7	2.7
Primary expenditures	1.8	2.3	3.1	4.0	4.2	4.2
Primary balance	0.9	0.5	-0.4	-1.2	-1.4	-1.4
Interest receipts/payments	0.9	1.5	1.9	1.8	1.3	0.6
Balance	1.8	2.0	1.5	0.6	-0.1	-0.8
Net asset position	14.9	24.5	30.1	28.2	19.9	8.9
<u>Memorandum items</u>						
Number of pensioners (thousands)	3,607	4,616	6,280	7,733	8,003	7,996
Employment (thousands)	13,827	14,628	14,509	14,000	13,810	13,686
Support ratio	3.8	3.2	2.3	1.8	1.7	1.7
Average pension (dollars)	5,170	8,280	12,981	20,248	31,357	48,711
Average wage (dollars)	40,115	62,566	97,583	152,197	237,377	370,229
Effective replacement rate (in percent)	12.9	13.2	13.3	13.3	13.2	13.2

Source: Fund staff estimates.

Table VII-2. Canada: Replacement Rate Lowered
from 25 Percent to 19 Percent for New Pensioners

(In percent of GDP)

	2000	2010	2020	2030	2040	2050
<u>(With contribution rate of 5.6 percent)</u>						
Revenue	1.2	1.2	1.2	1.2	1.2	1.2
Primary expenditures	1.6	1.8	2.5	3.2	3.3	3.3
Primary balance	-0.4	-0.6	-1.3	-2.0	-2.1	-2.1
Interest receipts/payments	0.4	0.2	-0.4	-1.7	-3.5	-5.8
Balance	--	-0.5	-1.7	-3.7	-5.6	-7.9
Net asset position	6.2	1.9	-8.2	-29.0	-58.9	-95.5
<u>(With balancing contribution rate of 10.2 percent)</u>						
Revenue	2.2	2.2	2.2	2.2	2.2	2.2
Primary expenditures	1.6	1.8	2.5	3.2	3.3	3.3
Primary balance	0.6	0.4	-0.3	-1.0	-1.1	-1.1
Interest receipts/payments	0.7	1.2	1.5	1.5	1.1	0.6
Balance	1.3	1.6	1.2	0.5	--	-0.5
Net asset position	12.6	19.8	24.6	23.3	16.9	8.9

Source: Fund staff estimates.

Table VII-3. Canada: Indexation of Pension Benefits
Limited to 80 Percent of CPI Inflation

(In percent of GDP)

	2000	2010	2020	2030	2040	2050
<u>(With contribution rate of 5.6 percent)</u>						
Revenue	1.2	1.2	1.2	1.2	1.2	1.2
Primary expenditures	1.8	2.2	3.0	3.8	3.9	4.0
Primary balance	-0.5	-1.0	-1.8	-2.6	-2.7	-2.7
Interest receipts/payments	0.4	--	-0.9	-2.7	-5.2	-8.3
Balance	-0.2	-1.0	-2.7	-5.3	-7.9	-11.0
Net asset position	5.6	-1.6	-16.9	-46.2	-86.8	-136.5
<u>(With balancing contribution rate of 12.1 percent)</u>						
Revenue	2.6	2.6	2.6	2.6	2.6	2.6
Primary expenditure	1.8	2.2	3.0	3.8	3.9	4.0
Primary balance	0.9	0.4	-0.4	-1.2	-1.3	-1.3
Interest receipts/payments	0.8	1.4	1.8	1.7	1.3	0.6
Balance	1.7	1.9	1.4	0.6	-0.1	-0.7
Net asset position	14.5	23.5	28.8	26.9	19.1	8.9

Source: Fund staff estimates.

Table VII-4. Canada: Retirement Age Increased to 67

(In percent of GDP)

	2000	2010	2020	2030	2040	2050
<u>(With contribution rate of 5.6 percent)</u>						
Revenue	1.2	1.2	1.2	1.2	1.2	1.2
Primary expenditures	1.7	1.9	2.7	3.6	4.0	4.0
Primary balance	-0.5	-0.7	-1.5	-2.4	-2.8	-2.8
Interest receipts/payments	0.4	0.1	-0.6	-2.0	-4.4	-7.3
Balance	-0.1	-0.6	-2.0	-4.5	-7.2	-10.1
Net asset position	6.1	0.6	-11.0	-35.5	-73.8	-121.0
<u>(With balancing contribution rate of 11.4 percent)</u>						
Revenue	2.5	2.5	2.5	2.5	2.5	2.5
Primary expenditure	1.7	1.9	2.7	3.6	4.0	4.0
Primary balance	0.8	0.6	-0.2	-1.2	-1.5	-1.5
Interest receipts/payments	0.8	1.4	1.8	1.9	1.4	0.6
Balance	1.6	1.9	1.7	0.7	-0.1	-0.9
Net asset position	14.1	23.0	29.5	29.1	20.7	8.9

Source: Fund staff estimates.

Table VII-5. Canada: Lower Productivity Gains
(1 Percent Instead of 1.5 Percent)

(In percent of GDP)

	2000	2010	2020	2030	2040	2050
<u>(With contribution rate of 5.6 percent)</u>						
Revenue	1.2	1.2	1.2	1.2	1.2	1.2
Primary expenditures	1.9	2.4	3.3	4.2	4.3	4.4
Primary balance	-0.7	-1.1	-2.0	-2.9	-3.1	-3.2
Interest receipts/payments	0.4	-0.2	-1.3	-3.5	-6.7	-10.9
Balance	-0.3	-1.3	-3.3	-6.4	-9.8	-14.0
Net asset position	5.1	-3.6	-22.5	-58.7	-111.2	-178.6
<u>(With balancing contribution rate of 12.7 percent)</u>						
Revenue	2.8	2.8	2.8	2.8	2.8	2.8
Primary expenditure	1.9	2.4	3.3	4.2	4.3	4.4
Primary balance	0.9	0.4	-0.5	-1.4	-1.6	-1.6
Interest receipts/payments	0.9	1.5	2.0	1.9	1.4	0.7
Balance	1.8	1.9	1.5	0.5	-0.2	-1.0
Net asset position	15.0	24.9	31.1	29.5	20.9	8.9

Source: Fund staff estimates.

Table VII-6. Canada: Lower Real Interest Rate
(2 Percent Instead of 3.5 Percent)

(In percent of GDP)

	2000	2010	2020	2030	2040	2050
<u>(With contribution rate of 5.6 percent)</u>						
Revenue	1.2	1.2	1.2	1.2	1.2	1.2
Primary expenditure	1.8	2.3	3.1	4.0	4.2	4.2
Primary balance	-0.6	-1.1	-1.9	-2.8	-2.9	-3.0
Interest receipts/payments	0.3	-0.1	-0.8	-2.1	-3.7	-5.3
Balance	-0.4	-1.2	-2.7	-4.9	-6.6	-8.3
Net asset position	4.8	-3.6	-19.1	-45.8	-79.0	-114.0
<u>(With balancing contribution rate of 14.2 percent)</u>						
Revenue	3.1	3.1	3.1	3.1	3.1	3.1
Primary expenditure	1.8	2.3	3.1	4.0	4.2	4.2
Primary balance	1.2	0.8	-0.1	-0.9	-1.1	-1.1
Interest receipts/payments	0.7	1.2	1.5	1.4	1.0	0.5
Balance	2.0	2.0	1.4	0.5	-0.1	-0.6
Net asset position	16.3	26.3	31.1	28.0	19.3	8.9

Source: Fund staff estimates.

Table VII-7. Canada: Macroeconomic and Demographic Assumptions under Baseline Scenario

(In percentage change, average over five years)

	2000	2010	2020	2030	2040	2050
Macroeconomic assumptions						
Nominal GDP (in billions of Canadian dollars)	1,025	1,692	2,617	3,939	6,060	9,367
Real GDP growth factor	2.5	1.9	1.3	1.2	1.4	1.4
Employment growth	1.0	0.4	-0.2	-0.3	-0.1	-0.1
Labor productivity growth	1.5	1.5	1.5	1.5	1.5	1.5
Real GDP (In billions of constant Canadian dollars)	693	850	979	1,096	1,255	1,443
Nominal wage growth factor ^{1/}	4.5	4.5	4.5	4.5	4.5	4.5
Nominal interest rate	6.6	6.6	6.6	6.6	6.6	6.6
Real interest rate	3.5	3.5	3.5	3.5	3.5	3.5
Inflation	3.0	3.0	3.0	3.0	3.0	3.0
Unemployment rate	9.0	8.9	8.3	7.8	7.7	7.7
Nominal GDP growth rate	5.6	5.0	4.3	4.2	4.5	4.5
Real GDP growth rate	2.5	1.9	1.3	1.2	1.4	1.4
Wage bill (in billions of Canadian dollars)	554.7	915.2	1,915.8	2,130.7	3,278.1	5,066.9
Wage bill (in percent of GDP)	54.1	54.1	54.1	54.1	54.1	54.1
Demographic assumptions						
Average labor force participation rate	63.9	61.2	56.8	53.1	52.2	52.0
Elderly dependency ratio	20.1	22.6	31.3	43.4	46.2	46.4

Source: World Bank; Statistics Canada; and Fund staff projections.

^{1/} Nominal wage growth is assumed equal to inflation plus productivity growth.

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VIII. Federal and Provincial Debt and Debt Management Strategies 1/

1. Introduction

Canadian public indebtedness has increased rapidly over the past 20 years. The federal net debt-to-GDP ratio more than tripled over this period, reaching 72 percent by the end of the 1994/95 fiscal year, and combined federal and provincial government debt ratio reached nearly 100 percent of GDP, the second highest ratio among the G-7 countries after Italy. At the same time, debt-service payments have claimed an increasing share of federal revenues, from around 12 percent in 1974/75 to 34 percent in 1994/95. This chapter examines some of the key issues regarding the size and composition of the public debt and analyzes federal and provincial debt management strategies.

2. The size and composition of the public debt

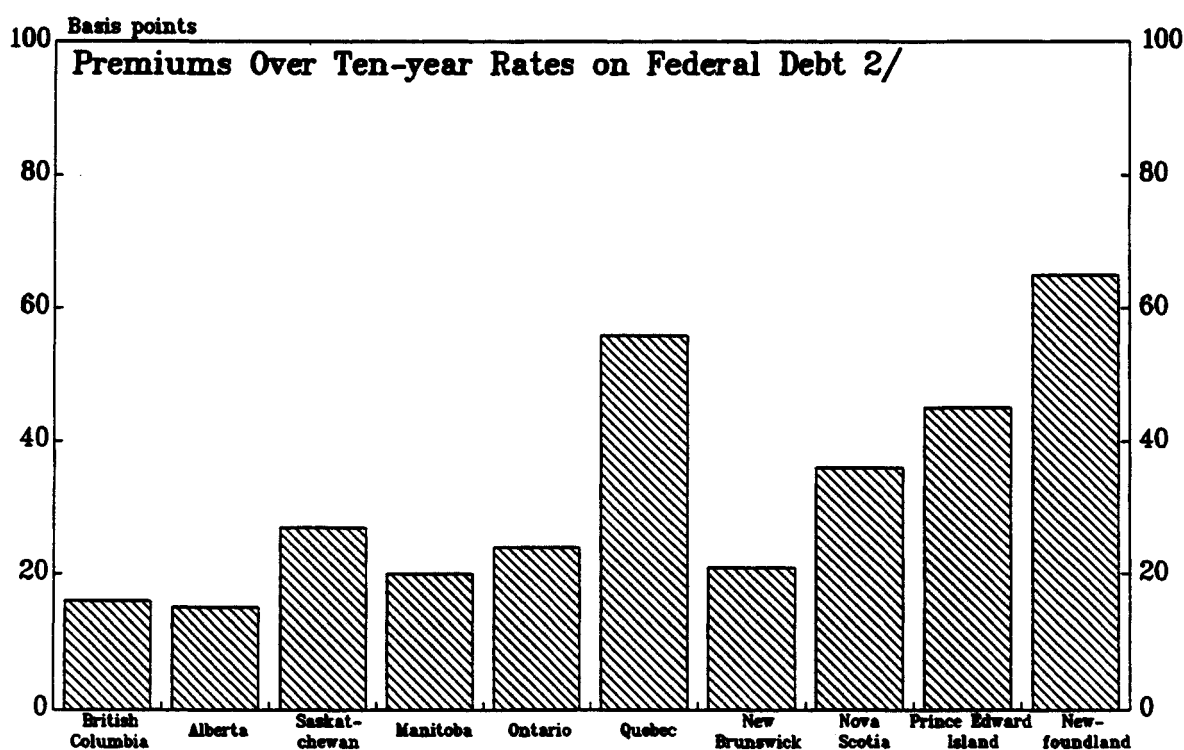
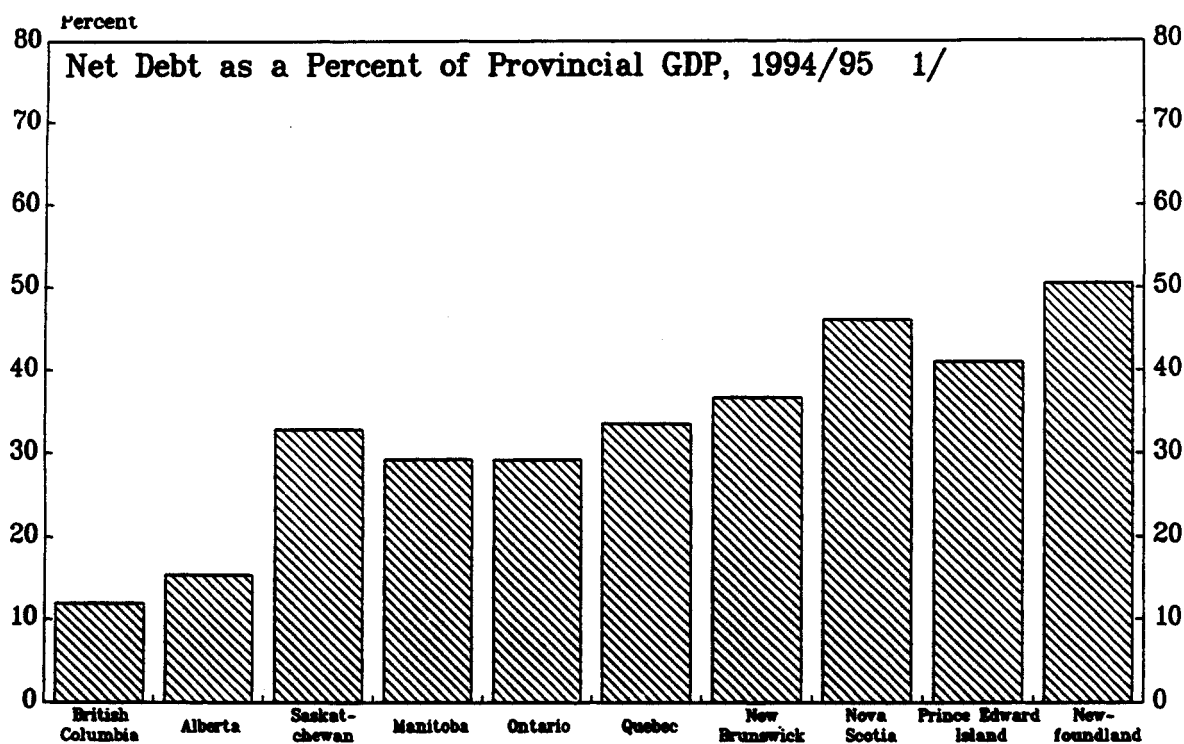
Table VIII-1 contains data on public sector debt as a percentage of GDP, as measured by the national accounts and the public accounts, between 1975 and 1994. 2/ On a national-accounts basis, net debt of the federal government amounted to 53 percent of GDP, and provincial net debt totaled 15 percent of GDP. Including the debt of local governments, hospitals and public enterprises, gross debt of the public sector stood at 132 percent of GDP in 1994. Debt ratios measured on a public-accounts basis are considerably higher, partly because the public accounts treat civil service retirement plans (which hold a large share of government debt) as off-budget. However, the public-accounts based debt ratios show roughly the same rate of growth. Indeed, most measures of public indebtedness have more than doubled as a percentage of GDP since 1975.

While total net provincial debt equals about one-sixth of Canadian GDP, indebtedness varies significantly across provinces. Net debt (public-accounts basis) ranged from 12 percent of provincial GDP in British Columbia to 51 percent in Newfoundland (see Chart VIII-1). Investor concern regarding provincial indebtedness has been reflected in credit ratings for provincial bonds and the interest premium over rates on ten-year federal debt, which range from about 15 basis points for Alberta bonds to about

1/ Prepared by Jeffrey Cole and S. Erik Oppers.

2/ Canadian fiscal data are generally presented either on a public-accounts or a national-accounts basis. The public accounts generally record revenues on a modified-cash basis and expenditures on an accrual basis, while the national accounts are booked on an accrual basis. The national accounts measure of the fiscal position facilitates international comparisons, as well as aggregation and comparisons of the fiscal positions of the various levels of government in Canada. The national accounts fiscal deficit is typically lower than the public accounts deficit, mainly reflecting the inclusion of the net surplus of the government employees' pension funds.

CANADA
PROVINCIAL FISCAL DEBT OVERVIEW



Source: Provincial Public Accounts (supplied by Department of Finance); Scotia McLeod; and Fund staff estimates.

1/ Public accounts basis.

2/ Interest rate on ten-year provincial debt less the interest rate on ten-year federal debt, as of September 1995.

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65 basis points for Newfoundland bonds (Department of Finance, 1995b, see Chart VIII-1).

In 1994/95 debt charges for provincial governments ranged from 4.8 percent of total expenditure in British Columbia to 19.1 percent in Nova Scotia. For the provincial governments combined, debt charges have increased from 5.4 percent of total expenditures in 1980/81 to 12.8 percent in 1994/95 (Chart VIII-2). Federal debt charges as a percentage of total federal expenditure increased from 10.5 percent in 1974/75 to 26.2 percent in 1994/95 and exceed the federal deficit (see Chart VIII-2).

Canada's general government indebtedness--as measured by both gross debt and net debt as a percentage of GDP--is the fourth highest among industrial countries, after Belgium, Italy, and Greece (Table VIII-2). General government gross interest expenditures amounted to 9.1 percent of GDP in 1994, more than twice the level in the United States, Germany, and Japan. In addition to being high by international standards, by the early 1990s the maturity structure of the federal debt had become skewed toward the short end. As a result, Canada had the second highest proportion of short-term debt among industrial countries.

3. Federal debt management issues

The Canadian Department of Finance's Debt Operation Report issued in December 1995 lists the following objectives of the federal debt management strategy:

- to minimize the cost of funding for the Canadian Government;
- to ensure that these costs remain relatively stable over time;
- to maintain a diverse investor base; and
- to ensure the continuing development of liquid and well-functioning Canadian financial markets.

To achieve these goals, the federal government focuses on four key elements. First, it aims to rebalance the stock of debt more towards longer-term fixed-rate instruments to reduce the sensitivity of public debt charges to interest rate fluctuations. The federal government uses three main classes of financial instruments to meet its domestic financing requirements. These are marketable bonds (including fixed-coupon bonds and Real Return Bonds), treasury bills, and Canada Savings Bonds. ^{1/} Currently, about 45 percent of total federal government borrowing will mature or be repriced within one year, compared to a ratio of about 35 percent among other industrialized sovereign borrowers. This leaves the federal government finances relatively sensitive to increases in interest rates. The Department of Finance has estimated that under the current debt

^{1/} These instruments account for around 80 percent of total federal government borrowing. The remainder of its financial needs are met by loans from internal government sources, such as the civil service retirement plans.

structure, a one percentage point increase in interest rates would increase debt charges by \$1.3 billion (0.2 percent of GDP) in the first year.

With a positively sloped yield curve, a lengthening of the average maturity of the outstanding debt leads to higher interest costs, but these costs tend to be more stable over time. The Government has set itself the target of increasing the share of fixed-rate debt to 65 percent by 2004/05, which is expected to provide a balance between cost minimization and cost stability. The average term to maturity of federal debt already has increased from a low of 4 years in 1990/91 to 4 years and 10 months in 1994/95; the Government's current debt strategy will bring the average term to maturity closer to the OECD average of around 5 years and 3 months.

The second element of the Government's debt management strategy is the development of a retail debt program aimed at stopping the decline in the retail investor base. The share of the domestic federal debt held by small private investors has fallen from over 40 percent in the mid-1980s to 16 percent in 1994 (Department of Finance, 1995a, p. 3). A retail debt program has been launched to shift the focus from a single product, the Canada Savings Bond, to a family of products that are intended to meet the needs of a broader group of investors.

A third element of the Government's debt management strategy is to reduce borrowing costs through the development of innovative financing instruments and the promotion of the liquidity and efficiency of Canadian bond markets. The Government has estimated that its efforts to improve the transparency of its debt-issue program have lowered its borrowing costs by up to 10 basis points over the past few years (Department of Finance, 1995a). These efforts include large benchmark issues, a regular bond calendar, quarterly bond and note auctions, and common coupon dates.

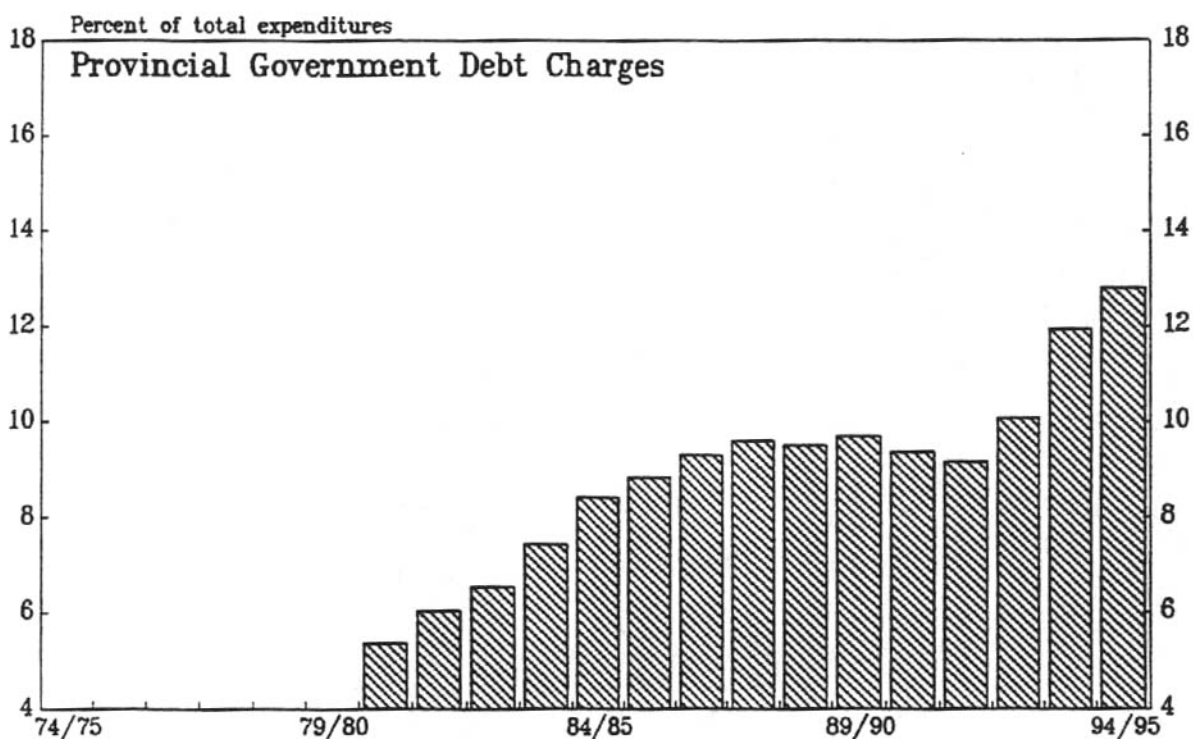
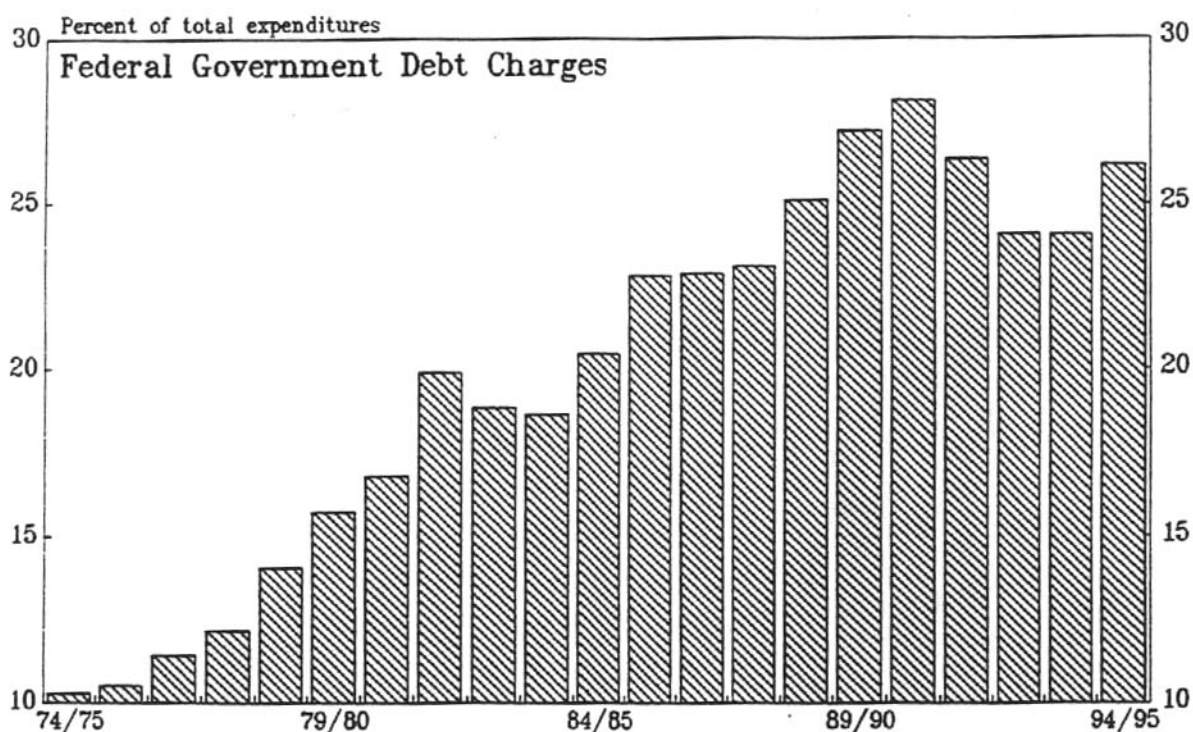
A fourth aspect of the debt management strategy is the maintenance of active relations with investors and credit rating agencies to promote Canada's attractiveness to international investors. As of March 1995, non-residents held 25 percent of outstanding federal market debt, compared to 11 percent in 1984/85. ^{1/} Most of the non-resident holdings are in Canadian dollars, and only 4 percent of the outstanding market debt is denominated in foreign currency.

4. Provincial debt management issues

The fiscal position of the provinces has improved markedly over the past few years. However, due to large debt refinancing requirements, gross provincial borrowing requirements are still expected to increase over the next decade (Chart VIII-3). More than 70 percent of existing provincial debt falls due within 10 years, reflecting the fact that a large part of the

^{1/} Department of Finance (1995a), Table V. This is according to the Bank of Canada classification, which differs from the public accounts classification.

FEDERAL AND PROVINCIAL DEBT CHARGES 1/



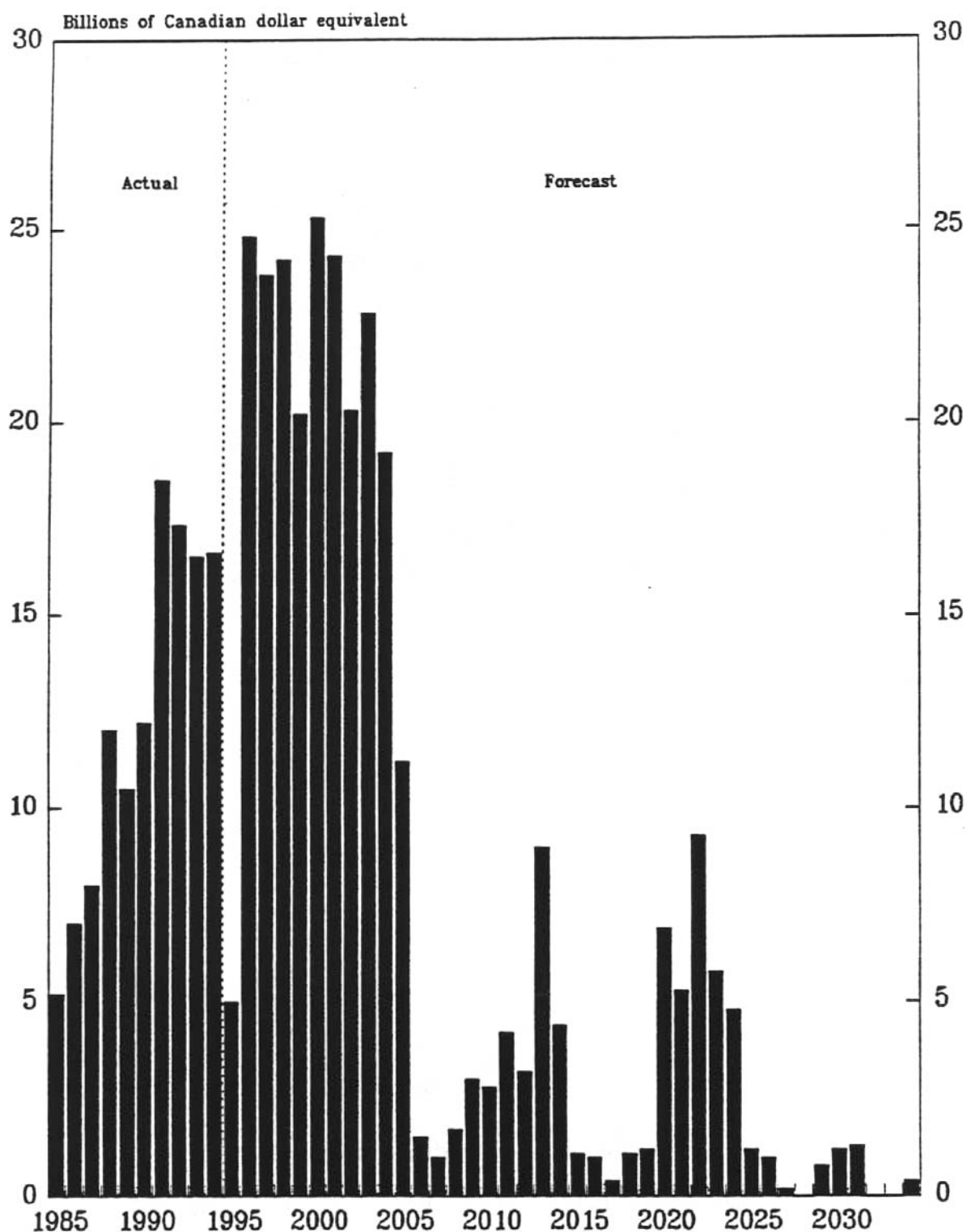
Source: Federal and Provincial Public Accounts (supplied by Department of Finance); and Fund staff estimates.

1/ Fiscal year, beginning April 1.

CHART VIII-3

CANADA

PROVINCIAL DEBT MATURITY SCHEDULE



Source: CIBC Wood Gundy.

provincial deficits in the past decade were financed using medium-term instruments.

However, less than 20 percent of provincial debt has a maturity of less than two years, suggesting that the provincial governments are relatively unexposed to the short-run effects of interest-rate shocks. For example, gross provincial debt charges have been estimated to increase by only about 2 1/2 percent in response to a 1 percentage point increase in interest rates. 1/ While the effect on debt-service outlays would be relatively modest in the short term, the large amounts of debt falling due in the next few years leaves the provinces vulnerable to interest-rate developments over the medium term.

The large volume of provincial debt scheduled to fall due over the next ten years takes place against the backdrop of a relatively modest domestic market for provincial securities. In the past decade, provincial governments increasingly looked abroad for financing, and by the end of the 1993/94 fiscal year about 35 percent of provincial debt was denominated in currencies other than the Canadian dollar before hedging. The share of foreign currency-denominated debt varies greatly by province (Table VIII-3). Prince Edward Island has issued only Canadian dollar debt; among the other provinces the share of provincial debt denominated in foreign currencies ranges from 11 percent in British Columbia to 67 percent in Nova Scotia.

However, most of the provinces' exposure to foreign exchange rate risk is at least partially hedged. Table VIII-3 indicates that hedging activity changes the foreign currency exposure of some of the provinces substantially. In the case of Ontario, hedging increased its domestic currency component of the debt from 71 percent to 97 percent. Others are hardly hedged at all: Newfoundland retains almost 50 percent foreign currency exposure. Most of the provinces' remaining foreign currency exposure consists of U.S. dollar-denominated liabilities. 2/

1/ Unpublished Department of Finance estimates.

2/ Some provinces enjoy a "natural hedge" in the form of substantial foreign currency revenues, which reduces the budgetary impact of changes in the exchange rate. For example, it is estimated that Alberta's net revenues would increase as a result of a depreciation of the Canadian dollar.

Table VIII-1. Canada: Total Public Sector Debt

(In percent of GDP)

	1975	1980	1985	1990	1991	1992	1993	1994
Public accounts 1/								
Federal government								
Gross debt	34.1	38.2	56.2	64.6	68.5	72.2	75.5	76.6
Net debt	19.4	28.6	49.9	58.4	62.5	67.1	70.5	71.8
Provincial governments								
Gross debt	...	22.4	30.0	33.3	37.6	42.7	45.2	46.2
Net debt	...	8.1	12.7	15.7	19.0	24.0	26.1	26.8
Combined federal and provincial								
Gross debt	...	60.6	86.3	97.9	106.1	114.9	120.7	122.9
Net debt 2/	...	36.7	62.6	74.1	81.5	91.1	96.6	98.6
National accounts 3/								
Federal government								
Gross debt	25.9	30.0	45.9	51.6	55.2	58.5	61.1	62.2
Of which: held outside public sector 4/	25.7	28.7	43.8	48.7	52.1	55.9	58.4	58.9
Net debt	5.4	16.0	35.5	43.0	46.3	49.9	52.2	53.0
Provincial governments								
Gross debt	16.3	18.6	24.6	27.0	30.8	34.4	37.3	38.3
Of which: held outside public sector 4/	9.1	9.2	15.1	19.1	22.6	26.5	29.7	31.1
Net debt	1.5	-0.6	3.9	5.8	8.1	11.6	13.8	15.2
Combined federal and provincial								
Gross debt	42.1	48.5	70.5	78.5	86.0	92.9	98.4	100.4
Of which: held outside public sector 4/	34.8	37.9	59.0	67.8	74.8	82.3	88.1	90.0
Net debt	6.9	15.4	39.4	48.8	54.4	61.5	66.0	68.3
Memorandum items national accounts 3/								
General government (including local, hospital, and social security accounts)								
Gross debt	53.5	57.4	78.4	85.6	93.4	100.4	105.9	107.9
Of which: held outside public sector 4/	43.3	44.3	64.7	73.1	80.4	88.0	93.8	95.6
Net debt 5/	7.3	13.3	34.7	44.0	49.7	56.9	61.9	64.4
Gross debt: including public enterprises	78.7	86.9	106.6	108.6	118.3	125.9	131.0	132.2

Sources: Statistics Canada (supplied by DRI); Federal and Provincial Public Accounts (supplied by Department of Finance); and Fund Staff estimates.

1/ Both debt and GDP are measured on a fiscal year basis, beginning April 1. The unavailability of data on intergovernmental holdings of public debt on a public accounts basis precludes the estimation of gross debt held outside the public sector.

2/ Data on intergovernmental holdings of public securities are not available on a public accounts basis so that combined net debt figures will be biased upward.

3/ Estimated on a national accounts basis using the National Balance Sheet accounts.

4/ Includes all debt owed to the nongovernmental sector.

5/ Includes assets held by the Quebec Pension Plan (QPP) and the Canada Pension Plan (CPP).

Table VIII-2. Canada and Selected Industrial Countries:
General Government Debt Levels and Interest Charges, 1994

(In percent of GDP)

	Debt		Interest Expense
	Gross	Net	
Canada	95.6	64.4	9.1
United States	68.9	57.6	4.2
Austria	63.3	55.0	4.2
Belgium	136.0	128.4	10.3
Denmark	78.9	54.4	7.1
France	48.4	40.3	3.3
Germany	49.8	40.1	3.4
Italy	129.0	117.2	10.7
Netherlands	79.4	60.8	7.2
Norway	49.4	-10.5	3.9
Sweden	92.0	28.4	6.9
Switzerland	48.5	...	2.3
Japan	83.2	7.8	4.0
Finland	59.8	-9.0	5.4
Greece	114.1	75.8	14.6
Iceland	46.6	29.5	4.1
Portugal	70.7	...	5.9
Spain	62.9	47.4	5.4
Austria	35.6	25.3	3.3
New Zealand	55.9	...	4.4
United Kingdom	45.9	37.7	3.3

Source: Fund staff estimates (Canada); and World Economic Outlook,
October 1995.

Table VIII-3. Canada: Distribution of Provincial Government Direct Debt by Currency, Before and After Hedging

(In percent of total debt)

Province		C\$	US\$	Yen	DM	Other
British Columbia	before	89.2	10.6	0.2	--	--
	after	93.1	6.9	--	--	--
Alberta	before	70.6	29.4	--	--	--
	after	74.7	25.3	--	--	--
Saskatchewan	before	71.3	18.9	2.0	4.3	3.4
	after	82.5	17.5	--	--	--
Manitoba	before	40.1	42.8	8.0	2.7	6.4
	after	53.2	46.9	--	--	--
Ontario	before	70.7	24.8	1.2	1.4	1.8
	after	97.3	2.7	--	--	--
Quebec	before	54.5	26.7	9.6	3.1	7.1 1/
	after	60.4	24.3	7.8	1.4	6.1
New Brunswick	before	70.3	20.8	5.8	--	3.1
	after	72.0	21.9	3.7	--	2.4
Nova Scotia	before	33.5	46.0	13.6	--	6.9
	after	33.5	46.0	13.6	--	6.9
PEI	before	100.0	--	--	--	--
	after	100.0	--	--	--	--
Newfoundland	before	49.7	32.2	5.6	--	12.5
	after	52.8	30.4	4.3	--	12.5
Total	before	65.5	25.6	3.8	1.6	3.5
	after	78.8	16.6	2.4	0.3	1.9

Source: Provincial Public Accounts, as of March 31, 1994 (supplied by Department of Finance).

1/ Original data do not add up to 100 percent.

References

CIBC/Wood Gundy, 1996 Provincial Profiles (Toronto: CIBC/Wood Gundy Economics, 1995).

Department of Finance Canada, Debt Operations Report (Ottawa: Department of Finance Canada, 1995a).

Department of Finance Canada, The Economic and Fiscal Update (Ottawa: Department of Finance Canada, 1995b).

IX. Provincial Fiscal Developments 1/

This chapter briefly reviews the longer term trends in the fiscal situation of the provinces, discusses the more recent developments, and examines in more detail the fiscal situation of the four largest provinces.

1. Recent trends 2/

Chart IX-1 illustrates the aggregate trends in revenues, expenditures, and balances of the provinces since 1970. As can be seen, the budgets of the provinces (on a national accounts basis) have tended to move from a near-balance during the 1970s to deficits during the 1980s and 1990s, particularly during economic downturns. For example, the recession experienced in the early 1980s was followed by an increase in the aggregate deficit to 1.5 percent of GDP in 1982 and 1983 and a subsequent retrenchment to a balanced position in 1988. Following the 1990-91 recession, the deficit of the provincial sector rose sharply and reached 3.4 percent of GDP in 1992, the largest deficit experienced during the past twenty years. Since that time the deficit has narrowed appreciably, but in 1995 it was still high, at about 1 percent of GDP.

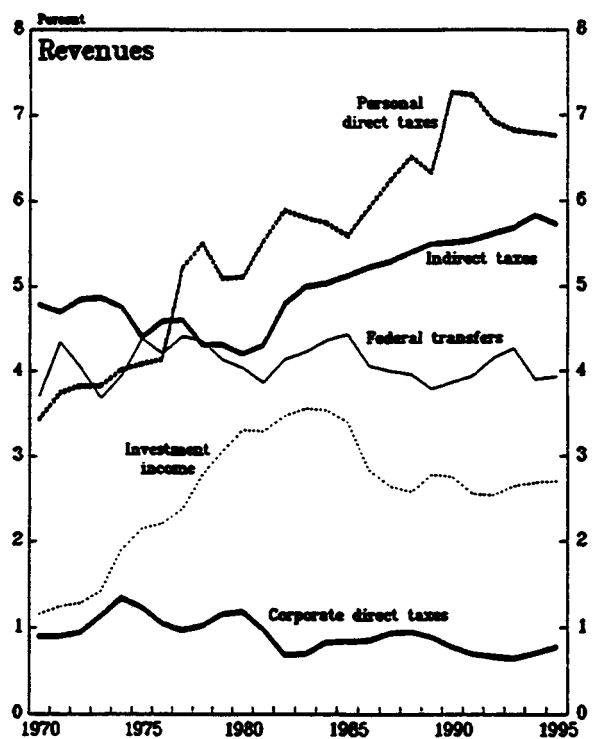
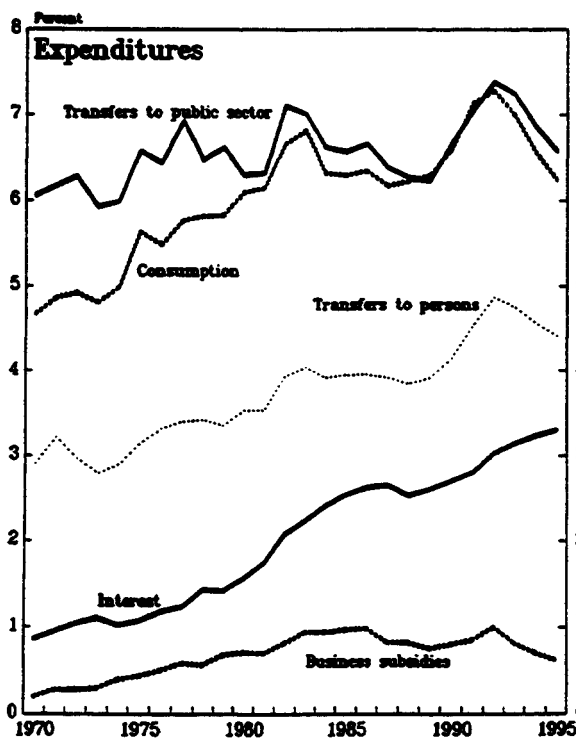
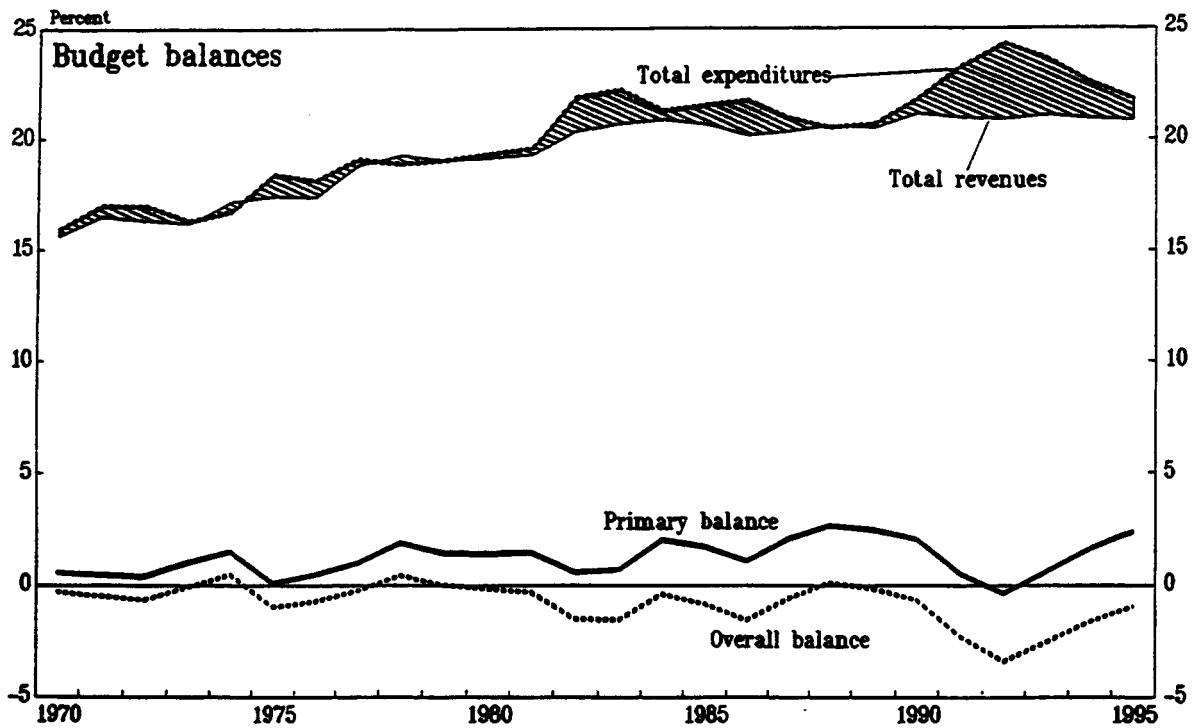
Provincial revenue/GDP and expenditure/GDP ratios have been on an upward trend since 1970. However, the rate of increase in the revenue/GDP ratio appears to have slowed since the mid-1980s, mainly owing to a slowdown in the growth of investment income--in turn related to the decline in interest rates--and the weakness in natural resource revenues following the decline in energy prices that took place in 1985. By contrast, direct personal income and sales tax receipts have grown rapidly as a share of GDP (except during economic downturns), partly owing to increases in tax rates. Federal transfers to the provinces have remained a roughly constant share of GDP during the past 25 years, despite the adoption of federal limits on the size of transfers since the late 1980s.

An important factor underlying the growth in the provinces' expenditure/GDP ratio during the past 25 years has been the rise in interest payments as a share of GDP from about 1 percent in 1970 to nearly 3 1/2 percent in 1995. Provincial consumption of goods and services and transfers to persons also have grown rapidly as a share of GDP, and appear to have been particularly sensitive to the business cycle. Transfers to lower levels of government and business subsidies have shown a relatively more modest upward trend, but also appear to be correlated with the economic cycle.

1/ Prepared by Christopher Towe.

2/ In order to provide a consistent time series, this section uses data on a national income accounts basis.

CANADA
PROVINCIAL FISCAL DEVELOPMENTS
(In percent of GDP)



Source: Statistics Canada (supplied by DRI).

1/ National accounts basis.

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2. Recent budgetary initiatives 1/

In response to the widening fiscal deficits and rising levels of debt that followed the 1990-91 recession, most provinces put in place adjustment programs. These programs concentrated for the most part on expenditure cuts, particularly in administrative costs, government employment, and other nonpriority areas. As a result, seven of the 10 provinces are projected to have either a balanced budget or to be in surplus as of 1995/96. However, owing to the continued large deficits in Ontario and Quebec (which account for roughly two thirds of Canada's GDP) the aggregate provincial deficit is expected to remain relatively high at about just over 1 1/2 percent of GDP (public accounts basis). This compares to aggregate deficits of 0.7 percent of GDP in 1989/90 and 3.6 percent of GDP in 1992/93.

The provinces have adopted medium-term balanced budget commitments in order to assist in their deficit reduction efforts. All but Ontario, Nova Scotia, and Quebec have targeted a balanced budget by 1996/97; Nova Scotia plans to balance its budget by 1997/98, and Ontario has targeted a balanced budget by 2000/01; Quebec's fiscal commitment is to balance its current account by 1997/98. 2/

A number of the provinces whose fiscal consolidation efforts are most advanced have moved to adopt explicit debt-reduction targets. 3/ In particular, Manitoba's Balanced Budget, Debt Retirement and Taxpayer Protection Legislation requires at least a balanced budget from 1995/96 and targets the elimination of Manitoba's net debt over a 30-year period. Alberta's Balanced Budget and Debt Retirement Act also requires balanced budgets after 1995/96 and mandates a \$8.3 billion reduction in net debt over 25 years (the debt reduction is roughly equivalent to 10 percent of 1995 provincial GDP; Alberta's net debt ratio is currently just over 15 percent). British Columbia has adopted a Debt Management Plan that calls for a cut in provincial net debt by \$10.2 billion (roughly 10 percent provincial GDP; the current debt ratio is around 11 percent) over 20 years.

1/ This section relies heavily on summaries provided by Canada's Department of Finance. The data described below are presented on a public accounts basis to be consistent with the provincial budget presentations. However, since public accounting methodologies differ between the provinces, the data are not strictly comparable. Some of the major differences between the public accounts and national accounts presentations are that: (i) the public accounts are generally on a modified-cash basis and the national accounts are on an accrual basis; (ii) the national accounts treat government employee pension plans as part of the government; (iii) the sale (purchase) of land and used assets is included as revenue (expenditure) in the public accounts but is treated as a balance sheet adjustment in the national accounts.

2/ Following the 1996 Federal budget, Quebec announced its intention to balance its budget by 1999/00.

3/ See Chapter VIII for a detailed discussion of provincial debt developments.

Further details of fiscal developments in Ontario, Quebec, British Columbia, and Alberta--which together account for nearly 90 percent of Canada's GDP--are presented below.

a. Ontario

Ontario's budget deficit rose sharply from near zero in 1989/90 to 4.4 percent of provincial GDP in 1992/93, mainly owing to similar increases in outlays related to increased spending on social programs and debt servicing. Despite the economic recovery and cuts in spending, the deficit ratio was reduced only modestly thereafter to 3.3 percent by 1994/95, and the net debt ratio reached 29 percent of GDP by the end of the year.

A new government took office in June 1995 and announced immediate spending cuts in the area of social welfare, capital spending, and departmental operating budgets. Further cuts in spending were announced in November 1995 and specific measures included: across-the-board cuts in spending (e.g., a 33 percent cut in internal program spending over two years); cuts in transfers to businesses and other organizations; higher user charges for provincial health plans; conversion of existing transfers to municipalities to block grants at lower levels of funding; a 3 percent reduction in funding for public schools; and cuts in transfers to hospitals. The Government also adopted a balanced budget target for 2000/01. However, detailed fiscal projections beyond 1995/96 have not yet been released, and there may be difficulties in making the balanced budget commitment consistent with the Government's campaign promise to sharply reduce personal income tax rates.

b. Quebec

Quebec's deficit rose steadily in relation to provincial GDP from 1.1 percent in 1989/90 to 3.4 percent in 1994/95; during most of this period the widening deficit was due to marked increases in spending on social services, which more than offset increases in the revenue ratio. During the last two years, though, the increase in the deficit ratio has resulted from weaknesses in tax revenues (particularly sales tax receipts) as well as cuts in federal transfers, which more than offset a slowdown in the growth of spending in the areas of health, social services, and education. By the end of 1994/95, the net debt ratio had reached 33.5 percent of provincial GDP. ^{1/}

Quebec's May 1995 budget contained measures aimed at further deficit reduction and ultimately at achieving a balanced current account by 1997/98. Measures included increases in cigarette taxes, fuel taxes, and capital taxes. In addition, a one percentage point increase in the provincial sales tax, effective July 1996, was proposed. Overall spending in 1995/96 was frozen at the previous year's level, but cuts in the areas of business

^{1/} Note that this excludes the unfunded liabilities of the Quebec Retirement Plan.

subsidies and capital spending are expected to provide further savings. The deficit for 1995/96 is projected to fall to 2.3 percent of provincial GDP.

c. British Columbia

British Columbia's deficit rose to 3.1 percent of provincial GDP in 1991/92, compared to a surplus of 1.1 percent of GDP in 1988/89. The deterioration in the province's fiscal situation occurred despite the fact that provincial growth was less affected by the recession than elsewhere in Canada. The deficit was mainly the result of rapid growth in almost all spending categories. With the election of a new government in 1991, efforts to restrain spending were adopted and, together with a sharp increase in the revenue ratio (related to buoyant corporate and natural resource revenues), the deficit declined steadily, reaching 0.4 percent of GDP in 1994/95. Provincial net debt was 11.9 percent of GDP at end-1994/95, compared with a recent peak of 12.4 percent in 1993/94.

In 1995, British Columbia's government adopted a 20-year plan in order to: reduce provincial net debt by \$10.2 billion; cut total "taxpayer-supported debt"--gross debt held by the public--from its current level of about 19 percent of GDP to 10 percent of GDP within 20 years; and cap interest payments on taxpayer-supported debt to no more than 8.5 percent of provincial revenues in any given year during the next 20 years. The 1995 budget also introduced a number of measures--including continued civil service salary freezes and other spending reductions--aimed at achieving these longer term objectives and ensuring a balanced annual budget. British Columbia's deficit is projected to be in modest surplus in 1995/96 and net provincial debt is expected to decline as a share of GDP to 11.3 percent. ^{1/}

d. Alberta

Unlike many of the other provinces, Alberta entered the 1990-91 recession with a relatively large deficit, a legacy of the sharp decline in natural resource revenues following the fall in energy prices in 1985. In particular, Alberta's deficit was 3.1 percent in 1989/90, still significantly lower than the 7.1 percent deficit/GDP ratio in 1986/87. With the economic downturn and the decline in the revenue ratio, the deficit widened to reach 4.6 percent by 1992/93. The province's fiscal situation has improved markedly since 1992/93, owing to an improved provincial economic situation that increased corporate tax receipts and natural resource revenues, as well as the adoption in 1993 of spending cuts in social services. A surplus of 1.2 percent of provincial GDP was recorded in 1994/95 and the net provincial debt was 15.4 percent of GDP at end-1994/95 compared to zero in 1990/91.

^{1/} The surplus may be lower than previously expected because of a recent decision by the federal government to withhold part of the province's transfer for social programs.

Alberta's government introduced the Balanced Budget and Debt Retirement Act in 1995, which requires elimination of the province's net debt by the year 2021 and a balanced budget every year after 1995/96. The 1995 budget also adopted additional spending cuts, including the elimination of over 2,000 government positions, cuts in education spending, reorganization in the area of health care spending, and the privatization and elimination of government agencies. The surplus is expected to fall somewhat in 1995/96, due to a decline in corporate tax receipts and natural resource revenues.

X. Developments in Canadian Trade Policy 1/

1. WTO agreement on trade in financial services

Under the Uruguay Round agreement which established the World Trade Organization on January 1, 1995, an agreement on financial services was not concluded. Instead, the parties resolved that an agreement should be achieved by June 30, 1995. Of the 76 WTO members with commitments in the financial services sector, 29 members, including Canada, offered improvements in the negotiations which finally led to the Agreement on Trade in Financial Services on July 26, 1995. The signed Protocol acts as an interim agreement to be implemented for an initial period to November 1, 1997 at which time members will have an opportunity to modify or improve their offers on financial services schedules and to take most-favored nation (MFN) exemptions by sector. The Protocol to which the new financial services schedules are annexed is open for acceptance until June 30, 1996, and will come into force 30 days after that date.

The General Agreement on Trade in Services (GATS) covers all service sectors, including financial services, and has two components. The first is a set of general rules and disciplines that apply to all WTO members, and the second provides schedules of specific commitments analogous to the tariff schedules governing market access commitments in goods. The service schedules contain commitments on individual service sectors and service activities defining the conditions of market access, which are binding undertakings and legally enforceable. The two key principles under the Agreement are: (i) most-favored nation (MFN) treatment, which guarantees that a member will not discriminate among members supplying a service; and (ii) national treatment, which guarantees that governments do not discriminate in favor of domestic service providers. However, specific exemptions from the MFN commitment can be taken and the national treatment obligation is subject to negotiation.

Accordingly, in exchange for the concessions of other countries in the GATS financial services negotiations, Canada agreed to eliminate the foreign ownership and market-share limitations in the federal financial regime. 2/ In particular, Canada has eliminated the following restrictions: (i) the 10 percent individual and 25 percent collective limitations on the foreign ownership of Canadian-controlled federally-regulated insurance companies and trust and loans companies; (ii) the 25 percent collective limitation on the foreign ownership of Schedule I banks; 3/ and (iii) the 12 percent asset ceiling on the size of the foreign bank sector in Canada.

1/ Prepared by Susan Prowse.

2/ These restrictions had already been lifted under the North American Free Trade Agreement (NAFTA).

3/ Schedule I banks are "widely held", that is, no one party may hold more than 10 percent of its shares. The 25 percent rule limited aggregate foreign ownership of Schedule I banks to 25 percent.

The agreement is expected to improve Canada's access to a number of markets, notably in Asia and Latin America. Enhanced access reflects, *inter alia*, improvements in the number of licenses available for establishing foreign financial institutions, and increased levels of foreign equity participation in branches, subsidiaries or affiliates of banks and insurance companies. There will be opportunities for a broad range of Canadian companies in the financial sector.

The United States did not participate fully in the deal and applies an MFN exemption in its GATS schedule for the whole of the financial services sector. The U.S. decision, however, will not adversely affect Canadian companies, as Canada is assured access to the U.S. market, including national and full MFN treatment, under NAFTA.

2. The Uruguay Round Agreement

Ratification of the Uruguay Round agreement by the Canadian Parliament occurred at the end of November 1994 and became effective on January 1, 1995. In total, 24 amendments to Canadian law were required to satisfy the obligations of the WTO. For most products, tariff rate quotas replaced quantitative import controls on January 1, 1995, however, for certain dairy and grain products, the conversion became effective August 1, 1995. 1/ 2/ While prohibitively high over-quota rates ensure that imports are effectively limited to the TRQ quantity, the access commitments have resulted in some expansion of import opportunities. In addition, some modifications to supply management systems have been made to respond to the needs of food processors for competitively-priced dairy and poultry inputs. Significant changes have occurred in chicken, where production quota is no longer tied to historical performance but is more responsive to current market factors. In dairy, the federal subsidy is being gradually phased out for fiscal reasons, and will terminate in 2001. Consultations are to occur in 1996 with a view to developing a longer-term plan for other elements in the federal dairy program.

Canada implemented its commitments to reduce export subsidies on grain, oilseeds, and their products by eliminating the program through which these subsidies were granted. Effective from August 1, 1995, the Western Grain Transportation Act (WGTA), which provided subsidies for transportation of grain from the Prairies, was eliminated. An adjustment package of C\$1.9 billion has been made available for compensation and to enhance infrastructure in the sector. Under the terms of the Uruguay Round no further reductions in domestic subsidies are necessary, in that they now represent less than 60 percent of their 1986-88 baseline, compared with an

1/ The tariff-rate quota consists of (i) a minimum-access commitment with a relatively low tariff rate for a product and (ii) a much higher tariff rate for all imports in excess of the minimum commitment.

2/ For further information see "Canada - Recent Developments and Policies," SM/95/81 (4/20/95).

upper limit of 80 percent to be achieved by 2000. However, in the context of improved efficiency and the need for additional budgetary restraint, further rationalization of agricultural subsidies remains under review.

Canada, in quadrilateral discussions with the United States, Japan and the European Union (EU), supported further consideration of a number of initiatives, designed to help maintain momentum on market access liberalization, including the possibility of accelerating certain Uruguay Round tariff reductions, examination of zero for zero tariff packages, broadening participation in existing packages, and inclusion of new areas such as information technology products.

3. Tariff system review

In the February 1994 Budget, the Government announced a comprehensive review of the tariff system, and intends to fully implement the recommended changes by 1998. With the growing complexity of the tariff regime, the intention is to simplify the system, making it more transparent and easier to administer.

Reductions in tariffs on a wide range of manufacturing inputs (classified under some 1,500 tariff lines) became effective on June 13, 1995. The competitive disadvantage created by the Canadian tariff levels on manufacturing inputs had traditionally been mitigated by full reimbursement to exporters of their input duties through a duty drawback program. ^{1/} The tariff reductions on these inputs are at least to current U.S. MFN levels, with subsequent reductions in certain cases to be phased-in over four or nine years in line with the reductions agreed to by the United States under the Uruguay Round agreement. Where inputs are not made in Canada, and additional economic benefits have been identified, tariffs have been eliminated.

The government has recently launched public consultations on an overall draft simplified customs tariff, which incorporates the input tariff reductions and modified proposals on: the elimination or conversion of concessionary tariff codes; the termination of the Machinery Remission Program; the conversion of some specific rates; and the elimination or replacement of tariff regulations, all of which have been the subject of previous consultations. The draft Tariff also incorporates new proposals, including measures aimed at: the modernization and simplification of legislative provisions; the accelerated implementation, in 1998, of the final Uruguay Round tariff reductions scheduled for January 1, 1999; the harmonization of rates on certain competing goods, and the rectification of tariff anomalies; the elimination of rates below 2 percent, and the rounding down of decimal rates to the nearest half percentage point; and, the amalgamation of tariff lines where rates are the same, rate differentials

^{1/} NAFTA provisions require that duty drawbacks be reduced on products exported to the United States, effective January 1, 1996 and on products exported to Mexico, effective January 1, 2001.

are small or imports are insignificant. Corresponding legislation would be tabled by early 1997, for full implementation in 1998.

4. Trade disputes

Under Canada's use of Chapter 19 of the Free Trade Agreement (FTA), the U.S. Government revoked the countervailing duty on softwood lumber and agreed on December 15, 1994 to refund approximately \$450 million in cash deposits with interest. 1/ At that time both countries agreed to establish a consultative body to create a better understanding to resolve problems and a new forum to mediate disputes in order to avoid future litigation in the sector. After successive rounds, on February 16, 1996, an agreement in principle was reached in which Canadian provinces would make changes to their forest management practices and the United States would agree not to initiate any trade action. The key exporting provinces are Alberta, British Columbia, Ontario, and Quebec. The agreement takes effect from April 1, 1996 and will operate for five years.

On July 17, 1995 the United States requested the establishment of a dispute panel under NAFTA Chapter 20 to examine Canada's application of WTO tariff equivalents for imports of certain U.S. agricultural products, including dairy, poultry, eggs, and barley. As part of the Uruguay Round Agreement, Canada converted its quantitative import controls on these products to equivalent tariffs. Canada believes that this was fully consistent with its international trade obligations under both the NAFTA and the WTO. As part of the Uruguay Round Agreement, The binational panel was established at the end of January 1996 and is expected to announce its decision in May 1996.

The one-year Memorandum of Understanding (MOU) on Grains agreed between Canada and the United States, including U.S. tariff rate quotas on durum wheat and other wheat, expired on September 11, 1995. 2/ As part of the MOU, a Joint Commission on Grains was established to assess each country's grain marketing and support systems, and to make recommendations to both governments on long term solutions in the grains sector. The final report was released in January 1996. Generally, the Commission recommended that the United States should significantly curtail its grain export subsidies while the Canadian Wheat Board should be made more responsive to market mechanisms.

In implementing its Uruguay Round market access commitments for sugar, the United States significantly reduced Canada's access for refined sugar

1/ Chapter 19 of the FTA covers provisions for dispute settlement for antidumping and countervail. Chapter 18 contains general provisions for all other dispute settlement. NAFTA extends the dispute-resolution provisions detailed in Chapter 18 and 19 of the FTA, to Chapters 20 and 19 of NAFTA, respectively.

2/ For details on the tariff rate quotas see "Canada - Recent Developments and Policies," SM/95/81 (4/20/95).

from previous levels. Effective from October 1, 1995 the United States created a new global tariff-rate quota of 22,000 tones for sugars, other than raw sugar, to be administered on a global first-come-first-serve basis. There were previously no restrictions on Canadian exports of refined beet sugar to the United States. In addition to restricting Canada's access for refined sugar, the United States also reduced Canada's access in certain sugar-containing products. In total, it is estimated that U.S. measures on sugar and sugar containing products resulted in close to a 50 percent reduction in Canada's access. At Canada's request, NAFTA Chapter 20 consultations with the United States were held in March 1995 but the issues remain unresolved. Canada intends to await the conclusions and recommendations of the NAFTA panel on supply managed agricultural products, as the final outcome may have some relevance for the sugar dispute.

On February 6, 1995 the United States Trade Representative (USTR) announced a Section 301 investigation over the decision of the Canadian Radio-Television Telecommunications Commission (CRTC) to revoke the distribution rights of the U.S. firm, Country Music Television (CMT), which had been operating in Canada since 1984. An accord was reached on June 21, 1995 to establish a joint network entity between New Country Network, the Canadian-based network that originally applied to the CRTC, and Country Music Television, to form CMT (Canada). 1/ A commercial deal was reached on March 7, 1996.

In November 1995, the Canadian Parliament approved a law imposing an 80 percent tax on advertising in split-run magazines (those publications where the editorial content is produced abroad and combines with Canadian advertising for sale in Canada). The law was largely aimed at Sports Illustrated Canada, which by electronically transmitting the editorial content into Canada, avoids the prohibition of imports of split-run periodicals which has been in effect since 1965. In March 1996, the United States initiated dispute-settlement procedures against Canada with the World Trade Organization; the United States has complained of discriminatory restrictions on foreign magazines.

On June 30, 1995 Canada requested consultations in the World Trade Organization in response to the European Union's new system of wheat import duties. 2/ Officials suggested that the EU's use of reference prices as a basis for duty assessment was inconsistent with WTO obligations. On December 17, 1995 Canadian and EU trade officials reached an agreement, which provided sufficient modifications to the EU regulations on import duties to improve Canadian access by raising the duty rebate on high-quality wheat and lowering the quality threshold for durum wheat. The agreement, to be effective from January 1, 1996 to June 30, 1996, also provides for further discussions during the first quarter of 1996 to examine what

1/ For further information see, "United States - Background Papers," SM/95/18, (7/26/95).

2/ A request for consultations is the first step in the WTO's dispute-settlement procedures under Articles XXII and XXIII of GATT (1994).

measures might be necessary for future marketing years. Canada has presently terminated its request for a WTO panel but retains the right to pursue the matter in the WTO if further discussions do not prove satisfactory.

Canada initiated 11 antidumping investigations under GATT procedures in 1995, and 8 final determinations of dumping actions were issued. Three countervail actions were also initiated and one final determination of subsidization was made in 1995. 1/ The majority of these cases related to refined sugar from six countries. On March 17, 1995 Canada initiated antidumping and countervailing duty investigations following a complaint by the Canadian Sugar Institute. After preliminary determinations announced in July 1995, the final dumping determination made in October 5, 1995 ruled that U.S. sugar exports were being dumped in the Canadian market with an overall average dumping margin of 44 percent. Dumped sugar exports from Germany, Denmark, the Netherlands, and the United Kingdom, with U.S. exports, were found to threaten injury to Canadian production. It was determined that no material injury had as yet been caused to the Canadian industry, but that injury could be caused if the dumping were allowed to continue. No evidence of injury or a threat of injury was found for dumped Korean sugar exports. A final determination of countervailable subsidies was made against exports of sugar from all EU member countries to Canada.

5. The North American Free Trade Agreement (NAFTA)
and the Free Trade Area of the Americas (FTAA)

While it is difficult to isolate the effects of lower trade barriers at this early stage, the Canada-U.S. Free Trade Agreement (FTA) and NAFTA are believed to have had a positive impact on intra-regional trade. Canadian merchandise exports to the United States have grown by 83 percent over the six year period to 1994, and trade with the United States now accounts for over 80 percent of total exports, compared with 71 percent in 1988 (the year prior to the FTA). Canadian exports to Mexico increased by 28 percent in 1994 and imports rose by 21 percent. Trade in services and investment flows have also increased within the NAFTA region. Canadian direct investment in Mexico doubled in 1994 to \$1.2 billion and direct investment in the United States reached \$67 billion.

Overall, the vast majority of trade between the NAFTA countries has been without problems. The implementation of NAFTA and the conduct of trade under its provisions has been facilitated by regular meetings of the NAFTA Trade Commission and the ongoing work of the Commission in the various committees and working groups created under the NAFTA. With regard to the dispute-settlement provisions of the NAFTA, to date there has been only one request for a panel under the dispute settlement mechanism in Chapter 20. The review mechanism for antidumping and countervailing duty in Chapter 19

1/ During the last year, Canada has not taken any safeguard actions as governed by the WTO Agreement on Safeguards (as provided in Article XIX of GATT 1994) or any safeguard actions as provided by NAFTA, Chapter 8.

has been more active. There are currently 14 active panel reviews under Chapter 19, of which three are reviewing determinations made by Canadian agencies.

Under NAFTA a trilateral working group was established to recommend a new system of rules governing antidumping and countervail. The focus has been primarily on antidumping (AD) with the group waiting to see how the new WTO disciplines on subsidies operate. While a deadline of December 31, 1995 had been set, a number of protracted issues remained unresolved and discussions have been extended. However, the group is expected to issue interim recommendations to provide for changes in administrative practices and regulations governing AD cases, and to reduce the administrative burden associated with the process, increase its predictability, and enhance transparency.

Canada fully supports the commitment made at the December 1994 Summit of the Americas held in Miami to create a "Free Trade Area of the Americas" by 2005 in a manner fully consistent with WTO provisions. The FTAA is viewed as a complementary initiative to NAFTA and other subregional trade agreements to assist in the elimination of barriers to trade and investment through agreed disciplines.

At the FTAA Trade Ministerial Summit held in Denver on June 30, 1995, a preparatory framework was put in place with the establishment of seven working groups. 1/ Each group will provide recommendations within their assigned areas to facilitate a program for negotiations. 2/ At the end of March 1996, a Trade Ministerial meeting will be held in Cartagena, Colombia, to assess the working groups' recommendations, and to set up four additional working groups on government procurement, intellectual property rights, services and competition policy. Depending on the outcome of these preparations, formal FTAA negotiations could be launched at the subsequent ministerial meeting sometime in 1997.

Formal negotiations on Chile's accession to NAFTA were initiated in Toronto on June 7, 1995. Pending passage by the U.S. Congress of fast-track negotiating authority, Canada and Chile have begun negotiations on an interim bilateral trade accord, which is consistent with the ultimate aim of NAFTA accession. The intention is to provide a stand-alone, interim accord which will integrate easily into four-way NAFTA accession discussions. Three working groups have been established, covering market access, services and investment, and legal questions and dispute settlement.

1/ The working groups are to cover: market access; custom procedures and rules of origin; investment; standards and technical barriers to trade; sanitary and phytosanitary measures; subsidies, anti-dumping and countervailing duties; and a "smaller economies" group.

2/ For further information on the work program of the groups see "United States - Background Papers," SM/95/181 (7/26/95).

6. Asian-Pacific Economic Cooperation Forum (APEC)

On November 17, 1995 the 18-member nations of APEC endorsed an "Action Agenda" to achieve "free and open" trade and investment by the year 2020. 1/ The Action Agenda includes two parts. Part One provides for a framework to facilitate and liberalize trade and investment, including actions in specific areas. Part Two covers increased economic and technical cooperation, through, *inter alia*, infrastructure development, human resource development, and finance and exchange rate coordination. 2/

As a first step, each country submitted "initial actions" on tariffs and non-tariff barriers. In most cases, these initial actions represented a restatement or acceleration of previous commitments undertaken either unilaterally or under the Uruguay Round. 3/ Each member country is expected to submit more substantive proposals during the 1996 APEC Ministerial Meeting at Subic Bay in the Philippines. 4/

The intention at this stage is to build "consensus through consultation" rather than to achieve commitments through negotiated agreement. The approach, which comprises concerted unilateral undertakings as well as collective and multilateral actions where possible, remains a mechanism to a more open regional trading environment for member countries.

1/ At the APEC meeting in Bogor, Indonesia on November 15, 1994, member countries issued a "Declaration of Common Resolve" to achieve "free and open trade and investment" by 2020, and for the more industrialized countries by 2010.

2/ For further details see "Declaration for Action and The Action Agenda - The Implementation of the Bogor Declaration," APEC Economic Leaders' Meeting, Osaka, Japan, November 19, 1995.

3/ Canada listed a number of measures undertaken over the last year, as "initial actions" including, enlarging preferential tariff treatment to 219 new lines and reducing preferential tariff rates on some 3,000 items, and extending to all WTO members preferential treatment under the Investment Canada Act previously reserved for investors under NAFTA.

4/ Members will submit unilateral liberalization plans in 15 specific areas; tariffs, non-tariff measures, services, investment, standards and conformance, customs, intellectual property rights, competition policy, government procurement, deregulation, rules of origin, dispute mediation, mobility of business persons, Uruguay Round implementation, and information gathering. Following an initial comparison, these "Action Plans" will be tabled at the Philippine Summit, with implementation and review to begin in 1997, when Canada will chair APEC.

7. Trade preferences for developing countries

The General Preferential Tariff (GPT), originally implemented in 1974, was designed to promote economic growth within developing countries and more recently within transitional economies. Until recently, GPT rates were generally two-thirds of MFN rates. However, as MFN rates are reduced under the Uruguay Round, the GPT margin of preference would be eroded and Canadian officials sought to reconsider appropriate preferential tariffs. Consequently, following a review of the scheme, a new schedule of GPT rates became effective from January 1, 1996 which provides for the phased reduction of many GPT rates on over 3,000 products. In addition the GPT product coverage was broadened by 219 tariff lines (primarily in the agriculture and electrical machinery chapters of the Customs Tariff).

Duty-free entry is extended to all GPT eligible imports from the least developed of the developing countries (44 countries are eligible for LDDC tariff treatment). During 1996 the Government is seeking consultations with industry to propose an extension of the special preferential tariff treatment for LDDCs across most of the Canadian tariff schedule, regardless of whether an item is eligible for GPT treatment.

8. Foreign investment

The Communiqué issued at the Ministerial meeting of the Organization for Economic Cooperation and Development (OECD) in Paris, on May 24, 1995 endorsed the immediate start of negotiations to reach a Multilateral Agreement on Investment (MAI) by the 1997 Ministerial meeting. The intention is to provide a broad multilateral framework for the liberalization of investment regimes, with effective dispute settlement procedures. The agreement will be a free-standing international treaty open to all OECD members and to accession by non-OECD member countries. Such an agreement is expected to prepare the ground for multilateral discussions on investment within the context of the WTO. In September, 1995, the OECD Negotiating Group began the task of formulating a draft agreement to establish the procedural arrangements for negotiations and created a Drafting Group on Selected Topics to prepare specific investment protection provisions, and a dispute settlement mechanism.

Canada will continue to negotiate bilateral Foreign Investment Protection Agreements (FIPAs) however, until a universal multilateral investment agreement is in place. Currently, Canada has FIPAs with Russia, the Czech and Slovak Republics, Hungary, Latvia, Poland, and the Ukraine. Agreements are expected to be reached over the coming year with a number of other countries, including India, Kazakhstan, Peru, and Venezuela.

9. Internal trade

On July 1, 1995 the Agreement on Internal Trade, signed by the Prime Minister and the premiers of the 12 provinces a year earlier, came into force. While the constitution mandates a customs union with no tariff barriers across provinces, in fact there have been substantial nontariff

barriers to internal trade in the form of government procurement restrictions, and general standards and regulations. The agreement provides for the elimination of these barriers to trade, as well as barriers to investment and labor mobility within the country. The intention is to promote a more open, efficient and stable domestic market.

Liberalization of government procurement is considered to be one of the most important facets of the agreement, covering contracts with a market valuation of C\$50 billion per annum. Provincial governments are no longer permitted to discriminate against suppliers from another province through use of local price preferences, imposing unfair registration requirements or setting unreasonable time constraints. Also included in the agreement are provisions for labor mobility and investment. The labor mobility chapter restricts the use of residency requirements and establishes a process for harmonizing worker occupational qualifications and standards across the country. The investment chapter limits the imposition of local presence and residency requirements and restricts the use of local content and purchasing requirements. The agreement also has a formal dispute-settlement mechanism patterned on NAFTA to deal with grievances.

The agreement is viewed as an initial step toward eliminating internal trade barriers. It also prevents new barriers from arising while establishing a framework for further liberalization. The work program envisages further discussions on the energy chapter to allow the free flow of electricity across provincial borders as well as increasing transparency in pricing. In agriculture, issues to be considered are inspection standards and other technical barriers, as well as a review of the supply managed commodities. To increase labor mobility a reconciliation of occupational standards is to be concluded by July 1, 1996.

10. Other measures and issues

Since March 1994, Canada has been participating in the negotiations for a successor regime to the Coordinating Committee on Multilateral Export Controls (COCOM). The main focus of the arrangement under discussion is on the non-proliferation of weapons and will encompass both arms and dual-use goods and technologies, including the establishment of a control list. Working groups are in the process of reporting their progress and a concluding agreement is expected shortly.

Canada maintains restrictions on payments and transfers to Iraq (since August 1990) and Serbia and Montenegro (since June 1993 and April 1993, respectively).

XI. Official Development Assistance 1/

The International Assistance Envelope (IAE) in the federal budget funds includes both traditional official development assistance (ODA) to low- and middle-income countries, as well as other international assistance initiatives. Among the latter, the main recipients are the transition economies of central and eastern Europe, the Baltic countries, Russia, and the other countries of the former Soviet Union.

In line with budget-wide constraints, Canada's ODA to developing countries and multilateral institutions, measured on a Development Assistance Committee (DAC) basis, declined to US\$2,296 million in 1994, (representing 0.43 percent of GNP) from US\$2,373 million (0.45 percent of GNP) in 1993 (see tabulation below).

Official Development Assistance 2/

	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>
<u>(In billions of U.S. dollars)</u>						
<u>Total</u>	<u>2.3</u>	<u>2.5</u>	<u>2.6</u>	<u>2.5</u>	<u>2.4</u>	<u>2.3</u>
<u>Bilateral</u>	<u>1.6</u>	<u>1.7</u>	<u>1.8</u>	<u>1.7</u>	<u>1.6</u>	<u>1.5</u>
<u>Multilateral</u>	<u>0.7</u>	<u>0.8</u>	<u>0.8</u>	<u>0.8</u>	<u>0.8</u>	<u>0.8</u>
<u>(In percent of GNP)</u>						
<u>Total</u>	<u>0.44</u>	<u>0.44</u>	<u>0.45</u>	<u>0.46</u>	<u>0.45</u>	<u>0.43</u>
<u>Bilateral</u>	<u>0.30</u>	<u>0.30</u>	<u>0.31</u>	<u>0.31</u>	<u>0.30</u>	<u>0.28</u>
<u>Multilateral</u>	<u>0.14</u>	<u>0.14</u>	<u>0.14</u>	<u>0.15</u>	<u>0.15</u>	<u>0.15</u>
<u>(In percent of total ODA)</u>						
<u>Total</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>
<u>Bilateral</u>	<u>68</u>	<u>68</u>	<u>69</u>	<u>68</u>	<u>67</u>	<u>65</u>
<u>Multilateral</u>	<u>32</u>	<u>32</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>35</u>

The Government is committed to making progress toward the target of 0.7 percent when Canada's fiscal situation permits. However, the current

1/ Prepared by Susan Prowse.

2/ Includes traditional ODA measured on a DAC basis, and excludes aid programs for transition economies.

need for fiscal consolidation has made it difficult to achieve this goal. Following a 15 percent decline in IAE funding in fiscal 1995/96 and a scheduled spending freeze in 1996/97, the 1995 budget called for an additional 6 percent nominal cut in 1997/98.

In view of its overall fiscal objectives, the Government has been reappraising its international assistance programs. In response to a special joint Parliamentary committee reviewing Canadian foreign policy, the Government reaffirmed in 1995 that the mandate of Canadian foreign assistance remains poverty reduction and sustainable development. Support for basic human needs is to become a key priority, with special emphasis on health care, basic education, family planning, nutrition, water and sanitation, and shelter. In response, the Government has committed itself to the longer term objective of raising the share to 25 percent of ODA.

The Government also endorsed the views of the committee that bilateral aid administered by the Canadian International Development Agency (CIDA) should concentrate, in addition to basic human needs, on five other program priorities, including, women in development, human rights, democracy and good governance, private sector development, the environment, and infrastructure services.

Canada maintains active programs of assistance to the countries of central and eastern Europe, the Baltic countries, Russia, and the other countries of the former Soviet Union. Assistance is directly engaged in promoting the transformation of the region to democracy and market economies, and stimulating trade and investment opportunities for Canada.