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Cover

Brass Cash Register, 1910

The cash register is probably the most familiar, and the most important, piece of equipment in any store. It serves as the point where customers complete their transactions, tendering their money in exchange for the merchant's goods or services. The cash register is the repository for payments: it records and tabulates sales or charges on account and dispenses change and receipts, providing both the merchant and the customer with an accurate record of the transaction.

Before the cash register was developed in the late nineteenth century, merchants relied on a simple cash drawer to hold their daily cash and receipts and a separate ledger in which to record transactions. This system was prone to inaccuracies and was susceptible to the greed of dishonest clerks. Frustrated by these limitations, Ohio barkeeper James Ritty set out to build an automated, accurate, and secure method of handling transactions. He succeeded in 1879, and within a few short years the cash register enjoyed widespread popularity among merchants.

In 1884, John H. Patterson purchased the National Manufacturing Company, which had been created to produce Ritty's cash registers, and renamed it the National Cash Register Co. Based in Dayton, Ohio, the firm opened its first office in Canada in Montréal about 1888 and another in Toronto the following year. By 1910, the company had sales offices in every major city across Canada and a large factory in Toronto.

The example shown here, one of the company's No. 500 series models, combined mechanical sophistication with visual artistry. Impressive in scale, it measured 73.6 by 83.8 by 50.8 centimetres and was so heavy that it took at least two people to move it. In addition to the necessary accounting machinery, these models included such options as motors, electric lights, clocks, and time and date stamps, all housed within an ornate brass cabinet with a marble shelf. The complete unit was mounted on a hardy oak base with one to six drawers, depending on the model.

The cash register featured on the cover was manufactured in Toronto in 1910 for P.D. Herbert, a grocer at 228–232 Bank Street in Ottawa. Objects associated with the register suggest that John W. Thomson of Buckingham, Quebec, proprietor of a men's store, acquired the register sometime during or after the First World War and used it into the 1940s.

The register is part of the National Currency Collection, Bank of Canada.

Photography by Gord Carter, Ottawa.

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The Comparative Growth of Goods and Services Prices

Edith Gagnon, Patrick Sabourin, and Sébastien Lavoie, International Department

- *An analysis of movements in the prices of the components of the consumer price index (CPI) confirms that a widespread pattern has emerged in the industrialized world. Specifically, prices of services have increased faster than prices of goods.*
- *Since this divergence in price movements has persisted and is independent of the level of inflation, it cannot be said to influence the trend in the development of the overall price level.*
- *To a great extent, the gap between the growth rates of prices in the goods and service sectors is explained by the more rapid pace of productivity growth in the goods sector.*

Changes in the prices of the components of the consumer price index in recent years have attracted the attention of both economists and markets. While prices of services have been rising more rapidly than those of goods since the 1960s**,** the difference in the growth rates of prices between the two sectors widened considerably in 2002 in most industrialized countries.

Overall Context

An analysis of the two main components of the CPI, goods and services, clearly indicates that, for several decades, the prices of services have been rising more rapidly than the prices of goods. This trend has persisted in Canada and the other major industrialized countries, regardless of the inflation rate[1] (Table 1). For example, growth in services prices outpaced growth in goods prices as much during periods when inflation was relatively high (the 1970s and 1980s) as it did when inflation was low (the 1960s and 1990s).

The divergent rate of growth between services prices and goods prices became more pronounced in 2002, leading researchers to ask if this was the beginning of a trend.

1. The index (or measure) used for each country is represented by the general consumer price index: in Canada, the United States, and Japan, this is the CPI; in the euro zone, the Harmonized Consumer Price Index (HCPI); and in the United Kingdom, the Retail Price Index (RPI).

Table 1

Average Annual Changes in Consumer Price Indexes*

Per cent

	Canada	United States	Euro zone	United Kingdom	Japan
CPI					
1962–70	2.92	2.96	–	4.12	–
1970–90	6.84	6.28	–	10.02	5.59
1990–2002	2.27	2.91	2.52	3.35	0.75
Services					
1962–70	4.05	4.06	–	–	–
1970–90	7.07	7.72	–	7.31	6.47
1990–2002	2.69	3.64	3.27	4.66	1.39
Goods					
1962–70	2.31	2.36	–	–	–
1970–90	6.72	5.56	–	5.03	4.98
1990–2002	1.90	1.95	2.02	2.49	0.17

* The data for each country begin on the following dates: Canada and the United States, 1962; euro zone, 1991; Japan, 1971; United Kingdom, 1962 (RPI) and 1988 (RPI components).

Source: Thomson Financial Datastream and Statistics Canada

Table 2

Annual Changes in Consumer Price Indexes

Per cent

	Canada	United States	Euro zone	United Kingdom	Japan
CPI					
2000	2.7	3.4	2.4	2.9	-0.7
2001	2.5	2.8	2.5	1.8	-0.7
2002	2.2	1.6	2.2	1.6	-0.9
Services					
2000	2.3	3.4	1.7	3.5	0.0
2001	2.5	4.2	2.5	3.7	-0.1
2002	2.9	3.2	3.1	4.6	0.0
Goods					
2000	3.1	3.3	2.6	0.3	-1.3
2001	2.5	1.0	2.5	0.3	-1.4
2002	1.6	-0.6	1.7	-0.5	-1.8
Gap					
2000	-0.9	0.1	-0.9	3.2	1.2
2001	0.0	3.2	0.0	3.3	1.3
2002	1.3	3.8	1.4	5.1	1.8

Source: Thomson Financial Datastream and Statistics Canada

The gap between the growth rates for the prices of goods and services widened considerably in 2002 in Canada, the United States, the euro zone, the United Kingdom, and Japan (Table 2). Further, prices of services increased in some countries while those of goods fell. While no country other than Japan experienced deflation in 2002, the widening of the gap between the prices of the two components began to attract widespread attention.

Historical context

Though considerable, the widening of the gap in 2002 was not unusual in the industrialized countries under consideration here, since fairly large gaps have occurred in many different years (Chart 1). Further, in all the industrialized countries, the gap was in fact larger on several occasions than it was in 2002 and was even negative for short intervals, when the prices of goods increased more rapidly than those of services. Despite these short-term dynamics, however, changes in the prices of services relative to those of goods were positive, on average, over longer periods of time.

On that basis, the existence of a gap between the growth rates for the prices of the goods and services components of the CPI should not be a cause for concern, since the gap appears to be independent of the trend in the development of the overall price level. Similarly, a widening of this gap is not inherently worrisome, as evidence shows that it is eventually reabsorbed. Nevertheless, the question remains: Why have the prices of goods developed differently than the prices of services?

Why the Prices of Services Have Risen Faster

Various factors may explain the tendency of services prices to rise more rapidly than goods prices. First, it is possible that this trend is an artificial one, owing to the difficulty of accurately measuring prices in the service sector (see Box). If the difference really exists, however, it could be explained by several economic factors: in particular, by the more rapid productivity gains in the goods sector than in the service sector,[2] the greater openness of goods to foreign trade, and stronger growth in the demand for services as the population ages.

Productivity growth

According to Baumol (1967), the slower growth of productivity in the service sector is the underlying cause of the faster growth in the prices of services. To illustrate, he suggests that if productivity grows by

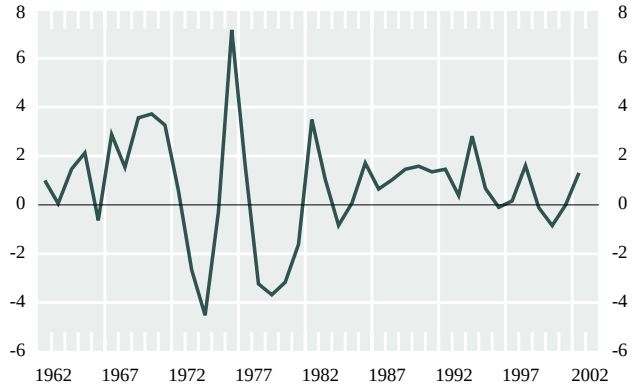
2. See Maclean (1996, 1997) for details on productivity growth in the service sector in Canada and Gordon (1996) for details on its develoment in the United States.

Chart 1

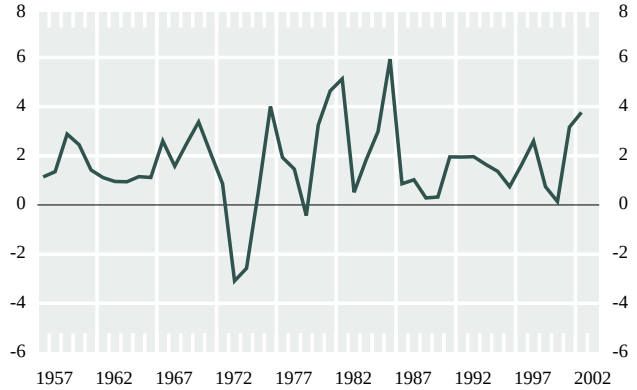
Gap Between the Growth Rates of Prices in the Services and Goods Components of the CPI

Percentages

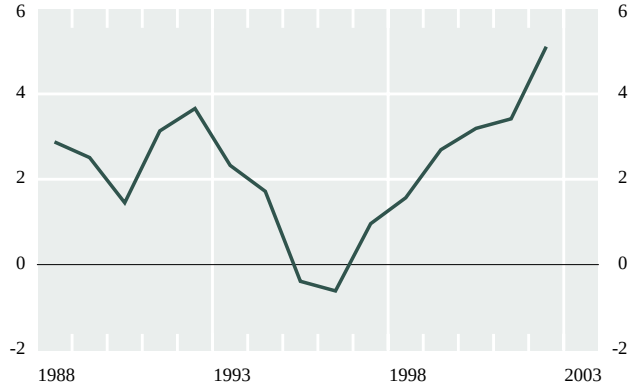
Canada



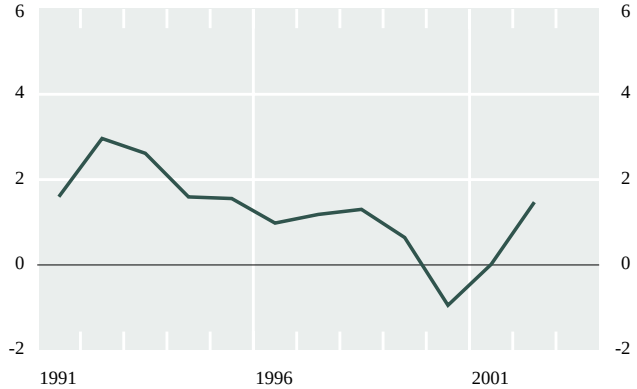
United States



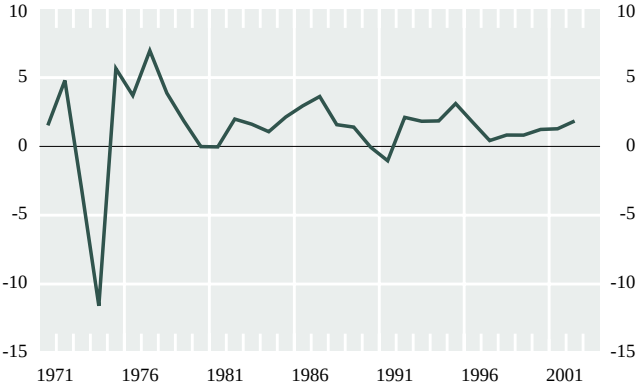
United Kingdom



Euro zone



Japan



Source: Thomson Financial Datastream and Statistics Canada

4.0 per cent in the goods sector, then firms can increase their employees' wages by an equal amount without raising prices. Yet some services, in particular, social services (e.g., health and education) and certain personal services (e.g., hairdressing) rely heavily on the worker's skill and do not leave much room for technological improvements. It is difficult, for example, for a hairdresser to increase productivity by reducing the amount of time spent with the client, since the tools and the opportunities for automating services are limited.

Under conditions of competition and labour mobility, wages should grow at approximately the same pace in both sectors, or a labour shortage will develop and widen in the service sector over time. If the cost of labour is comparable across both sectors—once differences in working conditions and skill requirements have been accounted for—and the return on capital is also the same, then faster productivity growth in the goods sector will drive down goods prices relative to services prices. The stiffer the competition in a sector, the faster a drop in production costs associated with productivity gains will be passed through to consumers.

The data in Table 3 support Baumol's thesis.[3] The growth of wages in the service sector between 1988

Explaining Measurement Errors

In some sectors, production is intangible, and not easily measured in quantifiable units (Maclean 1996). Quality improvements in the service sector are particularly difficult to measure since, in general, they depend on a wide range of factors (e.g., the client's convenience) that are not captured by the measures of production. By definition, an improvement in quality increases productivity (production) and reduces the effective price by an equivalent amount.

Sources of errors

The rate of change in the price of a good or service is overestimated if a quality improvement is not accounted for.[1] The price of a medical consultation, for example, is measured in terms of the rate charged.[2] Changes to the quality of medical care are difficult to quantify, since they essentially consist of contributions to the health of the patient (decreased side effects) and the speed of recovery, which are not accounted for in statistical data. In addition, in many service industries (e.g., financial, insurance, and real estate), it is unlikely that quality improvements resulting from new technologies can be captured by traditional measures. Automated teller machines (ATMs) are a good example: to the extent that ATMs have allowed banks to eliminate staff, banking statistics should reveal increased productivity. However, the increased convenience associated with such factors as the proximity of automated tellers and a reduction in time spent waiting in line is not reflected in data on productivity growth, even though clients clearly benefit.

The difficulties in measuring growth in production, productivity, and prices in the service sector (as in the goods sector) are also linked to the issue of how the value added is allocated among the sectors. For example, many services are not sold directly to consumers but serve as inputs in goods-producing industries. Underestimating this factor can lead to the risk of overestimating the value added that is generated by the goods sector and thus to overestimating productivity growth in that sector.

To summarize: it is widely accepted that measurement issues pose greater problems with respect to the prices of services than to the prices of goods, owing to the difficulty in capturing quantifiable improvements in the service sector, where there is less coverage and the quality of the data is more limited. According to numerous empirical studies, however, measurement errors alone cannot explain the gap between increases in the prices of services and those of goods. At most, they may explain half (Kostenbauer and Prud'homme 1999; Kroch 1991; Brauer 1993; Rappoport 1987).

1. Crawford (1998) provides an overview of the quality bias in the Canadian CPI. See also work by Shapiro and Wilcox (1996) for the United States and Cunningham (1996) for the United Kingdom.

2. Note that this example only applies to the United States. In Canada, fees for medical consultations are paid by the government and are excluded from the CPI.

Table 3

Average Gap Between the Growth in Prices, Productivity, and Wages in Industrialized Countries

Annual rate of change*

	Period	Ps – Pg	Prodg – Prods	Cg – Cs
Euro zone	1991–99	1.9	1.8	0.0
United Kingdom	1988–99	1.8	1.3	0.5
Japan	1988–98	1.3	1.4	1.0
United States	1988–2001	1.4	1.8	-0.3
Canada	1988–99	1.0	1.3	0.0

* Ps and Pg represent the growth rates of the prices of services and the prices of goods; Prodg and Prods, productivity growth in the two sectors; Cg and Cs, wage growth in the goods and service sectors.
Source: OECD STAN database (2002)

and 2001 was similar, on average, to that in the goods sector (except in Japan, where there was a 1-percentage-point difference). At the same time, productivity growth in the goods sector across the industrialized world systematically exceeded that in the service sector. A similar gap existed, on average, between the growth of prices and the growth of productivity in the two sectors.

Faster productivity growth in the goods sector will drive down goods prices relative to services prices.

These results are compatible with those obtained by Brauer (1993) for the United States and by Baldwin, Durand, and Hosein (2001) for Canada. These authors' results support the assumption that relative wages and relative productivity develop independently of one another. They also find a strong correlation between sectoral differences in productivity and real wage growth when these are expressed in terms of the prices in the sector involved (i.e., real wages from the perspective of the producer). However, it should be noted that the assumption of intersectoral mobility of labour is not consistent with the results obtained by Rappoport (1987) and Kostenbauer and Prud'homme (1999). These authors argue that the degree of substitutability between jobs in the goods and service sectors is low, while Baumol's theory suggests that it is very high. Despite this apparent contradiction,[4] the results in Table 3, along with most other empirical studies, tend to confirm that the faster rate of productivity growth in the goods sector relative to the service sector is an important contributor to the greater rise in services prices.

International trade . . . intensifies competition in the market for goods and limits the growth in the prices of goods compared with those of services.

Increased Openness to Foreign Trade

International trade is more focused on goods than on services, since goods are more tangible than services. This intensifies competition in the market for goods and limits the growth in the prices of goods compared with those of services.

While the degree of openness to foreign trade varies from one country to the next,[5] the industrialized nations have, overall, continually increased their integration into the global economy in recent decades (Table 4). As a result of this greater openness, countries are increasingly specializing in the production of goods in which they have a comparative advantage.

This ongoing expansion in foreign trade involves developing strong trade ties with rapidly growing markets, notably the emerging economies of Asia

3. Owing to the difficulties associated with measuring quality changes in the service sector, we should be cautious in interpreting the rates of relative productivity growth in industries in the goods and service sectors.

4. The contradiction may be more apparent than real. It is possible to have considerable ex ante substitutability even when there is no ex post substitutability; i.e., with limited intersectoral mobility. This type of substitutability may arise as new workers enter the labour force, without currently established workers needing to change sectors.

5. The degree of openness is represented by the share of goods (exports and imports) in total production. See Dion (1999–2000) for more details on recent trends in Canadian foreign trade.

Table 4

Openness to Foreign Trade

	Canada	United States	Euro zone*	United Kingdom	Japan
Average per cent of GDP					
1980–85	44	14	–	43	18
1986–90	52	17	–	48	19
1991–95	63	20	53	54	21
1996–2002	79	27	68	69	26

* Includes trade within the euro zone
Source: National accounts data for each country

Table 5

Trade Between Industrialized and Emerging-Market Countries

	Canada		United States		OECD-Europe*		United Kingdom		Japan	
	1980	2001	1980	2001	1980	2001	1980	2001	1980	2001
Share of imports of goods by region										
Asia	2.6	7.9	11.1	21.0	8.6	24.7	5.3	11.9	23.7	37.5
China	0.2	3.7	0.4	9.3	0.8	8.7	0.3	2.6	3.1	16.6
Latin America	5.7	5.5	15.4	17.4	7.1	6.1	2.7	1.8	4.1	2.7
Mexico	0.5	3.5	5.2	11.5	0.8	0.8	0.3	0.7	0.7	0.6

* Excludes trade within OECD-Europe, which consists of the 15 members of the European Union, the Czech Republic, Hungary, Iceland, Norway, Poland, Slovak Republic, Switzerland, and Turkey.
Source: WTO (2002), OECD

(Table 5).[6] Since these countries provide some goods at lower prices, they affect competition by putting downward pressure on the prices of these goods in the developed economies. Conversely, pressures on the prices of tradable goods produced in industrialized countries are mitigated when demand for these goods increases in emerging markets, or there is an appreciation of these countries' currencies.

According to Balassa (1964) and Samuelson (1964), the real exchange rate of a country will tend to appreciate if three factors are at work: productivity in its goods sector is growing faster than it is in other countries; the difference between the growth of productivity in the service sectors of the various countries is negligible; and the law of one price applies for comparable tradable goods.[7]

Increased international competition forces firms in the goods sector to increase their productivity in order to remain competitive. Consequently, their productivity will also increase relative to firms in the service sector. Thus, greater openness to foreign trade will maintain the gap in growth rates between the prices of services and the prices of goods.

Fluctuations in the real exchange rate that are induced by productivity shocks modify the relative prices of tradable goods vis-à-vis those of services, which are not traded.

Fluctuations in the real exchange rate that are induced by productivity shocks modify the relative prices of tradable goods vis-à-vis those of services, which are not traded.[8] Where a country benefits from productivity growth in the goods sector, a currency appreciation will exacerbate the gap in the growth of prices between the goods and service sectors. Yet the extent to which firms pass the impact of exchange rate fluctuations through to the prices of tradable goods is often limited, since it is usually costly to adjust prices in response to temporary fluctuations in the exchange rate. A sustained appreciation of the currency, however, will cause a drop in the prices of imported goods and, subsequently, a drop in production costs that is ultimately reflected in the prices of goods. The impact of exchange rate movements on the prices of goods also varies between countries.[9]

Table 6 shows the impact that fluctuations in the exchange rate may have on the prices of goods and services. In fact, the appreciation of the U.S. dollar and the pound sterling since 1995 have been accompanied by steep declines in the prices of goods compared with those of services. Conversely, during the same period, the fall in the prices of goods relative to services was much less pronounced in countries whose

6. An important step in the integration of the goods market was accomplished in December 2001, when China was admitted to the World Trade Organization (WTO).

7. Note, however, that Balassa and Samuelson's hypothesis is not fully supported by the data. This is notably explained by rejecting the law of one price in the tradable goods sector.

8. The real exchange rate may fluctuate for other reasons. Changes in the terms of trade resulting from an oil-price shock or a change in the composition of fiscal spending, for example, may also alter the real exchange rate.

9. The implications of variations in the exchange rate for consumer prices may vary over time, depending on the size of the output gap (Bank of Canada 2000).

Table 6

Changes in the Effective Exchange Rate and the Ratio of Goods and Services Prices, 1995–2002

	Ps – Pg[1]	Ps	Pg	e[2]
Euro zone	-0.1	-0.3	-0.2	-6.0
United Kingdom	5.5	2.0	-3.5	17.5
Japan	-1.3	-1.5	-0.2	-20.0
United States	2.4	-0.2	-2.6	23.0
Canada	0.6	0.4	-0.2	-6.0

1. Ps and Pg represent the movements in the prices of services and goods.
2. e represents the growth of the real effective exchange rate.
Source: Thomson Financial Datastream

Table 7

The Share of Services in Total Consumption

	In value		In real terms		Gap*
	1980	2000	1980	2000	1980–2000
United Kingdom	0.37	0.49	0.35	0.46	1.93
Japan	0.48	0.56	0.49	0.49	1.39
United States	0.48	0.58	0.52	0.56	1.98
Canada	0.43	0.51	0.44	0.51	0.61

* The price-growth gaps are taken from CPI indexes for purposes of illustration.
Source: OECD and Statistics Canada

currencies depreciated (Canada, Japan, and the euro zone). Indeed, since 1995, there has been a widening of the gap between the growth rates in the prices of goods and services in countries that experienced an appreciation of their currencies, concurrent with a levelling off of the gap in countries whose currencies fell (except Canada).

The Growing Demand for Services

The more rapid growth in the demand for services compared with that for goods is often cited in the literature as a cause of the more rapid growth in services prices. Various factors can explain why the demand for services continues to grow in industrialized countries. An aging population, for example, will tend to consume more and more personal services and health care.[10] Similarly, the income effect is stronger than the price effect, so that it will continue to operate even when services become more expensive, and a larger share of increasing incomes will be devoted to leisure, education, personal services, insurance, financial services, etc.

Möller (2001) uses estimates of income and of price elasticities of services to explain the more rapid rise in the demand for services and concludes that, in most cases, it is higher than 1 (for Germany, the United States, and the United Kingdom). His results also suggest that, since 1970, the income effect has trumped the price effect. Thus, a rise in consumers' incomes may compensate for an increase in the prices of services relative to those of goods, such that the demand for services will continue to grow. Möller also finds that the price elasticity of goods declined noticeably between 1960 and 1990.

The data in Table 7 confirm that, between 1980 and 2000, the consumption of services increased relative to that of goods in all the industrialized countries. During this period, the proportion of real spending on services generally grew, while their relative prices increased. Consequently, the demand for services has risen since the beginning of the 1980s.[11]

This faster growth in the demand for services relative to the demand for goods is another possible explanation for the trend of services prices to rise more rapidly than those of goods.[12]

Conclusion

The gap in the growth rates between the prices of services and the prices of goods seems to be independent of the inflation rate in Canada as well as the principal industrialized countries. The gap cannot therefore be said to influence the trend of inflation. While the gap in the growth rates of prices between the two components of the CPI may fluctuate significantly over short periods, as in 2002 for example, it generally fluctuates around a long-term positive average. The persistence of this gap is largely explained by the faster pace of productivity growth in the goods sector relative to the service sector. It is also related to increasingly open markets for tradable goods and to a growing demand for services as the population ages.

10. This example is particularly valid in the United States, where medical care is included in the CPI.

11. Clearly, the validity of this argument is contingent on a relatively small margin of measurement error.

12. In the literature, this simultaneous increase in the relative prices of, and the persistent demand for, services is generally called the Paradox of Services.

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Current Account Imbalances: Some Key Issues for the Major Industrialized Economies

Jocelyn Jacob, International Department

- *In recent years, the resurgence of sizable current account imbalances in the major economies, particularly the U.S. deficit, has led to renewed academic and public discussions about their sustainability.*
- *By themselves, current account imbalances (deficits or surpluses) are neither good nor bad. They simply reflect the outcome of relative cyclical and structural factors in domestic and foreign economies.*
- *Over the second half of the 1990s, the much faster increase in U.S. productivity compared with that of other major economies has been an important factor shaping the evolution of current account balances in major economies. More recently, however, a key element behind the further widening in the U.S. current account deficit has been the loosening in the U.S. fiscal stance.*
- *The experience of recent decades suggests that deficits similar to those that currently exist do not usually last for long and can sometimes unwind in the context of relatively abrupt exchange rate movements. Still, the current episode is unique in a number of respects. For instance, it reflects in part the relatively favourable U.S. productivity performance, which (if sustained) could reduce the likelihood of an abrupt adjustment. Moreover, some believe that the capacity of the United States to finance its current account deficit has increased over time.*
- *The sizable but orderly depreciation of the U.S. dollar on a real effective basis since the beginning of 2002 will contribute to some reduction in external imbalances among major economies.*

There have been renewed academic and public discussions in recent years about growing external imbalances among major economies, particularly the U.S. current account deficit. In that context, one of the main objectives of this article is to show that current account balances are simply the outcome of various relative structural and cyclical forces between trading partners. The first section of this article is a review of the underlying determinants of the changes in current account positions among the three largest industrial economies (the United States, Japan, and the euro area)[1] since the mid-1990s.

In the second section, possible risks to macroeconomic and financial stability that might stem from large current account deficits and the associated buildup of international liabilities are discussed. We review a range of outside assessments by the Organisation for Economic Co-operation and Development (OECD) and the International Monetary Fund (IMF), and in the academic literature, of current external imbalances, as well as the international historical experience (notably in the 1980s) with external imbalances that are similar to those that currently exist. Evidence indicates that large deficits in industrialized countries do not usually persist for long and that their unwinding generally involves a significant currency depreciation and a slowing in the growth of domestic demand. The parallels that can be drawn with recent developments in exchange markets and U.S. economic activity make this article particularly topical.

1. The United States, Japan, and the euro area are collectively referred to as the "G-3."

Recent Current Account Developments in the G-3

A key feature of current account developments in the major economies since the mid-1990s is that the U.S. deficit has more than tripled. It rose from 1.5 per cent of GDP in 1997 (its approximate average value over the previous two decades) to 4.6 per cent in 2002 (Table 1).[2] At the same time, while a sizable surplus position was maintained in Japan, and to a lesser extent in the euro area, other economies, particularly certain developing countries, experienced a substantial shift from a deficit to a surplus position. The newly industrialized Asian economies[3] also witnessed a sizable increase in their surplus positions in recent years. Consequently, the combined Japanese-euro area surplus, which more than offset the U.S. deficit in 1997, accounted for less than 40 per cent of the U.S. deficit by 2002. While not the focus of this article, this development underscores the growing importance of emerging economies on the global economic scene.[4]

A key feature of current account developments in the major economies since the mid-1990s is that the U.S. deficit has more than tripled.

Table 1

Global Current Account Balances

US$ billions

	1997	1998	1999	2000	2001	2002	Changes between 1997 and 2002
United States[a]	-128.4	-203.8	-292.9	-410.3	-393.7	-480.9	-352.5
	(-1.5)	(-2.3)	(-3.2)	(-4.2)	(-3.9)	(-4.6)	-3.1 [b]
Euro area[a c]	98.2	62.5	29.0	-28.7	11.8	61.2	-37.0
	(1.5)	(0.9)	(0.4)	(-0.5)	(0.2)	(0.9)	-0.6 [b]
Japan[a]	96.6	119.1	114.5	119.6	87.8	112.7	+16.1
	(2.2)	(3.0)	(2.6)	(2.5)	(2.1)	(2.8)	+0.6 [b]
Canada[a]	-8.2	-7.7	1.7	20.7	17.3	14.9	+23.1
	(-1.3)	(-1.2)	(0.3)	(2.9)	(2.4)	(2.0)	+3.3 [b]
Newly industrialized Asian economies	8.5	66.8	60.1	43.5	54.6	68.0	+59.5
Other advanced economies	22.0	3.7	-7.2	20.7	31.3	37.5	+15.5
Developing countries	-55.6	-82.6	-9.6	67.8	25.9	74.0	+129.6
Countries in transition	-25.3	-29.5	-2.4	25.1	12.8	9.9	+35.2
Total[d]	7.8	-71.6	-106.8	-141.6	-152.2	-102.8	-110.6

a. The figures in brackets are the current account balances as a percentage of nominal GDP. More details about the classification of countries into major groups (e.g., advanced, developing, or in transition) can be found in the statistical appendix of the IMF *World Economic Outlook.*
b. Figures are expressed in percentage points.
c. Calculated as the sum of the balances of individual euro-area countries
d. Reflects errors, omissions, and asymmetries in balance-of-payments statistics on the current accounts. Excludes data for international organizations and some countries.
Source: IMF

Valuable insights into the evolution of current account balances can be gained by examining their underlying determinants. In this regard, current account balances can be analyzed by considering two different perspectives, which are consistent and mutually reinforcing: (1) a domestic perspective based on savings and investment, and (2) an international perspective based on trade flows in goods and services.[5]

Savings-investment perspective

From the basic national accounts identities, we can show that current account balances reflect the difference between domestic savings and investment.[6] Indeed, international financial integration and mobility

2. The Box on p. 13 outlines the disparate data sources and measurement errors that complicate the analysis of current account balances and international investment positions. These caveats must be kept in mind where discrepancies are found between conceptually equivalent statistics such as those reported in the tables and figures in this article.

3. Hong Kong SAR, South Korea, Singapore, and Taiwan, Province of China.

4. Although it is a major trading nation, Canada's current account balance is relatively small (an average surplus of about US$16 billion since 2000). Consequently, Canada has not contributed significantly to global external imbalances.

5. Current account balances fundamentally reflect domestic savings and investment conditions. However, international forces have a bearing on domestic conditions, notably through their influence on interest rates and exchange rates.

6. Consider the following concepts: $GNDY = GNP + NCT$
$GNP = GDP + NY$
$GDP = C + I + G + X - M$
where GNP is gross national product
GDP is gross domestic product
$GNDY$ is the gross national disposable income
C is consumer expenditure
I is business investment and residential construction
G is government purchases of goods and services
X is export of goods and services
M is import of goods and services
NY is net income from abroad
NCT is net current transfers
T is government tax receipts.

The current account balance *(CAB)* is:
$CAB = X - M + NY + NCT$
$= (GNDY - T - C) + (T - G) - I$
= Private savings + Government savings – Investment.

The Global Current Account Discrepancy and Other Statistical Problems

As highlighted by the IMF (2002c), various measurement errors complicate the analysis of current account imbalances and the balance of payments more generally. A comparison of Tables 1, 2, and 4 shows that there can be significant discrepancies not only between balances for the current account and the financial and capital account (balance-of-payments data), but also between measures of domestic savings relative to investment (national accounts data). Yet, in theory, all of these measures should give the same results.

At the global level, these statistical problems add up to sizable discrepancies. While the world current account should, in principle, be in balance, the IMF estimates that it reached a deficit of US$103 billion in 2002. This suggests that some countries' reported current account deficits might be exaggerated, or the current account surpluses of others might be underestimated. This raises the question of how much of the observed current account imbalances are simply the result of measurement errors.

There are also problems with the measurement of international investment positions. In this regard, Warnock and Cleaver (2002) argue that the U.S. debtor position, which has grown rapidly in recent years, has been overstated because U.S. holdings of foreign securities are underestimated, while foreign holdings of U.S. securities are overestimated.

of capital allow a deficit in savings relative to investment in one economy to be "financed" by surplus savings in foreign economies, which contributes to an efficient worldwide allocation of resources.[7]

As can be seen from Table 2, domestic investment was systematically larger than domestic savings in the United States over the 1997–2002 period. As a result, the United States has been a net borrower of foreign savings. In contrast, the euro-area and Japanese economies are both significant net lenders to the rest of the world. Although investment (as a proportion of GDP) is larger in the euro area and Japan than in the United States, the proportion of savings is also much greater.

In part as a result of forward-looking expectations, global productivity developments had many economic and financial repercussions in the United States and the rest of the world, notably on investment and savings. In particular, there was a substantial upward shift in U.S. labour-productivity growth relative to the previous two decades (Table 3). In contrast, labour-productivity growth continued its downward trend in both Japan and the euro area. As a result, the U.S. productivity performance shifted from well below that of Japan and the euro area to well above them (the so-called "U.S. productivity miracle").

In part as a result of forward-looking expectations, global productivity developments had many economic and financial repercussions in the United States and the rest of the world, notably on investment and savings.

Between 1997 and 2000, the foreign-borrowing needs of the United States increased markedly, reflecting mainly a substantial rise in the proportion of investment in GDP. The much more pronounced rise in U.S. investment compared with other industrialized economies resulted in large part from the significant and sustained rise in U.S. productivity since the mid-1990s, which raised longer-term prospects for potential growth in the U.S. economy. The capital-stock adjustment to this higher perceived growth rate for trend output (i.e., a shift to a higher capital-labour ratio), along with a higher rate of depreciation of the capital stock (i.e., a shift in the composition of capital towards short-lived assets such as computer equipment) led to a substantial growth in U.S. business investment.

7. Shifts in the "world" real interest rates help to equalize savings and investment at the global level. For instance, when investment is larger (smaller) than savings, this puts upward (downward) pressure on real interest rates, which induces savings to increase (decrease) and investment to decrease (increase).

Table 2

Savings – Investment Balances in the G-3

Per cent of nominal GDP

	1997	1998	1999	2000	2001	2002	Changes between 1997 and 2002 (percentage points)
United States							
Savings – Investment balance	-1.8	-1.9	-2.6	-2.7	-2.6	-3.6	-1.8
Gross savings							
Total	18.1	18.8	18.4	18.4	16.5	15.0	-3.1
Public	1.9	3.1	3.8	4.4	2.6	-0.2	-2.1
Private	16.2	15.7	14.6	14.0	13.9	15.2	-1.0
Gross investment							
Total	19.9	20.7	20.9	21.1	19.1	18.6	-1.3
Public	3.2	3.2	3.3	3.3	3.3	3.4	+0.2
Private	16.7	17.5	17.6	17.9	15.7	15.3	-1.4
Japan							
Savings – Investment balance	2.2	2.9	2.5	2.5	2.1	2.8	+0.6
Gross savings							
Total	30.8	29.7	28.4	28.7	27.7	26.5	-4.3
Public	5.1	3.8	2.4	1.8	3.5	1.0	-4.1
Private	25.7	25.9	26.0	26.9	24.1	25.5	-0.2
Gross investment							
Total	28.6	26.8	25.9	26.2	25.6	23.7	-4.9
Public	7.6	7.4	7.8	6.9	6.6	6.3	-1.3
Private	21.0	19.3	18.1	19.3	19.0	17.4	-3.6
Euro area							
Savings – Investment balance	0.9	0.1	-0.1	-0.9	-0.4	0.6	-0.3
Gross savings							
Total	21.3	21.2	21.2	21.1	20.6	20.7	-0.6
Public	0.1	0.8	1.9	2.3	1.7	1.8	+1.7
Private	21.2	20.3	19.3	18.8	18.9	18.8	-2.4
Gross investment							
Total	20.3	21.0	21.3	22.0	21.0	20.0	-0.3
Public	2.7	2.7	2.8	2.8	2.9	2.8	+0.1
Private	17.7	18.3	18.5	19.2	18.1	17.2	-0.5

Source: IMF

Table 3

Labour Productivity in the Business Sector

Average annual growth rate*

	1976–86	1987–95	1996–2002
United States	1.0	1.1	2.2
Japan	2.8	2.2	1.3
Euro area	2.1	2.1	0.9
Canada	0.9	1.2	1.7

* Based on real output per employed person in the business sector
Source: OECD

Moreover, the sharp rise in U.S. stock market prices (up to 2000), which reflected in part the improved longer-term prospects for potential growth in the U.S., led to a significant reduction in the cost of equity financing, which provided further impetus to business investment.[8]

In the second half of the 1990s, U.S. fiscal consolidation, helped by stronger real growth in U.S. GDP, led to a marked rise in public savings. However, there was a concurrent reduction in U.S. private savings (households and corporations), apparently reflecting in part the sharp increase in net wealth (owing mainly to rises in equity and housing prices)[9] and increased consumption in anticipation of higher future income, reflecting improved longer-term prospects for potential growth.[10] Although there was a rise in U.S. overall savings, it was not sufficient to finance the increase in investment.

In more recent years, the greater foreign borrowing by the United States has stemmed from a significant decline in public savings. Although there was a sharp retrenchment in U.S. investment in 2001 and 2002, reflecting in part an adjustment to the over-investment that took place during the late 1990s, particularly in the information and communication technology industries, there was an even more pronounced easing in the U.S. fiscal stance that substantially reduced the amount of public savings. The decline in overall savings was attenuated, however, by a significant pickup in private savings. This apparently reflected, in part, some unwinding of the earlier wealth effect, owing to

8. According to an empirical analysis conducted by the OECD (2001), other factors, such as the pickup in output growth (the traditional "accelerator effect") and the ongoing decline in the relative prices of capital goods, also explain the acceleration in U.S. business investment during the second half of the 1990s.

9. The OECD reported that net wealth of U.S households rose by about 160 percentage points relative to their disposable income between the end of 1994 and the end of 1999. The large accumulation of wealth had major implications for U.S. household savings, because wealthier households tend to spend more on goods and services (see IMF 2002a). In their empirical study, de Serres and Pelgrin (2002) argue that "Ricardian equivalence" could explain a large part of the decline in U.S. private savings in the second half of the 1990s. Ricardian equivalence suggests that expectations of lower taxes in the future (which could have been the case when fiscal consolidation took place) would have reduced the savings rate of households and businesses.

10. As argued by Obstfeld and Rogoff (1994, 1996), the intertemporal approach views the current account balance as the outcome of forward-looking dynamic savings and investment decisions. According to the permanent-income hypothesis, household consumption is based on the discounted value of expected future income (as opposed to current income alone). As a result, a permanent (country-specific) increase in productivity leads to a current account deficit so that agents can smooth consumption over their lifetime. This implies that a deficit represents expectations about high future growth relative to other countries.

the sharp decline in stock market prices and a concomitant reassessment of future income expectations.

Elsewhere, the relative stability of the net lending position of Japan and the euro area over the 1997–2002 period masked different underlying trends in overall savings and investment. In the euro area, savings and investment rates, which are close to the average for advanced economies, were relatively steady. In contrast, Japanese investment and savings rates declined from exceptionally high levels. Indeed, the decline in Japanese investment mainly seems to be a convergence to more normal levels following the huge over-investment that took place in the late 1980s, when the Japanese asset-price bubble substantially lowered the cost of capital.

A closer examination reveals that public savings in the euro area increased significantly as a result of the fiscal consolidation that was required by the Maastricht Treaty before the adoption of the common currency in January 1999. However, an offsetting shift in private savings likely reflected, in part, wealth effects and demographic trends.[11] In contrast, there was a large reduction in public savings in Japan, reflecting the impact on public finances of weak economic activity and the adoption of discrete fiscal measures to sustain aggregate demand.[12]

Trade-flow perspective

Current account balances can also be examined directly by considering the evolution of exports and imports of goods and services (Table 4).[13] In this regard, we will highlight in our analysis two main forces shaping the trade flows of goods and services.[14] First is the income effect, whereby a country's demand for imports is positively related to its income. Similarly, export demand is positively related to foreign income. Thus, changes in the relative cyclical position (domestic versus foreign real GDP) will be a key determinant in shaping the evolution of the current account balance. Second is the relative price effect, whereby a country's demand for imports and, similarly, its demand for exports, depends on the price of domestic goods and services compared with the price of foreign goods and services, adjusted for transportation costs and converted to the local currency. If domestic goods

Table 4

Current Account Balances in the G-3

Per cent of nominal GDP

	Total	Total excluding oil imports	Goods	Services	Income	Current transfers
United States						
1997	-1.5	-0.7	-2.4	1.1	0.2	-0.5
1998	-2.3	-1.8	-2.8	1.0	0.1	-0.6
1999	-3.1	-2.4	-3.7	0.9	0.2	-0.5
2000	-4.2	-3.0	-4.6	0.8	0.2	-0.6
2001	-3.9	-2.9	-4.2	0.7	0.1	-0.5
2002	-4.6	-3.6	-4.6	0.6	–	-0.6
Japan						
1997	2.3	3.0	2.4	-1.3	1.4	-0.2
1998	3.0	3.5	3.1	-1.3	1.4	-0.2
1999	2.6	3.3	2.8	-1.2	1.3	-0.3
2000	2.5	3.5	2.5	-1.0	1.3	-0.2
2001	2.1	3.0	1.7	-1.1	1.7	-0.2
2002	2.8	3.9	2.4	-1.1	1.7	-0.1
Euro area*						
1997	1.0	2.1	2.0	–	-0.3	-0.7
1998	0.4	1.1	1.8	0.1	-0.5	-0.8
1999	-0.4	0.6	1.2	-0.3	-0.6	-0.7
2000	-1.0	0.8	0.5	-0.3	-0.4	-0.8
2001	-0.2	1.4	1.1	–	-0.5	-0.7
2002	0.9	2.4	1.8	0.2	-0.4	-0.7

* Corrected for reporting discrepancies in intra-area transactions
Source: OECD

11. OECD (2003b) estimates show that household net wealth (as a per cent of disposable income) in the three major economies of the euro area increased substantially between the end of 1994 and the end of 1999 (161 percentage points in France, 38 percentage points in Germany, and 29 percentage points in Italy). De Serres and Pelgrin (2002) also estimate that the aging of the population in the major euro-area countries has reduced the savings rate significantly (this impact is much greater in Japan but is absent in the United States). According to the life-cycle hypothesis, an increase in the old age dependency ratio (i.e., the population over 64 years relative to the population between the ages of 20 and 64 years) results in a decline in the savings rate as an increasing share of the population is drawing down financial assets to sustain its consumption.

12. Note that, in Table 2, the general government balance will be reflected in the difference between gross public savings and gross public investment. However, our discussion of the changes over time focuses on gross public savings, owing to the relative stability of gross public investment.

13. Apart from trade in goods and services, the current account balance also covers transfers, as well as receipts from, and payments of income to, foreigners. Transfers typically include official grants and private remittances, while income covers mainly investment income (receipts on country-owned assets abroad and payments on foreign-owned assets in the country). Those components are not covered explicitly in our analysis, since they are responsible for only a small portion of the overall movement in G-3 current account balances.

14. Our analysis of the nominal current account balance focuses on the determinants of the real trade flows. This approach has been commonly used by the IMF and the OECD, and is consistent with studies such as those of Clarida and Prendergast (1999) and Kandil and Greene (2002). Nevertheless, changes in terms of trade (i.e., the price of exports relative to the price of imports) can have a significant impact on the evolution of current account balances. For instance, a rise in the price of commodities (e.g., world oil prices) will contribute to raise the current account balance of oil-exporting countries, but will have the opposite effect on oil-importing countries.

and services become less expensive compared with foreign goods and services, for example, then domestic demand will shift away from imported goods and services towards those produced domestically. This would also increase foreign demand for the home country's now relatively less expensive exports. This is the concept of the competitiveness of a country relative to its trading partners, which is usually measured by a trade-weighted real effective exchange rate.[15]

Charts 1 to 3 allow us to better understand the historical relationships among current account balances, the relative cyclical position, and the real effective exchange rate in the G-3 economies.[16] In this light, we can see that the marked widening in the U.S. current account deficit since the early 1990s reflects, in part, faster GDP growth in the United States compared with that of its major trading partners. Moreover, the adverse lagged impact of the sharp real appreciation of the U.S. dollar (by almost 50 per cent in real effective terms between April 1995 and February 2002) on the real trade balance also contributed to the widening in the U.S. current account deficit in more recent years. According to IMF estimates (2002d), the widening of the U.S. current account deficit over the 1995–2001 period (by about 3.5 percentage points relative to nominal GDP) is explained mainly by the appreciation of the U.S. dollar, which accounts for 2 percentage points of the widening, and to a lesser extent by the shift in the relative cyclical position, which accounts for 1 percentage point.

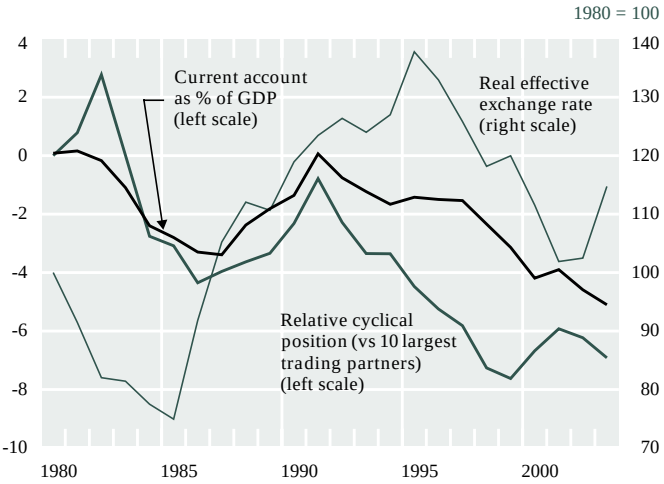
The marked widening in the U.S. current account deficit since the early 1990s reflects, in part, faster GDP growth in the United States compared with that of its major trading partners.

Not only has U.S. real GDP been growing relatively faster than those of its major trading partners, but an asymmetry in income elasticity between U.S. imports and exports has exacerbated the adverse impact on the U.S. current account balance. Indeed, even if the U.S. economy were growing at the same rate as the rest of the world, the U.S. current account would still tend to deteriorate, because there is apparently a much larger income elasticity of U.S. imports relative to U.S. exports. Estimates of income elasticities for U.S. imports have typically been between 1.5 and 2.5, while those for U.S. exports have been closer to 1.0. As reported in Mann (1999), this has been a consistent feature of the empirical literature of the post-war period.

Chart 1

Determinants of Trade Flow in the United States

Annual average



Note: For 2003, we show the average monthly value (up to November) for the real effective exchange rate. As well, the current account and relative cyclical position are based on IMF projections (2003). (See footnote 16 for a detailed description of the index.)
Source: IMF and OECD

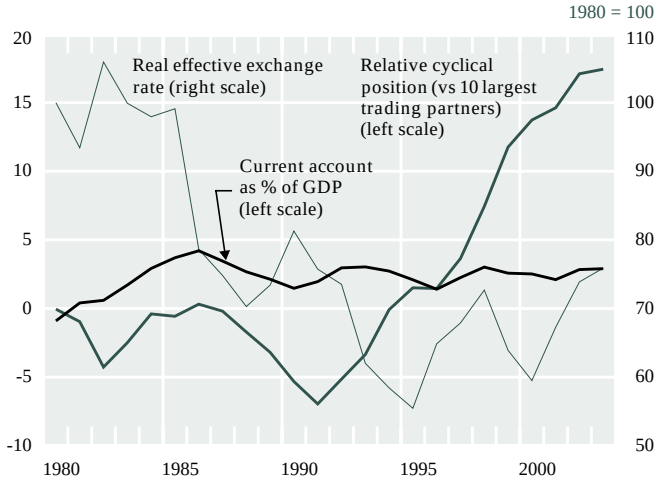
15. Lafrance (1988) and Lafrance and St-Amant (1999) reviewed the concept of competitiveness and the construction of various cost- and price-based measures. A depreciation (appreciation) in the real effective exchange rate represents an improvement (deterioration) in the competitive position of an economy. It is also important to note that the impact of these shifts in relative prices on real trade flow of imports and exports usually operates with some lags, depending in part on the duration of prior contractual agreements.

16. Our analysis is based on the IMF index of the trade-weighted real effective exchange rate, which is the ratio of the unit labour costs of the home country to those of 20 of its trading partners, converted to the home currency. For illustrative purposes, the index has been inverted such that a decline (rise) in the index reflects a real appreciation (depreciation) of the currency, which should lead over time to a decline (rise) in the current account balance (i.e., higher [lower] real imports and lower [higher] real exports). Similarly, we have constructed a trade-weighted measure of relative cyclical positions that is based on the ratio of real GDP in the home country relative to that of its 10 largest trading partners. A decline (rise) in the index reflects a faster (slower) rate of growth in the home country relative to its major trading partners, which should lead to a decline (rise) in the current account balance (i.e., a larger [smaller] rise in real imports compared to real exports).

Chart 2

Determinants of Trade Flow in Japan

Annual average

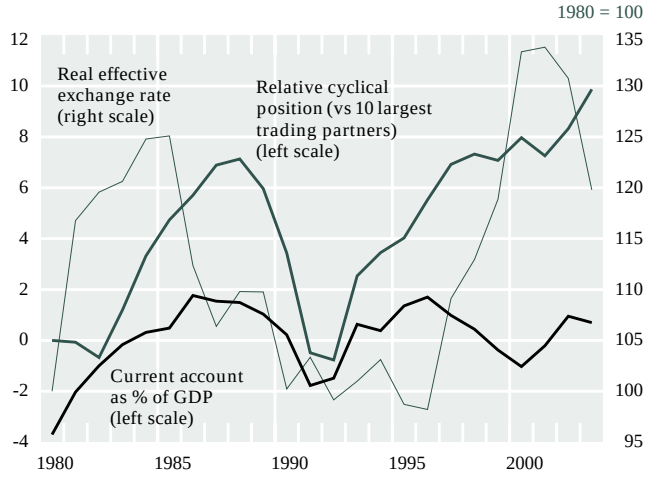


See note to Chart 1.
Source: IMF and OECD

Chart 3

Determinants of Trade Flow in the Euro Area

Annual average



See note to Chart 1.
Source: IMF and OECD

In contrast to the U.S. economy, the relative cyclical positions of both Japan and the euro area have weakened markedly since the early 1990s, as growth in those countries fell considerably behind that of the United States, which tended to improve their current account balances in more recent years. In the euro area, this was reinforced by the significant depreciation of the euro between February 1996 and October 2000 (by about 30 per cent). In Japan's case, however, the exchange rate probably played a modest role, since it has remained relatively flat over the past several years. Nevertheless, the above-mentioned positive influences on the current account balances of both the euro area and Japan have been offset to some extent by the adverse impact of higher world oil prices in recent years.[17]

Possible Implications for Macroeconomic and Financial Stability

While external imbalances in the major economies have been growing in recent years, some commentators have expressed concerns about the sustainability of the U.S. current account deficit. A major concern is the possibility that a sudden shift in expectations (particularly regarding the relatively more favourable U.S. prospects for longer-term productivity compared with those of other economies) could lead to abrupt changes in foreign exchange and financial markets, and ultimately cause disruptive changes in the macroeconomy. As argued by the IMF (2003), Mann (2002), and McKinnon (2001), the adverse balance-sheet effects of a sharp U.S.-dollar depreciation would fall mainly on the rest of the world, because most U.S. foreign liabilities are denominated in U.S. dollars.

However, recent developments have been benign. Despite some downward revisions to U.S. prospects for return on capital in recent years, the U.S.-dollar depreciation since the beginning of 2002, though significant, has so far taken place in an orderly fashion, and without substantial adverse effects on U.S. interest rates. In this regard, movements in official reserves from foreign authorities (notably in Asia) have provided support for the U.S. dollar. Such capital flows have become an increasingly important source of "financing" for the U.S. current account deficit.[18]

17. While the average price for West Texas Intermediate crude oil was about US$18 in the 1997–99 period, it jumped to an average of about US$27.5 in the 2000–2002 period, which represents an increase of over 50 per cent. In this regard, the figures shown in the column "Total current account balance, excluding oil imports" in Table 4 are more consistent with developments in the relative cyclical position and the real exchange rate. It is also likely that structural changes over the past decade or so (namely, greater integration with other Asian economies, which involved outsourcing of production) have led to a decline in Japanese export performance.

18. Though negligible in 2001, foreign official reserve flows accounted for almost 20 per cent of the net capital inflows into the United States in 2002. Over the first three quarters of 2003, their share rose to almost 35 per cent of net inflows.

In this context, the next section examines some potential implications for macroeconomic and financial stability stemming from external imbalances, notably by reviewing lessons from the international experience.

What does history tell us?

In principle, a current account deficit could be sustained as long as the stream of earnings from the investment financed by foreign savings covered the financing cost (i.e., interest payments and dividends).[19] In this regard, the Canadian experience shows that a country can run a sizable current account deficit for an extended period. Indeed, Canada recorded current account deficits throughout most of its history. Between 1870 and the early 1910s, Canada's current account deficit averaged about 7 per cent and reached a peak of close to 18 per cent of GDP before World War I (Powell 1997; Urquhart 1993).[20]

Since the 1970s, large current account deficits have generally not been sustained for long . . . . Nevertheless, some commentators remain confident that U.S. current account deficits and the associated buildup of external liabilities could be sustained well into the future.

More comprehensive reviews of the international experience among industrial countries by Freund (2000) and the IMF (2002c), however, show that, since the 1970s, large current account deficits have generally not been sustained for long. A typical current account reversal begins when the deficit is about 5 per cent of GDP and is associated with a combination of slower real GDP growth and a significant depreciation of the real effective exchange rate (interest rates are also found to rise noticeably in the years preceding the reversal).

A number of useful parallels can be drawn between the current situation and that of the mid-1980s.[21] These parallels support the view that large external imbalances can be resolved gradually without a significant adverse impact on financial stability or the macroeconomy. Exchange rate movements can be significant, however. For example, as can be seen from Chart 1, the marked widening in the U.S. current account deficit in the 1982–87 period (to about 3.5 per cent of GDP) coincided with much faster aggregate demand growth in the United States compared with that of its major trading partners. The adverse lagged impact on real trade of the sharp real appreciation of the U.S. dollar (by about 50 per cent in real effective terms between July 1980 and March 1985) also contributed to the widening in the U.S. current account deficit. Subsequently, the gradual elimination of the U.S. current account deficit between 1987 and 1991 was helped by a relatively sharper slowing in U.S. real GDP growth compared with that of its major trading partners.[22] Moreover, the substantial real effective depreciation of the U.S. dollar that began in March 1985 played a key role in the external adjustment process.

International investment positions and the role of exchange rates

Another way to evaluate the sustainability of current account imbalances is to consider the path of the associated buildup of net external assets or liabilities (as a ratio to GDP). As can be seen from Chart 4, the capital inflows that have been the counterpart to persistent U.S. current account deficits have cumulated into a sizable net international liability position.[23] In contrast, Japanese current account surpluses have translated

19. A more detailed discussion of what constitutes a sustainable external position can be found in Bank of Canada (1985) and IMF (2002b). Some of the medium-term issues covered in those studies include the importance of considering the source of the current account imbalance (i.e., changes in domestic savings versus changes in domestic investment and their sustainability), as well as the composition of external liabilities.

20. This was associated with substantial foreign direct investment in the resource sector of the Canadian economy and in railway construction to open up the western part of the country.

21. One should note that U.S. trade patterns are now significantly different from those of the 1980s. In particular, Mexico, South Korea, Singapore, China, and Hong Kong SAR have become much more important trading partners for the United States.

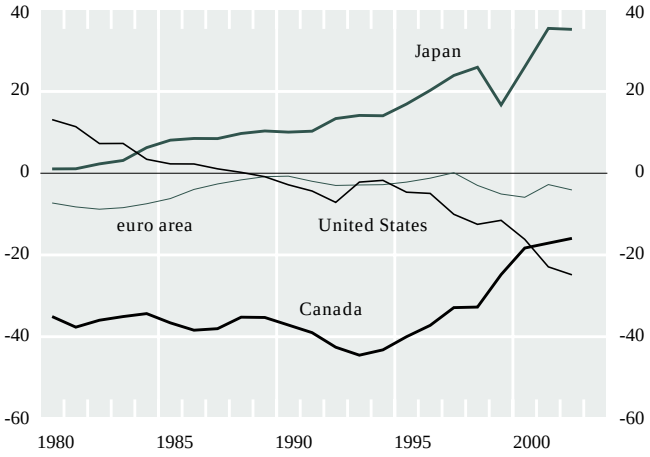
22. In 1991, the U.S. current account balance was also boosted by large one-time transfers from allies who shared some of the costs related to the Gulf War.

23. Net international investment positions also reflect changes in the valuation of exchange rates. In this regard, Tille (2003) shows that 30 per cent of the deterioration in the U.S. net investment position between 1999 and 2001 is accounted for by changes in the value of U.S. foreign assets, owing to the U.S.-dollar appreciation. As a result, the author believes that the U.S. net international investment position is less worrisome than if it reflected only current account imbalances.

Chart 4

Net International Investment Positions

Market values at year-end, as a per cent of GDP*



* International investment positions reflect not only the accumulation of current account balances but also exchange rate and other market valuations. For instance, the sharp decline in the Japanese international net asset position between the end of 1998 and the end of 1999 (despite a continued current account surplus) reflected mainly the adverse impact on asset valuations (largely denominated in U.S. dollars) of the sizable appreciation of the Japanese yen vis-à-vis the U.S. dollar and the increase in liabilities stemming from the gain in Japanese stock prices.

Source: IMF up to 2001, except for the euro-area data, which are taken from the European Central Bank *Monthly Bulletin* and, prior to 1997, from Fagan et al. (2001). For 2002, figures are from the U.S. Bureau of Economic Analysis, the Japanese Ministry of Finance, and the European Central Bank.

into a relatively large net international asset position. Looking forward, most forecasts imply that Japanese net assets and U.S. net liabilities will continue to rise sharply over coming years, to reach unprecedented levels.[24]

Yet, the U.S. net liability position cannot grow indefinitely. A number of conditions need to be satisfied to achieve a sustainable external position. In particular, the net liability position (as a ratio to GDP) has to stabilize at a level that is acceptable to both borrowers and lenders. In this regard, Obstfeld and Rogoff (2000) argue that even if the United States has the means to repay its liabilities, "home bias" in asset holdings suggests that the rest of the world's willingness to absorb U.S. liabilities is limited. The authors also point out that the current U.S. net international liability position (25 per cent of GDP at the end of 2002) is extremely high by historical standards. For instance, at the end of the nineteenth century, when the United States was an emerging giant, its net international liability position never exceeded 26 per cent. Long-term sustainability also implies that a country with net foreign liabilities must have a trade surplus in goods and services in steady state to finance the stream of interest and dividend payments. As a result, it is clear that significant adjustments to external imbalances in the major economies will eventually need to take place.

Nevertheless, some commentators remain confident that U.S. current account deficits and the associated buildup of external liabilities could be sustained well into the future. Cooper (2001) argues that the proportion of foreign savings invested in the United States is much lower than the weight of the U.S. economy in world GDP. Greenspan (2003) and McKinnon (2001) also point to the special role played by the U.S. dollar in the world economy. In this regard, the Chairman of the U.S. Federal Reserve Board, Alan Greenspan, has argued that the ability of the United States to finance its external deficit in a reserve currency has increased its capability to incur foreign debt relative to most other countries. He also suggested that globalization (namely, reduced costs and increased reach of international financial intermediation) has, over time, improved the U.S. capacity for raising debt. As a result, comparisons with earlier episodes might be misleading.

Over the medium term, a number of structural factors could contribute to the narrowing of external imbalances among the United States, Japan, and the euro area, as well as other countries. The OECD (2001), for example, has argued that there could be a convergence in productivity growth rates between the main economies, a narrowing of the difference between income elasticities of U.S. imports and exports,[25] and favourable demographic developments. Nevertheless, the extent of the contribution of those factors remains uncertain. For instance, over the next 20 years or so, the old age dependency ratio is expected to rise more rapidly in Japan and Europe than in the United States, such that savings could fall somewhat more in Japan and Europe as larger shares of their populations reach retirement age. However, aging is also expected to reduce investment spending because of the associated lower growth of the labour force. As a result, the net expected effect of aging on external imbalances is ambiguous. Similarly, a relatively large improvement

24. Canada's net international liability position (as a per cent of GDP), which in the past has been larger than that of the United States, has declined considerably since its peak in 1993.

25. The IMF (2001b) has suggested that the estimated income elasticities of U.S. exports and imports converged somewhat in the 1990s, and that this convergence could continue into the future.

in the productivity performance of U.S. trading partners would be required to reduce the U.S. current account deficit significantly.[26]

Regardless of the role played by structural factors, there is a broad consensus that part of the adjustment of global external imbalances will come through changes in real exchange rates.

Yet, regardless of the role played by structural factors, there is a broad consensus that part of the adjustment of global external imbalances will come through changes in real exchange rates.[27] In this regard, some of the major international organizations and economic commentators believe that a further significant real effective depreciation of the U.S. dollar is required to help achieve a sustainable U.S. external position (Table 5).[28] It should be noted, however, that the U.S. dollar does not have to depreciate by the same amount against all currencies. The more it depreciates against one currency, the less it needs to depreciate against others. Indeed, in order to provide sustainable external positions in all countries, it cannot be true that the U.S. dollar would depreciate by the same amount against all countries' currencies.[29]

Table 5

Effective Depreciation in the U.S. Dollar "Required" to Achieve a Sustainable External Position

Per cent[a]

	Original estimates	Adjusted for more recent exchange rate developments[b]
IMF	20	18
OECD	up to 30	up to 13
Mann	25	18
Obstfeld and Rogoff	12 to 45	6 to 39

a. Defined in real terms for the IMF (2003) and Obstfeld and Rogoff (2000) and in nominal terms for the OECD (2001) and Mann (1999)

b. Adjustments attempt to capture the changes in the value of the U.S.-dollar exchange rate that have taken place since these studies were completed (based on data for the month of November 2003).

Conclusion

The development of current account imbalances in the major economies can mainly be explained by a combination of structural and cyclical factors. In particular, growing imbalances have reflected in large part the relatively favourable U.S. productivity performance as well as the relatively easier U.S. fiscal stance.

As argued by commentators such as the IMF and the OECD, sound macroeconomic and structural policies would facilitate the required long-term adjustments to achieve sustainable external balances and to help maintain financial stability. Such policies should include further structural reforms that would raise potential growth and make regions outside the United States more attractive locations for investment. Strong domestic demand outside the United States would boost demand for U.S. goods and services, thereby helping to reduce external imbalances. As well, fiscal consolidation in the United States would be helpful.

However, most commentators agree that further significant adjustments to the real exchange rate will be necessary over the medium term to achieve sustainable external positions (i.e., a stabilization of net international investment positions in relation to GDP). While part of this adjustment will be against the Japanese yen and the euro, the currencies of other major U.S. trading partners may be affected as well. As long as this is accomplished in an orderly fashion, there is no reason to believe that global financial stability would be compromised.

26. IMF simulation results (2002a) suggest that if annual productivity growth in the rest of the industrialized countries were to increase relative to that of the United States by 0.5 percentage points, the U.S. current account deficit could be reduced by almost $100 billion after five years. An extrapolation of this rule of thumb suggests that the elimination of the U.S. current account deficit over that period, based solely on relative growth performance, would require a very large sustained improvement—about 2.5 percentage points per year—in the rate of productivity of U.S. industrialized trading partners.

27. Several empirical studies (such as Lane and Milesi-Ferretti 2000, 2002; Gagnon 1996; Faruqee 1995) have provided estimates of a positive long-run relation between net international investment positions and the real exchange rate, whereby debtor countries tend to have more depreciated real exchange rates that enable them to run trade surpluses to service their external liabilities (creditor countries, which can sustain a deficit in their balance of trade equal to their foreign investment income, tend to have more appreciated real exchange rates).

28. As discussed in footnote 23, a depreciation of the U.S. dollar would not only contribute to a stabilization of the U.S. net external liability position through a more favourable current account dynamic, but also directly through valuation changes to U.S. foreign assets. By themselves, valuation adjustments related to the U.S.-dollar depreciation during 2002 (by about 7 per cent on the basis of the IMF nominal effective exchange rate index) have reduced the U.S. net external liability position (as a per cent of GDP) by about 2 percentage points. A much larger exchange rate valuation adjustment would be expected for 2003, given the more pronounced U.S.-dollar depreciation during that year.

29. Real exchange rate movements can take place not only through changes in nominal exchange rates, but also through differential inflation rates.

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The Rationale for Cross-Border Listings

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- *Cross-border listings have gained in importance over the past few decades as many companies have become more international in their orientation. As well, technological progress and the liberalization of capital flows have fostered considerable competition among global stock exchanges for equity listings and trades.*
- *The geography of cross-border listings has changed considerably since the mid-1980s, with U.S. exchanges attracting an increasing share of cross-listed firms.*
- *Empirical studies suggest that the cost of equity capital generally declines following a foreign listing. This can be explained by a decline in transactions costs or by an improvement in the quality and quantity of firm-specific information available to investors.*
- *Informational asymmetries across countries prevent simultaneous price discovery on foreign exchanges.*

The structure of global equity markets has changed considerably over the past few decades as technological progress and the liberalization of capital flows have lowered the barriers that insulated national markets from each other. However, while investors can now access foreign capital markets more easily, geography has not become irrelevant. Obstacles to international capital flows, such as legal restrictions on capital mobility and foreign ownership, the costs associated with trading and acquiring information on firms listed abroad, and concerns over investor protection in certain foreign jurisdictions, still exist. The segmentation of markets that results from these barriers is creating incentives for corporate managers to adopt financial policies such as international cross-listing, whereby a firm lists its shares for trading on at least two stock exchanges located in different countries.[1]

The object of this article is to explore the reasons for—and the consequences of—cross-listings, focusing specifically on the channels through which cross-listing affects the cost of equity capital. The extent to which national equity markets are integrated with one another will also be discussed. The evidence presented here consists mostly of empirical findings from the literature.

1. In the remainder of this article, the terms *international* and *cross-border* will be dropped. This practice will be referred to simply as cross-listing (or as interlisting, which is considered a synonym in the literature). The reader should note that while dual listings within a single jurisdiction are common, the rationale for these listings is not the subject of this article.

The Geography of Cross-Listings

Canadian firms have been listing shares abroad in increasing numbers over the past two decades. As of November 2003, there were 181 Canadian listings in the United States, an increase of almost 100 per cent in 20 years.[2] A small number of Canadian firms (21) are listed on the London Stock Exchange, which is generally considered to be the most international of European stock markets. The rise in Canadian-based interlisted issues is more modest when the numbers are scaled by the total number of stocks listed on the Toronto Stock Exchange (TSX). The proportion of Canadian-based interlisted shares has increased from about 10 per cent in the late 1980s to roughly 15 per cent in recent years (Chart 1). These listings represent a broad range of industries from such sectors as natural resources, technology, transportation, and communications. For most of the past 20 years, trading of Canadian-based issues has been fairly evenly split between Canadian and U.S. exchanges. The percentage of the value of U.S. trading has fluctuated in a range of 40 to 50 per cent (Chart 2).

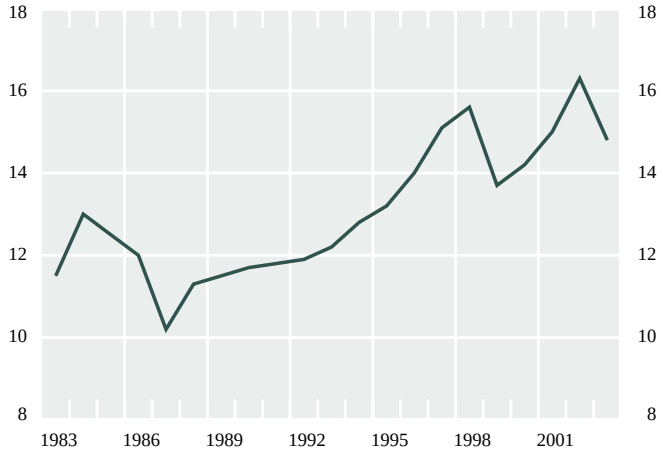
While there is evidence that U.S. exchanges have become more global in character in the past two decades, European exchanges have tended to narrow their focus. Although the number of European firms listing their shares abroad increased considerably between the mid-1980s and the mid-1990s, most of them gravitated towards U.S. exchanges as opposed to those in other European countries. During that period, the number of U.S.-based firms listing in Europe fell by a third (Pagano et al. 2001, 2002). This is believed to be a direct consequence of the competitive advantage of U.S. exchanges, which are generally considered to be better positioned to lure larger global firms that require deep and liquid markets to accommodate their funding needs and acquisition strategies. Evidence that will be discussed later shows that firms also try to associate themselves with the U.S. regulatory system.

Despite a higher cost, listing in the United States has become a way for high-quality, innovative firms to distinguish themselves from others. Pagano et al. find that the characteristics and performance of European companies differ sharply depending on whether they cross-list in the United States or within Europe. If they list in the United States, they tend to be high-tech, export-oriented companies, and are pursuing rapid expansion with no significant reliance on debt. Pagano's results also suggest that companies tend to list in countries that share similar cultural or linguistic characteristics with the country in which they are based.

Chart 1

Proportion of Canadian-Based Interlisted Shares on the TSX

Per cent

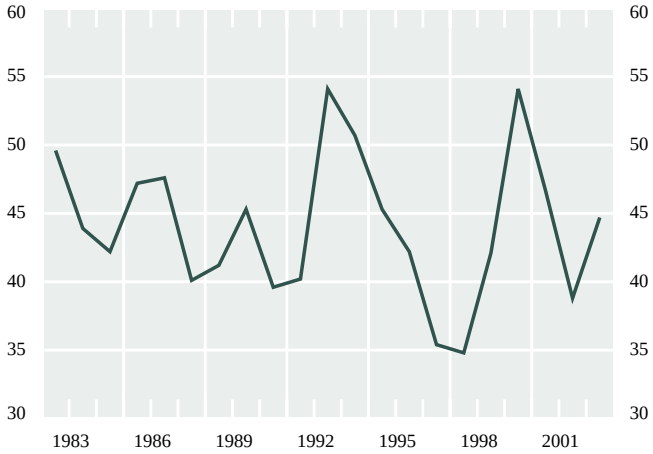


Source: *TSX Review*

Chart 2

Share of Trading Value for Canadian-Based Firms on U.S. Exchanges

Per cent



Source: *TSX Review*

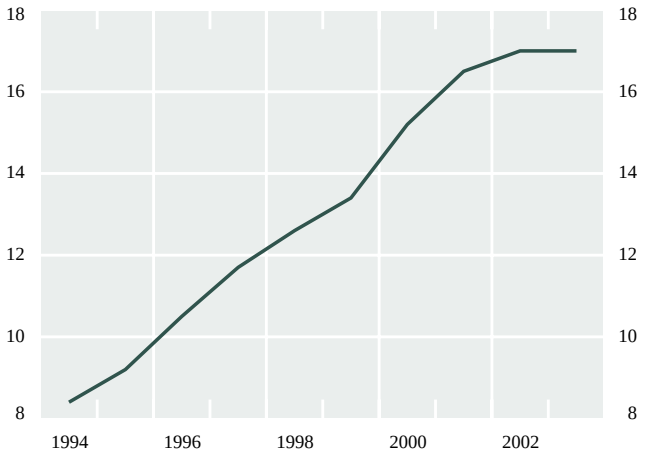
2. Most of the Canadian companies listed in the United States are trading on either the NYSE (80 of 181) or the NASDAQ (78). The remaining 23 companies list on regional exchanges or on the American Stock Exchange (AMEX).

The proportion of non-U.S. listings on the New York Stock Exchange (NYSE) has doubled in the past decade, rising steadily from about 8.5 per cent in 1994 to 17 per cent at the end of 2003 (Chart 3). During the same period, the proportion of the value of trading accounted for by non-U.S. firms fell slightly, from around 10 per cent to 8 per cent (Chart 4).

Chart 3

Proportion of Non-U.S. Listings on the NYSE

Per cent

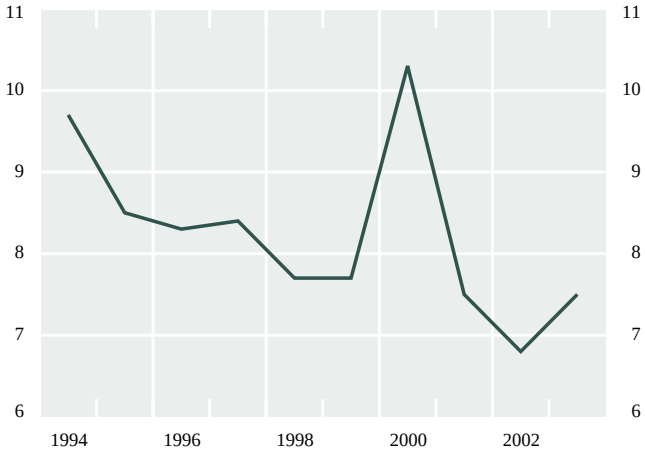


Source: New York Stock Exchange Web site at http://www.nyse.com

Chart 4

Share of Trading Value on the NYSE: Non-U.S. Listings

Per cent



Source: New York Stock Exchange Web site at http://www.nyse.com

The share of international stocks in the NASDAQ listings also increased in the 1990s, but to a lesser extent, rising from 7 per cent at the end of 1992 to slightly less than 10 per cent in 2003. Non-U.S. listings on the NASDAQ reached a peak in 2001 before declining, as technology stocks went through a severe correction following their rapid price appreciation in the late 1990s. Table 1 provides a breakdown by region of the number of firms cross-listed on the NYSE and the NASDAQ.

Table 1

Cross-Listings on the NYSE and the NASDAQ, by Region

As of 31 December 2003*

	NYSE	NASDAQ
Asia / Pacific	80 (17.1)	50 (14.7)
Europe	189 (40.3)	95 (27.9)
Middle East / Africa	13 (2.8)	76 (22.3)
South America / Caribbean	106 (22.6)	42 (12.3)
Canada	81 (17.3)	78 (22.9)
Total	469	341

* Figures in brackets are expressed in per cent.

Source: New York Stock Exchange Web site at http://www.nyse.com and the NASDAQ Web site at http://www.nasdaq.com

The Costs of Cross-Listing

Cross-listing offers many advantages for the listing firms, but there are also costs. These relate to enhanced disclosure requirements, registration costs with regulatory authorities, and listing fees (Karolyi 1998). To accommodate a wide variety of firms, exchanges have designed several different listing categories, each with a different set of requirements and, to the extent that investors are knowledgeable about this structure, varying potential benefits.

At one end of the spectrum is the ordinary listing. This is the most prestigious type of listing, but also the one for which requirements are the most stringent. A firm seeking a listing must meet certain criteria set by the exchanges. These usually relate to minimum levels of market capitalization and of certain accounting variables, such as income. Firms must also satisfy the requirements of regulators, who usually demand that financial statements be restated according to the principles and standards mandated by the local accounting authority. They must also make arrangements for the clearing and settlement of trades in the foreign country in which they wish to list.

Cross-listing offers many advantages for the listing firms, but there are also costs.

Firms wishing to list in the United States have the option of participating in an American Depository Receipts (ADR) program. ADRs are negotiable certificates issued by a bank to represent the underlying shares of stock, which are held in trust at a foreign custodian bank. The sponsoring bank provides all stock transfer and agency services, such as maintaining registration of holders and settling broker trades. The issuing banks exchange the foreign currency dividends for U.S. dollars and send the dollar dividend to the ADR holders. A number of listing options, each with different reporting requirements, are available to firms interested in issuing ADRs.[3]

Why List Abroad?

According to survey results, Canadian corporate managers generally believe that access to a broader investor base and increased marketability of a firm's securities are the main benefits of pursuing cross-listing, while compliance with foreign reporting requirements is cited as a major cost. The majority of survey respondents consider the net benefits of cross-listing to be positive, although not necessarily substantial. Whether benefits outweigh costs depends on whether total trading volume increases subsequent to listing abroad (Mittoo 1992).

Although some corporate managers may be partly motivated by such considerations as enhancing their firm's prestige or increasing the visibility of its products, the primary objective of cross-listing is the financial goal of reducing the cost of the firm's equity capital. Listing a company's stock abroad should have no impact on its price when domestic and foreign equity markets are fully integrated. If barriers exist, however, a firm's share value may be affected by the cross-listing announcement. Empirical evidence suggests that shares of cross-listed firms tend to experience abnormally high returns prior to their foreign listing and shortly thereafter. Longer-term performance varies greatly across companies. For many firms, the initial increase in performance dissipates over the next year.

Canadian corporate managers generally believe that access to a broader investor base and increased marketability of a firm's securities are the main benefits of pursuing cross-listing, while compliance with foreign reporting requirements is cited as a major cost.

This post-listing performance, which is generally more pronounced for smaller, less mature firms, is often considered to be related, not to the event of listing, but to firm-specific factors. For example, managers may have timed the foreign listing to occur just as the firm's value was peaking. It is also believed that smaller firms may have difficulty adjusting to their new environment, where disclosure requirements are usually higher than in their home market. Another possible explanation is that the firm may have issued too much equity at the time of listing relative to what the investors were willing to support (Karolyi 1998; Foerster and Karolyi 1999). Recent evidence suggests that, for Canadian firms, the magnitude of the price reaction declined significantly in the 1990s. This is explained by the increasing integration of the Canadian and U.S. economies (Mittoo 2003).

This post-listing performance may also be linked to a reduction in the underlying sensitivity to the company's share price among domestic investors, which results in lower required returns. A corporation that decides to list its shares abroad may benefit from investor heterogeneity, since a widening of the shareholder base improves the ability of investors to share risk. Specifically, investors would require lower expected returns to hold the stock, given that some of its pre-listing systematic risk can now be diversified. Empirical studies suggest that the cost of equity

3. Level 1 ADRs trade over-the-counter (OTC) as Pink Sheet issues with limited liquidity and require only minimal Securities and Exchange Commission (SEC) disclosure and no compliance with U.S. Generally Accepted Accounting Principles (GAAP). Level 2 ADRs are exchange-listed securities, but do not allow new capital to be raised. Level 3 ADRs, the most prestigious and costly type of listing, require full SEC disclosure and compliance with the exchange's own listing rules.

capital declines following a foreign listing (Karolyi 1998; Stulz 1999; Errunza and Miller 2000).

Transactions costs and informational considerations are two channels through which interlisting may lead to a drop in expected returns.

Transactions costs

Cross-listing reduces transactions costs through an improvement in market liquidity following the foreign listing (Karolyi 1998). A market is considered to be liquid if transactions can be executed rapidly and with little impact on prices.

The relationship between liquidity and interlisting is largely attributed to the global competition for order flow (i.e., trading volume). This competition causes exchanges to continuously look for ways to improve their trading processes in order to enhance market quality and maintain or attract order flow.[4] Improvements to trading processes relate, for example, to trade execution, disclosure of trading information, and to the presence and activities of market-makers.[5]

The relationship between liquidity and interlisting is largely attributed to the global competition for order flow (i.e., trading volume).

In theory, when a security trades on multiple markets, traders who do not have superior information regarding future returns will base their trading decisions largely on transactions costs. If one exchange has lower transactions costs than the other(s), order flow emanating from these so-called liquidity traders will gravitate towards that exchange. Other traders who wish to profit from information in their possession that has either not been disseminated to, or properly assimilated by, the whole trading community will then have incentives to trade on that market as well in order to better conceal their trading intentions. This exchange would eventually reap most of the trading volume for the stock and dominate the market (Chowdhry and Nanda 1991; Huddart, Hughes, and Brunnermeier 1998).

Empirical evidence, much of it derived from Canadian data, suggests that bid-ask spreads tend to narrow on the domestic market following interlisting, particularly for stocks that experience an increase in domestic trading volume. The improvement in quotes can be interpreted as a response of domestic market-makers to competition from their foreign counterparts. An increase in total trading volume and in market depth has also been documented. The extent to which liquidity is enhanced is related to the proportion of total trading volume that the new market captures and to the trading restrictions imposed on foreigners prior to listing (Karolyi 1998; Foerster and Karolyi 1998). Liquidity improves the most when the domestic market retains a significant portion of its trading volume and when restrictions on pre-listing cross-border trading are stringent. Another condition favouring the enhancement of liquidity, mostly in situations where the listing firm is based in an emerging market, is the existence of informational links between markets. If informational links were poor, e.g., for emerging markets, cross-listing would actually reduce liquidity and increase volatility on the domestic market as informative trades were directed to other markets (Domowitz, Glen, and Madhavan 1998).

All else being equal, greater liquidity should translate into a lower cost of equity capital, since liquidity is valued by shareholders. The required rate of return for a security has been shown to be an increasing and concave function of the spread between the quotes of interested buyers and sellers (Amihud and Mendelson 1986).

A closer look at foreign firms listing on the NYSE shows that foreign stocks are typically less liquid than those of firms based in the United States. They have wider bid-ask spreads and less market depth, and their prices are more volatile. The difference tends to be greater for companies from emerging markets than for those from industrialized economies. Specialists also appear to be less willing to maintain non-zero positions in their closing inventory of foreign stocks (Bacidore and Sofianos 2002). These results are attributed to informational asymmetry and to the increased

4. There is no precise definition of market quality, but liquidity is considered to be an important aspect. Other key considerations are operational and informational efficiency, transparency, and volatility.

5. The role of market-makers is to maintain a liquid, fair, and orderly market. While most stock exchanges have introduced some form of market-maker, their responsibilities and the proportion of stocks with a market-maker can vary across markets.

risk of adverse selection of foreign stocks, which are discussed in the next section.

Informational considerations

Informational considerations are another source of market segmentation that can be overcome through cross-listing. These considerations relate mainly to the cost of acquiring and processing relevant information about foreign firms, and to the reliability of that information. Several authors argue that interlisting reduces the cost of equity capital by making information on the listing firm more easily accessible.

While there is evidence that analysts tend to be less optimistic about the prospects of foreign firms compared with domestically based firms, cross-listings tend to improve the accuracy of their earnings forecasts.

Cross-listing is believed to increase a firm's visibility as well as investor recognition, based on evidence that both media coverage and the number of analysts following the firm rise subsequent to the foreign listing. While there is evidence that analysts tend to be less optimistic about the prospects of foreign firms compared with domestically based firms, cross-listings tend to improve the accuracy of their earnings forecasts. Since investors have to incur a lower cost to follow a corporation's affairs, its investor base expands, and demand for its stock will rise (Lang, Lins, and Miller 2003; Baker, Nofsinger, and Weaver 2002; Das and Saudagaran 1998).

Disclosure requirements for trading and accounting information, as well as the degree of protection of minority shareholders' interests, all have implications for the valuation of a firm. Empirical work suggests that cross-listing in a country with better disclosure requirements and investor protection might create value (Doidge, Karolyi, and Stulz 2003) because superior accounting and disclosure standards reduce investors' costs for researching information. Listing in a country with stricter standards than at home also reduces the potential for managers to benefit from private information in their possession. These lower information and agency costs allow firms to reduce their equity risk premium (Reese and Weisbach 2002). Some authors believe that firms based in countries with poor standards may also benefit from the signalling effect of listing in a country with stricter requirements. According to them, cross-listing could signal a credible commitment to enhanced corporate governance. Firms would then try to list in countries with higher disclosure standards and a greater standard of enforcement than in their own jurisdiction (Coffee 2002). This so-called "bonding hypothesis" has been tested empirically with Canadian data. The results suggest that Canadian firms can increase their valuation by bonding themselves to the U.S. regulatory environment through cross-listing (King and Segal 2003).

The notion of a "race to the top" in disclosure requirements has been formalized by Huddart, Hughes, and Brunnermeier (1998). In their theoretical model, the actions of non-informed traders, who have strong incentives to gravitate towards exchanges with better disclosure, prevent corporate insiders from listing the company on an exchange with low disclosure requirements—and profiting from the private information in their possession. Their model contradicts the notion that, without regulators, exchanges could be tempted to be lax about disclosure requirements in order to increase listings.

An additional advantage of cross-listing is that, in the case of stocks trading on markets located in different time zones, it facilitates the process of assessing a stock's value at the beginning of the trading session. At the opening of trading, prices are less volatile for shares that traded overnight on another exchange than for those that did not. Pricing errors are thus reduced (Yamori 1998; Lowengrub and Melvin 2002).

Price Interactions

An emerging stream of the literature on cross-listings is concerned with analyzing the fluctuations in the price of a stock on different markets. If equity markets were fully integrated, price gaps would be minimized when prices were converted into the same currency. In addition, all markets would incorporate new information almost simultaneously. Integration of market prices should favour market efficiency and liquidity by ensuring that orders are matched with the best offsetting orders from all trading venues.

Informational links between markets, however, are rarely strong enough for perfect market integration to take place and for concurrent price discovery to occur on multiple markets.[6] Informational asymmetries and transactions costs cause a certain degree of market segmentation, allowing one market to become from time to time a price leader for a given stock. While arbitrage forces necessarily drive prices on other markets to adjust so as to maintain an equilibrium of no arbitrage, the exchange acting as a price leader could attract a substantial portion of order flow if the adjustment takes time.

This type of misalignment is expected to arise, for example, when trading hours do not overlap. In such an environment, an advantage is gained by the firm's domestic equity market, since firm-specific news relevant to prices is likely to be produced in its home country during regular business hours. Another example of an informational asymmetry that may cause market segmentation occurs with firms that may be classified as "blue chip" in their home markets, because they have a relatively large investor base and analyst following, but have less visibility abroad. In these cases, it is reasonable to assume that price discovery will tend to occur primarily on the firm's national exchange. However, it could also be argued that price discovery will occur on the foreign exchange if its market quality is superior.

6. Price discovery refers to the process through which new fundamental information is reflected in prices.

Does price discovery on the firm's home market lead that in exchanges from abroad, or is the opposite true? Empirical evidence suggests that prices on Canadian and U.S. exchanges are mutually adjusting for Canadian-based cross-listed stocks. The contribution of each market varies greatly across stocks. The extent to which the foreign market will act as a leader is related to its share of total trading volume, its relative advantage in terms of liquidity, and the economic ties between the listing firm and the country in which the exchange is located (Eun and Sabherwal 2003).

Conclusions

While financial markets worldwide have become more integrated, geography still matters in finance. Stock exchanges are trying to circumvent barriers to international capital flows by creating strategic alliances that reach across borders. Firms are also constantly striving to overcome market segmentation by adopting financial policies such as cross-listing. Interlisting allows firms to reduce the cost of their equity capital by reducing the systematic riskiness of their shares for investors, by increasing the liquidity of their shares, and by improving the information environment.

Global competition for order flow among stock exchanges and the resulting enhancement in market quality not only improve the financial conditions of firms, but are also beneficial for investors. Empirical evidence suggests that prices on Canadian and U.S. exchanges are mutually adjusting for Canadian-based cross-listed stocks.

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Speeches

Introduction

Governor Dodge explored the effects of low inflation on the performance of Canadian labour markets in a lecture delivered at Memorial University, Newfoundland on 20 November, the 25th anniversary of the end of wage and price controls under the Anti-Inflation Board.

In a speech to the London Chamber of Commerce on 8 December, the Governor reviewed the economic adjustments that Canadians made throughout the 1990s and those that will be necessary in the coming decades. Productivity, in particular, will need to improve, and the Bank will be watching closely in the coming months for "evidence that the economy is growing at a rate solidly above the growth of potential," Mr. Dodge said.

Both are reprinted in this issue of the *Review.*

The full text of other speeches given by the Governor can be found on the Bank's Web site at: http://www.bankofcanada.ca, including:

22 January 2004	Opening statement following the release of the *Monetary Policy Report Update*
17 November 2003	Remarks to the Office for Partnerships for Advanced Skills Annual Visionary Seminar, Ottawa, Ontario
3 November 2003	Remarks to the David Dodge Tribute Dinner hosted by the Canadian Foundation of Economic Education, Toronto, Ontario
23 October 2003	Opening statement to the Senate Banking, Trade and Commerce Committee
22 October 2003	Opening statement at the House of Commons Finance Committee following the release of the *Monetary Policy Report*
	Opening statement following the release of the *Monetary Policy Report*
10 September 2003	Remarks to the Vancouver Board of Trade, Vancouver, British Columbia
5 September 2003	Remarks to the Spruce Meadows Roundtable, Spruce Meadows, Alberta
7 August 2003	Remarks to the Couchiching Institute on Public Affairs, Geneva Park, Ontario
17 July 2003	Opening statement following the release of the *Monetary Policy Report Update*
18 June 2003	Remarks by David Dodge, Governor of the Bank of Canada, to the Metropolitan Halifax Chamber of Commerce, Halifax, Nova Scotia
12 June 2003	Remarks to the Conseil du patronat du Québec, Montréal, Quebec
11 June 2003	Remarks by David Dodge, Governor of the Bank of Canada, to the Conference of European Statisticians, Geneva, Switzerland (via videoconferencing)
5 June 2003	Remarks to the German-Canadian Business Club of Berlin-Brandenburg, Berlin, Germany

Low and Predictable Inflation and the Performance of Canadian Labour Markets*

Lecture by David Dodge
Governor of the Bank of Canada
to the Memorial University of Newfoundland
St. John's, Newfoundland and Labrador
20 November 2003

The goal of Canadian monetary policy is to contribute to solid economic performance and rising living standards. The best way we can do this is by keeping inflation low, stable, and predictable. This has important implications for labour market performance.

Although inflation is now low, stable, and predictable, this has not always been the case. Indeed, in the 1970s, inflation was high, unstable, and unpredictable. This led to the establishment of the Anti-Inflation Board (AIB) in 1975, where I worked as Research Director.

Tonight, I would like to reflect on what we have learned since the AIB closed its doors almost 25 years ago to the day. I'll begin with a brief discussion of the theoretical foundation for the role that inflation expectations play. Expectations are important for both price- and wage-setting, but I will concentrate on the wage-setting aspects. I would next like to discuss the Bank of Canada's inflation-targeting framework, which serves to anchor inflation expectations. I will also address the issue that our inflation target may be too low because nominal wages are downwardly rigid. And I will discuss Canada's labour market performance and how it has improved substantially with the change in our monetary policy framework since 1991. Finally, I will say a few words about the conduct of monetary policy today, and offer some brief concluding remarks.

Inflation and the Role of Inflation Expectations

Let me begin by going back to the 1970s. When we started that decade, the inflation rate was around 3 per cent. But it quickly rose to over 12 per cent in the span of three years. Not only was inflation rising, it had become more variable, creating uncertainty over the future rate of inflation.[1] This made it difficult for workers and employers to decide on the appropriate rate of inflation to incorporate into wage settlements. In this environment, it was not surprising that some workers demanded wage increases, both as compensation for past inflation and as a precaution against future inflation. And many employers granted them. When they did not, workers often went on strike. On average, in the 1970s, over seven million person-days were lost to strikes each year. This was an enormous loss of output. High and variable inflation also triggered large wage settlements. This fuelled inflation expectations and contributed to both a wage-price spiral and a wage-wage spiral.[2]

* The oral presentation by Governor Dodge at Memorial University is an abridged version of this paper. The Governor would like to thank Robert Fay, Assistant Chief, Research Department, Bank of Canada, for his contribution to this paper.

1. Variability is measured as the standard deviation.

2. At the time, workers and unions were pushing for wage increases to compensate them for the risk of higher inflation over the life of their contracts. But employers in some sectors were also willing to offer high wage increases. The public sector, for example, saw larger revenues with rising inflation. And some firms in the private sector experienced a boost in profits generated by inflation and were therefore willing to grant relatively large wage increases. In some cases, this led workers and unions to demand similarly large wage increases, irrespective of the conditions in their particular sector.

In the economics literature of the day, there was a lot of confusion over the role that inflation expectations play in the wage-formation process. The literature stressed that workers and unions sought to catch up with inflation that had already occurred. But against this background, Milton Friedman argued that forward-looking expectations were more important in wage bargaining than catching up with past inflation. In particular, he stressed that workers bargain over real, and not nominal, wages. When signing a new contract, workers demand higher wages if they expect prices to increase over the life of the contract so as to preserve their real wages.

Thus, he argued that it is not the recently observed rate of inflation, but rather the *expected* rate of inflation that plays a prominent role in wage-setting. But with inflation rising and becoming more variable, there was considerable uncertainty over what the future rate of inflation would be. Indeed, high and variable inflation meant that there was no anchor for inflation expectations, and this lack of an anchor led to considerable turbulence in wage-setting.[3]

Although contractionary macroeconomic policies were required to lower the double-digit inflation rate, such policies operate with a lag and would have resulted in higher levels of unemployment during the transition period. One train of thought in the early to mid-1970s was that temporary wage and price controls could alleviate the negative impact on unemployment by ensuring that, over a period of time, wage- and price-setting behaviour would become consistent with the more restrictive macroeconomic policies.

The Anti-Inflation Board was therefore established to try to anchor inflation expectations through wage and price controls. The objective was to ensure that wage growth was in line with a set of targets for inflation of 8, 6, and 4 per cent over a 3-year period. This was done with the assumption that monetary and fiscal policy would be set to be consistent with such a result.[4]

The imposition of wage and price controls was very controversial, to say the least. One well-known academic even described them as "how to do a lot of harm by trying to do a little good."[5] There were three principal arguments against the use of controls. The first was that they would create distortions in the economy and that the longer the controls were in place, the greater these distortions would grow. The second was that controls are very difficult and costly to administer. Third, there was doubt as to whether the controls could really engineer a permanent reduction in inflation. In particular, would policy-makers place too much emphasis on controls and not enough on supporting macroeconomic and structural policies?

The empirical evidence that followed suggested that the controls were responsible for a reduction of about 2 to 3 percentage points in wage increases.[6] Ultimately, however, neither monetary nor fiscal policy was restrictive enough to maintain a lower rate of inflation, although, at the time, monetary policy was thought to be sufficiently tight. Subsequent research at the Bank, however, showed that the links between movements in the narrow monetary aggregate M1 and changes in prices were not as close in the short run as had been expected. And the size of the short-run changes in interest rates required to keep the money stock within its target band were not enough to have much of an impact on real output or prices.[7]

The fact that the link between any monetary aggregate and inflation did not prove to be very tight over time led the Bank to suggest in 1988 that it should focus directly on price stability as the anchor for monetary policy.[8] This led to the introduction of the inflation-targeting framework in 1991, one important objective of which is the anchoring of inflation expectations.

We did this because we had learned that, once inflation expectations are anchored, they contribute to more stable output and employment growth, allowing for more durable gains in real income over time.

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3. In addition, the economy was buffeted by shocks that had not been seen before. For example, the economy was hit by adverse oil-price shocks that fed directly into inflation expectations in the absence of a clear nominal anchor for monetary policy. And these shocks, combined with other structural changes, made it difficult for workers and employers to judge how to respond.

4. For an overview of the causes of inflation, as well as the goals of the AIB, see Dodge (1976).

5. Lipsey (1977).

6. Auld et al. (1979).

7. Thiessen (2000). In other words, the interest rate elasticity of M1 demand was too high. In the second half of the 1970s, the nominal anchor for monetary policy was a series of target ranges for growth in M1. These were abandoned in the early 1980s as the relationship between movements in the narrow money aggregate and changes in nominal spending broke down. Another problem with using the monetary aggregate M1 as the target for monetary policy was the uncertain impact of financial innovation, which weakened the relationship between M1 and other macroeconomic variables.

8. Crow (1988).

Inflation Targeting and the Behaviour of Inflation

In February 1991, the Bank and the Government of Canada jointly announced a series of inflation-reduction targets.

These targets were aimed at gradually bringing the 12-month rate of inflation down to 2 per cent, the midpoint of the inflation-control target range, by December 1995. Given the empirical evidence for Canada, which showed that the appropriate horizon for aiming at an inflation target was about 1 1/2 to 2 years, the first formal target was set for December 1992 at a rate of 3 per cent (plus or minus 1 per cent). Since that initial agreement, the inflation target has been extended three times, with the latest agreement covering the period to the end of 2006. In each case, the midpoint of the inflation-control target range has been maintained at 2 per cent.

The measure of prices chosen for the target was the consumer price index (CPI). This index is well understood by workers, unions, and employers, partly because of its use in cost-of-living (COLA) agreements. The operational guide for the Bank, however, is core inflation.[9] The reason for using a core inflation measure is to focus on the underlying trend in inflation on which monetary policy can have an effect. Given the lags between monetary policy actions and their impact on inflation, shocks that are expected to dissipate within that time frame are generally outside the scope of central bank action, unless such shocks have an impact on inflation expectations.

Since the adoption of inflation targeting, the inflation rate has fallen significantly. Indeed, by January 1992, inflation was already close to 2 per cent, down from its average of over 5 per cent between 1988 and 1991. Although at times it has approached the boundaries of the range, and exceeded it earlier this year, over the medium term, the average inflation rate has remained around 2 per cent. Indeed, over the six-year period from 1996 to 2002, it was just under 2 per cent. Moreover, not only has the inflation rate fallen, it has become more stable. In other words, movements away from the target have not been persistent. When inflation has moved away from the midpoint, it has shifted back towards 2 per cent as the shocks have worn off.

Not surprisingly, the Bank has undertaken considerable research to better understand the dynamics of inflation. One strand of this research has examined the persistence of inflation by allowing for potential changes in inflation regimes.[10] The results show that the inflation process in Canada can be divided into three distinct regimes: one with extremely high persistence and high inflation rates, one with fairly low persistence and moderate inflation rates, and one with low persistence and low inflation rates. In the first regime, which prevailed in the 1970s and early 1980s, when inflation moved up, it tended to stay up. Since that time, the economy has moved into the second and third regimes, with inflation becoming much less persistent. Indeed, persistence fell considerably over the 1980s and essentially disappeared in the late 1990s.[11]

This decline in the persistence of inflation was the result of the change in the monetary policy regime that has fostered more forward-looking inflation expectations. Traditional analysis of the inflation-unemployment trade-off using the Phillips curve, however, has typically modelled inflation expectations as the weighted sum of past lags of inflation.[12] More recent research has therefore moved towards embedding forward-looking expectations in this analysis. Cross-country analysis covering OECD inflation-targeting countries indicates that, since the adoption of the targets, inflation expectations have become more forward-looking, and that they are anchored around the official targets.[13] In our own empirical research for Canada, we have also found that expectations have become more forward looking.[14]

9. When the targets were first introduced, core inflation was defined as the CPI excluding food and energy prices and the effects of changes in indirect taxes on the remaining CPI components. We now have a more refined measure that excludes only the eight most volatile elements of the index as well as the effects of changes in indirect taxes on the remaining components. One reason for moving to the new measure of core inflation was that it is a better predictor of future inflation than the previous measure (Macklem 2001).

10. Ricketts and Rose (1995), Demers (2003).

11. St-Amant and Tessier (1998) find that this has also been the case in other major inflation-targeting and non-targeting countries.

12. The restriction that these lags sum to one is usually imposed so that there is no long-run trade-off between inflation and unemployment.

13. Clifton, Leon, and Wong (2001).

14. Khalaf and Kichian (2003). Because traditional Phillips curves are reduced-form equations, changes in the monetary policy regime can undermine their use for policy purposes (the Lucas Critique). Research at the Bank has therefore also examined whether the New Keynesian Phillips curve adequately represents inflation dynamics in Canada. Guay, Luger, and Zhu (2002) have found that this is not the case, although their work highlights the importance of including forward-looking expectations in the analysis. Work has also been undertaken on estimating the so-called sticky information Phillips curve based on the premise that firms change prices slowly because of the costs of acquiring new information relevant to that decision. See Khan and Zhu (2002).

Another fact about the inflation process in Canada is that inflation has become less uncertain—in other words, more predictable. After the oil-price shocks of the 1970s, inflation variability rose sharply. Although it fell during the years when the AIB was in operation, it rose again in the 1980s. However, between the 1980s and the latter part of the 1990s it dropped almost four-fold.[15] This reduction in inflation variability linked to the low-inflation environment allows people to take a longer-term view with respect to their planning, which leads to a better allocation of economic and financial resources.

In Canada, policy credibility has clearly increased over time. Work carried out using data to the mid-1990s suggested that, while central bank credibility had improved in inflation-targeting countries, it was difficult to say whether explicit inflation targets had made any additional contribution to that credibility.[16] More recent evidence suggests that the inflation target has, in fact, played an important role in enhancing credibility. For example, since the mid-1990s, long-term inflation expectations have fallen close to the midpoint of the target range, which is also close to the mean of inflation.[17]

In Canada, expectations of forecasters and businesses began to fall in line with the targets soon after they were introduced.[18] At first, this was for expectations at the 2-year horizon. Gradually, this lengthened to 6 to 10 years. By 1997, long-term expectations of inflation in financial markets, as expressed by the difference between 30-year yields on conventional and index-linked bonds, had fallen in line with the 2 per cent target midpoint. They have been firmly anchored at that level ever since, despite the various shocks that have hit the Canadian economy. This is in strong contrast to earlier periods in our history when future expectations had been fairly tightly linked to recently observed inflation rates.[19] And this change in behaviour is not because there have been fewer economic shocks. In fact, over the past few years, we have witnessed economic crises in Asia and Russia, oil-price shocks, and the tragic events of 11 September 2001 in the United States. Despite all of this, inflation expectations have remained well anchored. This is in absolute contrast to earlier periods. And it points to the important role that monetary policy plays in anchoring inflation expectations.

In general, there is real evidence to support the argument that, with the inflation target becoming increasingly credible, the whole nature of the inflation process has changed. The short-run response of inflation to measures of excess demand and supply appears to have fallen. And, similarly, the response of inflation to relative price shocks, such as changes in the exchange rate and energy prices, also seems to have declined. These changes have had the effect of reinforcing the stability of the inflation process and, therefore, of inflation itself. And this, in turn, has produced a more stable macroeconomic environment.

Moreover, by keeping average rates of inflation close to the inflation target, and by indicating that the Bank will act symmetrically in response to shocks that drive inflation away from the target in either direction, we have been able to contain inflation expectations. Indeed, under a credible monetary regime, there should be fewer forecasting errors in the bargaining process, since uncertainty about inflation is low. Thus, there is less need for workers to demand additional wage increases to protect themselves against the risk of unexpectedly high future inflation increases that can contribute to a wage-price spiral. Nor are employers as likely to offer such increases. Similarly, both employers and workers can look through periods when inflation is below the target. Thus, wage-setting becomes focused on actual developments in the particular sector. And workers and unions are able to place greater emphasis on real factors, such as productivity, that will help to boost income and living standards.

Inflation Targeting: Is the Target Set Too Low?

Now I would like to turn to concerns by some analysts that the level of the inflation target is set too low.

Inflation targets, whether in Canada or elsewhere, have typically not been set at zero. One argument for excluding zero is that there is downward rigidity in nominal wages. More specifically, it says that a little inflation is needed to "grease the wheels" of the labour market because nominal wages are downwardly rigid. Thus, it is argued that the target for the inflation rate

15. This is measured by the standard deviation of inflation, which fell from about 3 in the 1980s to 0.7 in the last part of the 1990s.

16. Johnson (1997).

17. In addition, long-term inflation expectations would appear to be better anchored in Canada than in the United States. See Kozicki and Tinsley (2002).

18. Perrier and Amano (2000)

19. Dodge (2002a).

should be in the 2 to 4 per cent range to facilitate adjustments in the real wage.[20] You will recall that, in Canada, the target range is set at 1 to 3 per cent.

One reason behind this argument is the belief that inflation allows firms to provide real wage increases to workers whose productivity is rising, while reducing real wages to less-productive staff without having to cut nominal wages.[21] Therefore, for firms to achieve the desired adjustment in real wages in the face of adverse demand shocks, inflation would have to be above zero. Otherwise, unemployment would rise, perhaps at an increasing rate, as inflation approaches zero, because firms would have to resort to layoffs to keep wage bills at their desired level.

Why might nominal wages be downwardly rigid? This could result from money illusion—for example, workers refusing to accept nominal wage cuts when, in fact, they may have suffered a similar reduction in real wages in the past because of inflation. Firms might also be reluctant to cut nominal wages because of notions of fairness. They might also have concerns that such cuts would adversely affect the quality of candidates they seek to attract, or lead to higher quit rates.

On the face of it, downward nominal wage rigidity would seem to have little relevance for Canada.[22] As I will discuss in more detail later, in the late 1990s, the unemployment rate fell sharply even though inflation had stabilized around 2 per cent.

The question is, how far above zero should the inflation target be set? This is an empirical question about how important downward nominal wage rigidity is in practice. Is there evidence that there is so much resistance to nominal wage cuts in Canada that our inflation target of 2 per cent is too low?

In the period leading up to the May 2001 renewal of the latest inflation target, the Bank undertook considerable research using a variety of tools and addressing a number of hypotheses to determine the extent of nominal wage rigidity in Canada.[23]

One way to examine the likely impact of downward nominal wage rigidity is to estimate what the wage distribution would look like in the absence of rigidity. On balance, this line of research demonstrates that downward nominal wage rigidity has not been an important feature of the Canadian labour market. Relatively more wage freezes do occur at low inflation rates, but this would be expected anyway, since the mean of the wage-change distribution varies with the rate of inflation. Econometric estimates suggest that the net effect of downward nominal wage rigidity on wage growth was in the range of only 0.07 to 0.18 per cent in the unionized private sector in the 1990s.[24]

It is important to note that what might appear to be downward nominal wage rigidity could also be a form of menu costs. By this, I mean the fixed costs associated with changing pay scales, a task that firms may be reluctant to undertake unless a large wage adjustment is required.[25] The estimates of rigidity that I just mentioned incorporate these effects.

Another strand of research has examined the employment effects of downward nominal wage rigidity in Canada. There are relatively few papers on this subject. Moreover, estimates of the employment impact tend to be sensitive to model specifications, which are typically reduced-form equations linking changes in employment growth to changes in output growth and to a variable that measures wage cuts or freezes. On balance, however, these studies do not support a significant employment impact.[26]

Most of the data used in the research I have cited come from wage settlements in the unionized sector, which begs the question as to whether the results would hold more generally for all workers in the economy. Evidence suggests that the wage-settlements data tend to overstate the amount of nominal wage rigidity in the economy, since base wage rates for workers outside the unionized sector are typically more flexible.[27] For example, small firms tend to have more flexible pay practices, while variable compensation, including adjustments to non-wage benefits, also allows for more nominal wage flexibility.

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20. Fortin (1996); Akerlof, Dickens, and Perry (1996); Fortin, Akerlof, Dickens, and Perry (2002).

21. Tobin (1972).

22. Thiessen (1996).

23. See Technical Background Document 1 from the renewal of the inflation-control target (May 2001). This can be found at http://www.bankofcanada.ca/en/press/annexe1.pdf.

24. Crawford (2001); Crawford and Wright (2001).

25. In addition, there are few small wage changes (up or down) in the data.

26. Simpson, Cameron, and Hum (1998) find relatively large effects, but Farès and Hogan (2000) and Faruqui (2000) show that, once their model is adjusted for possible endogeneity between wage freezes and output growth, the impact is insignificant.

27. Crawford and Harrison (1997).

In addition to using micro-level data to examine downward nominal wage rigidity, aggregate data can also be used to examine the effect of unemployment or the output gap on inflation—in other words, the slope of the Phillips curve. If downward nominal wage rigidity exists, then the slope of the Phillips curve should have become flatter in the period of excess supply during the low-inflation period of the 1990s. Evidence from this research, however, does not support this hypothesis.[28]

Another line of argument that has been tested using aggregate data has been referred to as "near-rational" wage setting. It suggests that workers and firms might not worry as much about inflation when it is at low levels and, therefore, do not fully incorporate small changes in inflation into their inflation expectations.[29] Supporters of this line of reasoning argue that unemployment can be sustained below the equilibrium rate over a range of low and moderate rates of inflation. Thus, there is some positive inflation rate that should be chosen as the target.

One problem with this argument is that it is difficult to imagine why agents would continuously ignore the negative impact of low inflation.[30] Although the cost might be small in a single period, it would clearly accumulate over time, which should induce them to become fully rational in their wage- and price-setting. There is little Canadian evidence in this area. That which exists, however, suggests implausibly high estimates of near-rational behaviour when inflation is at 3 per cent.[31]

In summary, there is little substantive evidence to suggest that downward nominal wage rigidity or near-rationality in wage-setting impedes appropriate adjustment at our currently targeted inflation rate of 2 per cent. But equally, there is little substantive evidence to suggest that a target lower than 2 per cent would lead to a measurable improvement in economic behaviour. Thus, because inflation expectations have become well anchored around 2 per cent, maintaining the 2 per cent target was judged to be appropriate.[32]

28. Farès and Lemieux (2000).

29. Akerlof, Dickens, and Perry (2000).

30. O'Reilly (1998).

31. Fortin and Dumont (2001). Their results imply that less than 50 per cent of agents take inflation into account when it is near 3 per cent.

32. See Technical Background Document 1 from the renewal of the inflation-control target (May 2001).

Canadian Labour Market Performance

In this part of my lecture, I would like to discuss how the labour market functions better than it did a decade ago and, indeed, better than when the AIB was wrapped up in 1978.

First: As I said, inflation has become low, stable, and predictable. The impact of this development can be seen in the path of nominal wages.[33] Indeed, the growth in nominal wages has also slowed, along with falling inflation. Since the introduction of the inflation target, average annual growth in nominal wages has been about 4 per cent, down from the approximately 14 per cent average growth recorded in the 1970s and the 8 per cent witnessed in the 1980s.[34]

In addition, the distribution of wage changes has narrowed as inflation has become more predictable. There are at least a couple of reasons why this might be the case. First, research points to a significant link between higher inflation and greater inflation uncertainty. Where there is increased uncertainty about inflation, firms and workers may set inflation adjustments incorrectly, creating relatively more dispersion in wage changes.[35] Thus, as uncertainty about inflation falls in line with declining inflation, so should the dispersion around average wage changes. I will have more to say on inflation uncertainty in a few moments. Second, a lower cross-sectional variation in wage settlements could arise because downward nominal wage rigidity would impose a floor on the distribution. As I have already discussed, this seems unlikely to have had a significant impact in Canada.

By contrast, others have argued that the variability of relative wage changes decreases when inflation rates accelerate. Essentially, the argument here is that higher

33. The relationship between movements in nominal wages and prices leads inevitably to the question of the direction of causality. The nature of these dynamics has been a source of debate over the years. In the 1970s, the prevailing view was that nominal wage inflation led to price inflation, largely because of wage "catch up"; i.e., workers and unions demanding additional wage increases to compensate them for unexpected inflation and to match settlements in other sectors of the economy, such as the public sector. In this context, the setting of wage guidelines by the Anti-Inflation Board was seen as instrumental in controlling inflation. Since then, our research suggests that causality tends to run— at least primarily— from prices to wages, and not the reverse. See Cozier (1992).

34. These numbers refer to average annual growth in nominal wages, salaries, and supplementary labour income from the System of National Accounts over the periods 1971–80, 1981–90, and 1991–2000.

35. Groshen and Schweitzer (1999).

inflation leads to a greater demand for indexed wage contracts either explicitly through COLA clauses or implicitly when setting wages with employers—to protect workers from unexpected increases in inflation.[36]

Clearly, what actually happens to the dispersion of wage settlements when inflation and inflation uncertainty decline is an empirical proposition. A stylized fact of the Canadian economy is that, in the unionized private sector, the variance in wage settlements fell by about two-thirds as inflation declined.[37] Although some have suggested that this could be because of greater downward nominal wage rigidity, this is not the case. We know this because the variability of wage changes above the median has also fallen significantly. Moreover, it has become apparent that wages no longer react quickly to large changes in relative prices such as those generated by oil-price shocks or, more recently, by auto insurance premiums. This is a very important contribution to labour market performance in Canada because it suggests that relative wages tend to better reflect demand and supply conditions in particular markets. There is, however, very little research in this area, and it is one where more in-depth analysis would be useful.

Second: Another development in the 1990s was the relatively sharp increase in the average duration of labour contracts in the private unionized sector of the economy. Compared with the 1980s, the average duration increased by almost 10 months.[38]

Reduced inflation uncertainty is one explanation for this. As the variability of inflation has fallen, this has likely lowered the amount of uncertainty in the economy and has led to labour contracts that are longer in duration. Theoretical work in the late 1970s and early 1980s showed that lower uncertainty about inflation should result in longer contracts.[39] Empirical evidence for Canada gathered in the early 1980s was consistent with this theoretical work.[40]

Using several measures of inflation uncertainty, researchers at the Bank of Canada have confirmed a robust negative relationship between inflation uncertainty and the duration of union contracts in the private sector.[41] In other words, as uncertainty about inflation has fallen, the duration of labour contracts has lengthened. Indeed, it has been estimated that each percentage point decrease in inflation uncertainty increases contract length by about two months.[42] One positive implication of longer labour contracts is a savings in the resources dedicated to negotiation, or in other words, lower transactions costs.

Another interesting finding is that the proportion of COLA clauses in private sector contracts has not changed much over the last decade, even though contract duration has increased.[43] Once unions have bargained for such clauses, they appear reluctant to give them up, even if they are seldom triggered.

Unions, of course, bargain for more than just wages and cost-of-living agreements. In the early 1990s, they became more preoccupied with job security for their members in the face of weak aggregate demand, increased contracting out, and the move towards hiring temporary staff as employers sought to contain costs.[44] Thus, uncertainty over developments in the real side of the economy—which I shall refer to as real

36. Hammermesh (1986).

37. Crawford (2001). In the early 1980s, the annual standard deviation of wage settlements in the private sector was just over 3 per cent. This fell to about 1 per cent in the year 2000. The data are drawn from a database maintained by Human Resources Development Canada, which contains information on agreements signed in the unionized sector of the economy. Note that wage settlements in the public sector are excluded from the numbers presented in the text. Data in this sector are distorted by wage freezes in the 1990s as governments at various levels sought to control budget deficits.

38. In 1980, average duration across all contracts in the private sector was approximately 27 months. In 2001, it was about 36 months.

39. Gray (1978); Canzoneri (1980).

40. Since then, advances in econometric techniques have allowed researchers to better specify and construct uncertainty variables and thus to measure the impact of inflation uncertainty on contract duration. For example, early empirical work by Christofides and Wilton (1983) used a rolling regression technique to calculate inflation uncertainty. New techniques, such as autoregressive conditional heteroscedasticity (ARCH) models, now allow researchers to better construct uncertainty variables.

41. Fay and Lavoie (2002).

42. This refers to the uncertainty measure derived from an ARCH model, and expressed in terms of the standard deviation of inflation uncertainty. Other measures of inflation uncertainty give different results.

43. In the 1980s, on average, 32 per cent of private sector contracts contained COLA clauses. This fell to an average of 25 per cent over the 1990s. In contrast to the private sector, the incidence of COLA clauses in public sector agreements fell substantially in the early part of the 1990s, after which it levelled off in the 1 to 7 per cent range.

44. One indicator of the importance of labour unions is union density—the number of workers who are union members. This measure suggests that the importance of unions has not changed substantially. Trade union density over the 1980s averaged about 36 per cent in Canada. The average over the 1990s was only slightly lower, although it did begin to fall after 1997, closing the decade at around 33 per cent.

uncertainty—may have become more prominent at that time. Work at the Bank, however, finds no empirical support for the proposition that this type of uncertainty affects contract length.[45]

Third: Another concrete benefit of low, stable, and predictable inflation has been less disagreement over future inflation, leading to fewer strikes and, therefore, lower output losses. The number of person-days lost to strikes peaked in the early to mid-1970s when inflation was at double-digit levels and uncertainty was high. Since then, the number of days lost has trended down. Between the 1970s and 1980s, the number of days lost to strikes fell by about one-third. In the 1990s, it declined again by over 50 per cent relative to the previous decade. This represents a clear gain for workers and, indeed, for all Canadians.

Fourth, and very importantly: greater stability has also been observed in output growth.[46] Several reasons have been put forward for this, including better inventory management. The conduct of monetary policy has certainly been an important factor. By responding promptly and symmetrically to demand shocks, and by focusing on the underlying trend of inflation—thus ignoring temporary inflation shocks unless they feed into inflation expectations—monetary policy will produce greater stability in output growth.

Alongside greater stability in output growth, there has been more stable employment growth and less volatility in the unemployment rate.[47] On the margin, other factors may have been at play as well. For example, there is evidence that the use of variable forms of compensation has increased over time.[48] Variable-compensation programs allow firms to adjust pay in the face of adverse shocks, rather than resorting to layoffs. This contributes to greater employment stability. It is also worth noting that changes in compensation practices that link individual performance to that of the firm also move in the direction of bolstering productivity growth.[49]

Greater stability in output growth has paved the way for a labour market with rising labour force participation rates, higher employment / population ratios, and lower unemployment rates. Indeed, both Canada's participation rate and the employment / population ratio hit record high levels this year. Moreover, this rising employment / population ratio has helped to boost our standard of living, and is a reflection of just how well the labour market is functioning. Newfoundland has also seen its aggregate labour force participation rate and employment / population ratio rise to record levels, although they still remain below the national average.

The current situation is in contrast to that of the late 1980s and early 1990s, when Canada faced a number of economic challenges that required painful policy action and difficult adjustments. Among these, inflation had to be lowered and public sector deficits had to be tamed. I discussed the linkages between monetary and fiscal policy elsewhere.[50] Overall, an extraordinary effort was made to get the macroeconomic framework—that is, both monetary and fiscal policies—right, and we are now reaping the benefits of those efforts.

To be sure, a number of other difficult policy choices have also contributed to better labour market performance, although it is difficult to isolate the specific contribution of each one of them. For example, there were reforms to labour market institutions, such as changes to the Unemployment Insurance program. Trade has also been opened up to improve the efficiency of markets, namely through the FTA and NAFTA. The main point here is that all of these policies have worked in the same direction—towards improved labour market performance.

Now let me turn to prospects for income growth.[51] An important determinant of aggregate income growth is labour-productivity growth. On an economy-wide basis, productivity growth averaged about 1.4 per

45. Fay and Lavoie (2002). See also Murphy (2000); Rich and Tracy (2000); and Wallace (2001) for evidence in the United States.

46. Debs (2001).

47. This is measured as the standard deviation of each variable in the 1980s and 1990s.

48. Crawford and Harrison (1997). The Conference Board of Canada (2002) also notes that while base pay represents the main element of compensation, it has made up a smaller percentage of total compensation over the past few years. In fact, 87 per cent of Canadian organizations had one or more types of variable pay plans in place in 2002, with cash bonuses being the most common type of short-term incentive plan. Stock options were the most common type of long-term incentive.

49. Lebow et al. (1999).

50. Dodge (1998, 2002b).

51. One way to approach this topic is to examine the share of labour in national income. Since the late 1970s, it has shown no observable trend, hovering around 64 per cent. The labour share of income rose sharply in the early 1990s, when profits fell during the recession and payroll taxes rose. After this period, profits rose, and the labour share declined. When the share of labour income in GDP is unchanged, we would expect growth in labour income to be close to the projected growth in nominal GDP. A general rule of thumb would be for nominal GDP to increase by roughly 5 per cent per year, on average, over the medium term—2 per cent from inflation and 3 per cent from average potential output growth. This 5 per cent growth in labour income can be roughly divided into 1 per cent growth in labour input (person-hours) and 4 per cent growth in labour compensation per person-hour. See Longworth (2003).

cent between 1970 and 1997. It then picked up, accelerating to 1.8 per cent, on average, between 1997 and 2002. This is still well below that in the United States, but the acceleration is a promising sign. Indeed, increased investment in machinery and equipment as well as in communications technologies in the late 1990s, combined with sound economic policies, will likely see productivity gains remain strong in the near and medium term. Furthermore, as I discussed earlier, the Bank of Canada plays an important role here by keeping inflation low, stable, and predictable, which is conducive to innovation, risk-taking, and investment.[52]

The Conduct of Monetary Policy

But keeping inflation at the 2 per cent target is not an easy task. And there are times when inflation temporarily moves away from the target because of unexpected developments and shocks. Recent experience provides a case in point.

In early 2003, inflation was well above the 2 per cent target, and short-term inflation expectations had edged up. Although inflation was being pushed up by special factors, such as sharply higher oil prices and auto insurance premiums, there were also signs that strong domestic demand was working to broaden price pressures. Since then, however, the economy has weakened more than expected, and core inflation has fallen to 1.8 per cent. And virtually all measures of inflation expectations have decreased. Although we at the Bank had expected core inflation to ease, several unforeseen developments have caused this to occur sooner, and to be more pronounced, than we projected last April. These have included a slightly faster easing in pressures from insurance premiums and price discounting in certain service industries because of SARS. As well, the U.S. dollar has fallen substantially, adding to the recent weakness in goods prices in Canada. The average value of the Canadian dollar in terms of the U.S. currency in recent months represents a sharp increase from 69 cents in April.

Clearly, the appreciation of the Canadian dollar is an important factor that we at the Bank are considering carefully as we evaluate the economic situation and the risks attached to our outlook. At the same time, we continue to assess other developments, notably a somewhat stronger-than-expected recovery in world demand.

In this context, if it looked as though the appreciation of the Canadian dollar would more than offset the effects of stronger world demand, or that world demand was weakening, we would act to stimulate domestic demand with the intent of returning inflation to the 2 per cent target over the next 18 to 24 months. Such action would take the form of lowering interest rates. As I said in my recent testimony before the Senate Banking, Trade and Commerce Committee, the Bank continues to assess the implications of all past developments—domestic and external—for output and inflation in Canada.

This kind of analysis and the typically difficult assessment of future developments are what we at the Bank have to consider at each monetary policy decision date.

Concluding Thoughts

Let me now conclude. Changes in the conduct of monetary and fiscal policy, as well as increased emphasis on structural policies, have worked together to produce a better-functioning labour market in Canada.

The Bank's particular contribution has been to anchor inflation expectations at the 2 per cent target. Because our monetary policy framework reduces uncertainty about inflation, it helps both firms and workers make better planning decisions. Thus, wage bargaining can be concluded by focusing on factors that are relevant to wage-setting, such as productivity growth, without the noise of variable inflation. This, in turn, leads to a more efficient bargaining process with lower transactions costs and less loss of output,[53] as well as to a more productive allocation of labour in the economy.

This has contributed to an economic environment where there are rising employment / population ratios, higher participation rates, and lower unemployment rates.

52. Dodge (2002c).

53. Longworth (2002).

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Past Adjustments and Future Trends in the Canadian Economy

Remarks by David Dodge
Governor of the Bank of Canada
to the London Chamber of Commerce
London, Ontario
8 December 2003

Good afternoon, ladies and gentlemen. I'm happy to have this opportunity to visit the Forest City and to finally honour your long-standing invitation to address you.

When giving a speech near the end of a year, it is common practice to look back over the past 12 months, consider what we have learned from the events and experiences of the year, and think a bit about what might lie ahead. I became Governor of the Bank of Canada in 2001 and, since that time, I have found myself saying at the end of each year, "Well, we won't see another year like that again." In 2001, we saw the bursting of the tech bubble and the 9/11 terrorist attacks in the United States. Last year, we had the fallout from Enron and other examples of corporate malfeasance, as well as the growing threat of war in the Middle East. And our currency dropped to an all-time low against the U.S. dollar.

Not to be outdone, 2003 has also had more than its share of momentous events that had an impact on the Canadian economy. The list seems almost Biblical: war, pestilence, in the form of SARS and mad-cow disease, fires, floods, a hurricane, and a power outage. This year also brought another type of shock to keep Canadians preoccupied, and that is the sharp rise of our currency in foreign exchange markets. The Canadian dollar has jumped from under 64 cents U.S. at the start of the year to over 76 cents at the end of last week—an unprecedented movement.

The Bank of Canada has closely followed the economic effects of all these events, including the rapid movement of the Canadian dollar. But to better understand what has happened in the economy over the past year or so, I will place my comments in the context of longer-term economic trends.

The Adjustments of the 1990s

Let me start by recalling the state of our economy as the 1990s began. Although inflation had come down from the very high levels seen in the early 1980s, it was still quite high by today's standards. Several approaches had been tried to bring about an environment of low, stable, and predictable inflation. These included wage and price controls and the targeting of the money supply. But none of these methods provided a suitable medium-term anchor for inflation expectations. This made it difficult for individuals and businesses to form long-range plans with any degree of certainty. On the fiscal side, the picture was pretty grim at the start of the 1990s and getting worse. Public sector deficits would eventually peak at around 8 per cent of Canada's GDP, and public debt levels were continuing to mount. Clearly, the situation was not sustainable. Adjustments were urgently needed.

The first of these adjustments came in 1991, when the Bank and the Government of Canada agreed to adopt a series of explicit inflation-control targets. The agreement called for an inflation target—defined in terms of the annual rate of increase of the consumer price index—that descended gradually to 2 per cent, the midpoint of a 1 to 3 per cent range. That initial agreement has been extended three times, with the latest agreement covering the period to the end of 2006. In each case, the midpoint of the inflation-control target range has been kept at 2 per cent.

This framework has worked well—better than might have been expected. By January 1992, inflation was already close to 2 per cent, and from the end of 1994 to today, inflation has averaged almost exactly 2 per cent. Moreover, not only has inflation fallen, it has become more stable. Indeed, the trend of inflation—as measured by what we call core inflation—has stayed within the target range almost continuously for the past 10 years.

Just as importantly, we found that, after a few years of inflation targeting, the inflation expectations of Canadians fell into line with the 2 per cent target. And expectations have remained close to the target in recent years.

The point of all this is that we have been successful in using monetary policy to create an economic environment of low, stable, and predictable inflation. With a credible monetary policy, the whole nature of the inflation process has changed. Inflation itself has become more stable and, in turn, this has led to a more stable and better-functioning economy.

We have been successful in using monetary policy to create an economic environment of low, stable, and predictable inflation.

The second big adjustment began in earnest around the middle of the 1990s. As I said before, at that time, Canada was facing an unsustainable fiscal situation. Compounding this immediate fiscal problem were the looming challenges posed by our aging population. Spending had to be put on a viable long-term course, and the ratio of public debt to GDP on a steady downward track.

By the middle of the decade, governments—federal and provincial—had begun to take the painful steps to balance their books and reduce their debt burdens. It did not take long for the benefits of those tough decisions to materialize. In most jurisdictions, the vicious circle of rising deficits and debts became a virtuous circle of balanced budgets and falling debt burdens. This fiscal adjustment helped Canada's economic policy credibility and reduced the risk premium that investors demanded on Canadian government bonds. Not only did lower interest rates reduce debt-servicing costs, they stimulated economic growth, which brought in more revenues for governments.

The federal government recently announced a sixth consecutive surplus in its budget. Our public pension plans are once again on a sound footing. The federal debt-to-GDP ratio has fallen to about 44 per cent, from close to 70 per cent at its peak. The ratio of total government liabilities to GDP has declined from a peak of about 100 per cent to about 80 per cent, according to the OECD. And Canada's Triple-A credit rating has been restored.

I don't mean to suggest that inflation targeting and fiscal adjustments were the only factors behind Canada's overall improved economic performance. Of equal importance was the difficult restructuring that had to be done in the wake of free-trade agreements in the 1990s. Businesses and employees made some difficult adjustments. None of this was easy, but it did leave Canada's economy in a better position to grow sustainably and to handle economic shocks. Our economic record over the past few years, even in the face of all the events I have mentioned, is testament to that.

Now, let me talk about the role of the Canadian dollar in this long adjustment process. On a day-to-day basis, there are a number of factors that can drive movements in the value of the Canadian dollar in foreign exchange markets. But my intention is to stick to a discussion of long-term trends. From this perspective, there were really two major factors at work on the currency in the 1990s. Governments were cutting spending to address their fiscal problems, and that led to a reduction in domestic demand. On top of this, commodity prices were down sharply in the second half of the decade. Historically, there has been a fairly strong correlation between the prices of non-energy commodities and the external value of the Canadian dollar.

In the face of these two factors, Canada's floating exchange rate did its job as a "shock absorber" for the economy. How? Given the tight fiscal policy of the time, the lower dollar—in the context of an easing in monetary policy—played an appropriate role in encouraging foreign demand for Canadian products at a time when domestic demand was weak.

Further, while the lower currency cushioned the shock of falling commodity prices on resource producers, it also boosted the profitability of other sectors that were

able to expand in the wake of free trade agreements and strong foreign demand. This helped to facilitate the transfer of resources within the economy from sectors that were shrinking to those that were growing.

The depreciating Canadian dollar of the 1990s also changed the relative price of labour and capital. At the time, there was a fair bit of excess labour in the economy, because of the structural adjustments that were taking place. The lower dollar raised the cost of machinery and equipment relative to labour. And that made it easier for some of the labour that was released by the shrinking sectors of the economy to be absorbed by those that were growing.

Future Trends in the Economy

That's a quick look back at the 1990s. So what can we expect in the future? What are the major issues that we will have to grapple with in the coming decades? What adjustments will be needed?

I don't have a crystal ball, but a couple of issues seem fairly clear to me. As I already mentioned, the first important issue is demographics. The Canadian economy must prepare for the retirement of the baby boomers. Under current projections, Canada's working-age population—those 15 to 64 years of age—will start to decline in about 15 years.

We need to continue to lower our ratio of public debt to GDP. This will help to ensure that Canada will be able to support its growing elderly population.

Given this demographic outlook, there are two points to be made. The first is that we need to continue to lower our ratio of public debt to GDP. This will help to ensure that Canada will be able to support its growing elderly population.

The second point is that we will need to make adjustments to help us deal with a labour force that will soon be shrinking in relative terms and, ultimately, in absolute terms as well. What kinds of adjustments? We will need to make sure that the older segment of the working-age population is not discouraged from participating in the labour force. But more importantly, we need to raise productivity if Canadians are to continue to enjoy rising incomes.

It will not be easy to get those productivity gains. We will need to see greater investment in new, improved machinery and equipment. We will need to see more and better application of information and communications technology. We will need to ensure that our workers have the skills and receive the training they require to take advantage of productivity-enhancing technology. And we will need to improve business organization and practices, to fully exploit the potential of new technologies, and to minimize any barriers to their application in the workplace.

Raising productivity will also require a major effort to ensure that our microeconomic policies facilitate innovation and higher productivity in both the private and public sectors in Canada.

In thinking about our macroeconomic policies, we can't assume that all the shocks are behind us. We have seen the buildup of economic imbalances recently, with large current account surpluses in Asia and a large current account deficit in the United States. And fiscal imbalances are growing in Europe and the United States.

So how can the Bank of Canada help to prepare for the challenges ahead? Most importantly, we must stick with the monetary policy framework that we built in the 1990s. That means keeping our commitment to low, stable, and predictable inflation. And it means that our floating exchange rate will continue to be an important part of our monetary policy framework. This framework will continue to help the economy adjust to changing economic circumstances, both at home and abroad.

Having a floating exchange rate to facilitate economic adjustments is by far the best option for the Canadian economy.

Of course, exchange rates don't always move as smoothly as desired or expected. Still, let me repeat what I have said many times before: having a floating exchange rate to facilitate economic adjustments is by far the best option for the Canadian economy.

Recent Economic Developments

Let me now turn to the current economic situation, starting with the outlook for inflation. As we noted in our October *Monetary Policy Report*, we expect that Canada's inflation rate will fall over the next few months. The core rate of inflation—a measure that removes the eight most volatile components of the consumer price index—will likely move down close to the bottom of our 1 to 3 per cent inflation-control range early next year, before starting to move back up towards 2 per cent.

On the Bank's latest fixed announcement date last week, we decided to leave our key policy rate unchanged. In doing so, we noted a few developments that have altered our outlook since we published the *Monetary Policy Report*. Let me review some of them.

At the end of November, Statistics Canada released its national accounts data for the third quarter. These data showed that Canada's economy had grown at an annualized rate of just 1.1 per cent in the third quarter, a rate that was well below expectations. What's more, there were downward revisions to growth in previous quarters. This meant that, at the end of the third quarter, there was more excess capacity in the Canadian economy than we had anticipated.

In the *Monetary Policy Report*, we said that we expected the economy to close its output gap and return to its level of full capacity by early 2005. Closing the output gap over that period would be consistent with inflation returning to the 2 per cent target by mid-2005. But because we now know that the output gap is larger than we had expected in October, we also know that the economy will have to grow at a faster rate during the fourth quarter and through 2004 to close that output gap by early 2005.

While growth earlier this year was disappointing, we are now seeing a number of encouraging signs suggesting that stronger growth will resume, beginning in the current quarter. I will mention three of those signs. First, while the overall growth rate in the third quarter was just 1.1 per cent, it should be noted that this figure was depressed because businesses met demand in large part from inventories. Final domestic demand grew quite strongly by close to 6 per cent—thanks to healthy household spending and rising business investment. This investment bodes well for higher future production. And, with continuing employment growth, we expect household spending to remain robust.

Second, the reduction in inventory investment is probably over. While this adjustment depressed growth in the third quarter, it should not do so in the fourth quarter. In fact, the completion of the inventory correction should contribute to growth in the fourth quarter.

Third, Canada's export sector should receive a boost from rising foreign demand, in particular, from the United States. Remember that the U.S. economy grew at an annualized rate of about 8 per cent in the third quarter, and Canadian exporters should see some benefit from this and from the continuing strong growth expected in the U.S. economy over the months ahead. Rising non-energy commodity prices should also be a boost to the economy.

All told, the Canadian economy should be poised for solid growth ahead, beginning in the fourth quarter. We would expect economic growth in this quarter to be well above 4 per cent on an annualized basis.

However—and let me stress this—the effect of the recent sharp appreciation of the Canadian dollar is a major uncertainty at this time. It is not clear to what extent the increase in foreign demand I have just mentioned will be offset by the effects of a stronger currency. Nor can we be sure that there is enough monetary stimulus in the economy to support the increases in household spending and business investment that would be required to return the economy to full capacity by early 2005.

The effect of the recent sharp appreciation of the Canadian dollar is a major uncertainty at this time.

Some important economic data are expected between now and our next fixed announcement date, on 20 January. These should give us a better sense of how Canada's export sector is doing, and how household spending went over the holiday season. We will be closely watching all the data ahead for evidence that the economy is growing at a rate solidly above the growth of potential.

Conclusion

This past year, like the two years before it, was full of "interesting" economic challenges for Canada and the world. It is tempting to hope that next year will be somewhat less "interesting" and bring fewer challenges. But regardless of what next year brings, what is critical is that we keep our eyes on the longer-term horizon and focus on the challenges ahead. These challenges include adapting to shifting demographics, raising productivity, and getting our microeconomic policy framework right. At the Bank of Canada, we remain committed to the sound monetary policy framework that will help us rise to tomorrow's challenges. And that's good news for all of us, no matter what the coming years may bring.

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Summary Tables

A1 Summary of Key Monetary Policy Variables

Monthly		Inflation-control target (12-month rate)			Policy instrument			Monetary conditions			Monetary aggregates (12-month growth rate)			Inflation indicators					
		Target range	CPI	Core CPI*	Operating band for overnight rate (end of month)		Overnight money market rate	Monetary conditions index (January 1987=0)	90-day commercial paper rate	C-6 trade-weighted exchange rate (1992=100)	Gross M1	M1++	M2++	Yield spread between conventional and Real Return Bonds	Total CPI excluding food, energy, and the effect of changes in indirect taxes	CPIW	Unit labour costs	IPPI (finished products)	Average hourly earnings of permanent workers
					Low	High													
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
2000	J	1-3	2.3	1.2	4.50	5.00	4.77	-5.09	5.25	84.87	9.2	6.2	5.7	2.25	1.3	1.5	1.0	0.7	3.5
	F	1-3	2.7	1.3	4.75	5.25	4.97	-5.54	5.31	83.58	11.2	7.6	6.2	1.91	1.6	1.6	1.8	2.1	3.1
	M	1-3	3.0	1.4	5.00	5.50	5.25	-5.16	5.46	84.17	12.3	8.9	6.4	2.04	1.5	1.7	1.3	1.5	3.0
	A	1-3	2.1	1.1	5.00	5.50	5.26	-5.37	5.62	83.23	14.6	9.5	7.2	2.28	1.2	1.3	5.2	2.2	3.7
	M	1-3	2.4	1.1	5.50	6.00	5.75	-5.48	5.98	82.08	13.6	8.3	6.6	1.82	1.3	1.4	1.4	3.2	3.2
	J	1-3	2.9	1.3	5.50	6.00	5.75	-5.32	5.89	82.70	15.5	9.2	7.2	1.84	1.4	1.6	2.7	3.2	2.9
	J	1-3	3.0	1.2	5.50	6.00	5.73	-4.88	5.88	83.83	16.7	9.2	7.6	1.90	1.5	1.7	2.5	2.5	3.0
	A	1-3	2.5	1.2	5.50	6.00	5.75	-5.05	5.90	83.34	16.0	8.6	7.1	1.84	1.5	1.6	3.3	2.3	3.4
	S	1-3	2.7	1.0	5.50	6.00	5.74	-5.45	5.83	82.53	17.4	9.3	7.0	2.07	1.3	1.5	4.6	2.4	4.0
	O	1-3	2.8	1.3	5.50	6.00	5.75	-5.70	5.85	81.87	17.4	9.6	7.5	2.09	1.5	1.6	3.4	3.5	3.7
	N	1-3	3.2	1.5	5.50	6.00	5.75	-6.22	5.89	80.49	15.8	9.5	7.4	2.00	1.8	1.8	4.3	4.8	3.3
	D	1-3	3.2	1.8	5.50	6.00	5.80	-5.92	5.71	81.66	15.6	10.1	7.9	2.14	1.9	2.0	3.9	3.0	3.2
2001	J	1-3	3.0	1.8	5.25	5.75	5.49	-6.06	5.29	82.36	14.4	9.1	7.7	2.36	2.0	2.0	4.1	3.7	3.0
	F	1-3	2.9	1.7	5.25	5.75	5.49	-6.94	5.05	80.78	14.3	8.5	7.6	2.27	2.0	1.9	3.8	3.8	3.5
	M	1-3	2.5	1.8	4.75	5.25	4.99	-7.93	4.66	79.35	13.3	7.7	7.4	2.34	1.7	1.9	4.1	3.8	3.7
	A	1-3	3.6	2.3	4.50	5.00	4.74	-7.71	4.49	80.28	11.3	7.1	7.2	2.36	1.9	2.4	-	4.3	3.5
	M	1-3	3.9	2.3	4.25	4.75	4.67	-7.60	4.49	80.54	11.7	8.9	7.8	2.45	2.0	2.5	3.1	3.8	4.0
	J	1-3	3.3	2.3	4.25	4.75	4.49	-7.03	4.38	82.21	10.0	7.9	7.2	2.36	1.9	2.4	2.9	2.8	3.8
	J	1-3	2.6	2.4	4.00	4.50	4.24	-7.70	4.22	80.97	9.6	8.4	7.0	2.28	2.1	2.4	3.3	2.6	3.3
	A	1-3	2.8	2.3	3.75	4.25	4.17	-8.28	3.96	80.18	9.2	8.8	7.1	1.99	2.1	2.3	2.5	2.5	2.5
	S	1-3	2.6	2.3	3.25	3.75	3.49	-9.69	3.19	78.65	11.7	10.8	7.6	2.18	2.0	2.3	1.8	3.5	2.3
	O	1-3	1.9	2.2	2.50	3.00	2.74	-10.59	2.45	78.28	12.0	10.8	7.9	1.71	1.8	2.1	2.5	1.4	2.5
	N	1-3	0.7	1.7	2.00	2.50	2.60	-10.78	2.17	78.50	13.7	13.1	8.7	1.91	1.4	1.7	1.9	0.6	3.0
	D	1-3	0.7	1.6	2.00	2.50	2.24	-10.94	2.08	78.33	14.2	14.0	7.6	1.93	1.3	1.6	2.4	1.0	3.3
2002	J	1-3	1.3	1.8	1.75	2.25	1.99	-10.82	2.07	78.63	14.4	15.5	8.0	1.95	1.4	1.8	2.1	2.0	3.5
	F	1-3	1.5	2.2	1.75	2.25	1.99	-11.07	2.16	77.84	12.6	15.4	7.5	1.96	1.4	2.1	1.1	1.5	3.4
	M	1-3	1.8	2.1	1.75	2.25	1.99	-10.61	2.36	78.45	12.2	15.6	7.0	2.30	1.8	2.1	1.2	1.1	3.2
	A	1-3	1.7	2.2	2.00	2.50	2.24	-10.07	2.46	79.48	11.7	15.2	6.9	2.29	1.9	2.1	0.5	0.6	2.8
	M	1-3	1.0	2.2	2.00	2.50	2.25	-9.31	2.68	80.79	12.0	14.3	6.7	2.24	2.0	1.9	1.8	-0.3	2.4
	J	1-3	1.3	2.1	2.25	2.75	2.50	-9.12	2.78	80.99	13.5	15.6	6.9	2.32	2.1	1.9	1.2	0.6	2.7
	J	1-3	2.1	2.1	2.50	3.00	2.74	-10.40	2.88	77.71	13.9	14.9	6.8	2.28	2.1	2.0	0.7	0.5	2.8
	A	1-3	2.6	2.5	2.50	3.00	2.74	-9.68	3.09	78.90	14.4	15.3	6.8	2.18	2.2	2.4	1.4	1.3	3.0
	S	1-3	2.3	2.5	2.50	3.00	2.74	-10.27	2.90	77.97	11.2	12.7	6.2	2.18	2.3	2.3	0.9	0.9	2.8
	O	1-3	3.2	2.5	2.50	3.00	2.74	-10.06	2.83	78.63	11.7	12.5	5.7	2.18	2.5	2.4	1.4	2.1	2.7
	N	1-3	4.3	3.1	2.50	3.00	2.74	-10.21	2.85	78.24	9.8	10.3	4.8	2.15	3.1	3.0	2.2	1.8	2.5
	D	1-3	3.9	2.7	2.50	3.00	2.74	-9.80	2.83	79.24	7.2	8.1	3.7	2.09	3.3	2.4	1.6	2.1	1.9
2003	J	1-3	4.5	3.3	2.50	3.00	2.74	-9.34	2.91	80.15	7.8	7.4	3.6	2.27	3.3	2.9	1.6	1.1	1.9
	F	1-3	4.6	3.1	2.50	3.00	2.75	-8.61	2.97	81.78	7.3	6.3	3.2	2.40	3.3	2.9	1.7	1.1	2.1
	M	1-3	4.3	2.9	2.75	3.25	2.99	-7.72	3.28	83.22	6.5	5.5	3.2	2.50	3.1	2.7	1.7	0.1	1.8
	A	1-3	3.0	2.1	3.00	3.50	3.24	-6.92	3.35	85.07	7.0	5.2	3.0	2.28	2.8	2.1	2.7	-1.5	1.3
	M	1-3	2.9	2.3	3.00	3.50	3.24	-6.02	3.27	87.60	7.7	5.3	3.5	2.12	2.5	2.2	1.8	-2.7	1.8
	J	1-3	2.6	2.1	3.00	3.50	3.24	-5.11	3.11	90.45	7.9	5.4	3.3	2.04	2.1	2.0	2.1	-3.7	1.4
	J	1-3	2.2	1.8	2.75	3.25	2.99	-6.60	2.89	87.07	10.1	6.8	3.6	2.25	1.7	1.9	2.2	-2.1	2.1
	A	1-3	2.0	1.5	2.75	3.25	3.00	-6.68	2.80	87.11	9.5	6.7	3.5	2.29	1.7	1.7	2.2	-2.6	2.1
	S	1-3	2.2	1.7	2.50	3.00	2.75	-5.93	2.64	89.52	8.4	6.6	3.5	2.15	1.8	1.9	1.4	-3.8	2.7
	O	1-3	1.6	1.8	2.50	3.00	2.75	-4.85	2.71	92.25	7.1	6.2	3.0	2.38	1.8	1.8		-5.2	2.7
	N	1-3	1.6	1.8	2.50	3.00	2.75	-4.73	2.73	92.54	8.6	6.9		2.38	1.8	1.7		-5.5	2.3
	D				2.50	3.00	2.75	-4.68	2.66	92.87				2.41					2.7

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

A2 Major Financial and Economic Indicators

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

	Year, quarter, and month		Money and credit									Output and employment				
			Monetary aggregates					Business credit		Household credit		GDP in current prices	GDP volume (millions of chained 1997 dollars, quarterly)	GDP by industry (millions of 1997 dollars, monthly)	Employment (*Labour Force Information*)	Un-employment rate
			Gross M1	M1+	M1++	M2+	M2++	Short-term business credit	Total business credit	Consumer credit	Residential mortgages					
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	1991		2.6	4.9	2.9	8.6	7.6	1.0	3.4	2.3	8.2	0.8	-2.1		-1.8	10.3
	1992		7.0	4.2	0.2	5.8	7.1	-3.4	1.8	1.7	8.4	2.2	0.9		-0.7	11.2
	1993		9.5	5.1	-0.7	4.2	6.6	-6.4	0.7	2.3	7.6	3.8	2.3		0.8	11.4
	1994		13.2	8.4	1.4	1.9	6.8	1.6	4.8	7.8	6.4	6.0	4.8		2.0	10.4
	1995		6.6	0.8	-2.6	3.8	4.1	5.5	5.1	7.4	3.7	5.1	2.8		1.9	9.4
	1996		12.2	8.2	3.3	4.4	6.8	1.4	5.5	7.0	4.2	3.3	1.6		0.8	9.6
	1997		16.9	11.2	7.2	0.9	7.2	7.6	10.1	10.2	5.6	5.5	4.2		2.3	9.1
	1998		10.3	7.0	3.1	-1.1	5.5	11.6	11.7	10.3	4.9	3.7	4.1	3.8	2.7	8.3
	1999		7.6	6.0	4.3	3.6	5.3	1.9	6.1	7.9	4.5	7.4	5.5	5.6	2.8	7.6
	2000		14.7	10.6	8.8	5.9	7.0	6.6	7.4	12.7	4.7	9.5	5.3	5.5	2.6	6.8
	2001		12.1	10.3	9.6	6.6	7.6	-1.1	5.5	7.2	4.2	3.0	1.9	2.0	1.1	7.2
	2002		12.0	10.9	13.7	7.4	6.4	-5.6	3.7	6.9	7.3	4.3	3.3	3.5	2.2	7.7
	2003														2.2	7.6
Annual rates	1999	IV	9.9	5.9	4.6	4.6	5.2	-0.1	5.6	12.4	4.1	8.0	6.8	7.1	3.2	7.0
	2000	I	20.5	13.3	11.9	7.8	8.3	11.2	8.3	17.0	5.5	11.2	5.7	6.2	3.4	6.8
		II	22.0	16.4	13.2	6.5	8.0	16.5	10.7	13.1	5.8	10.7	4.2	3.5	1.5	6.7
		III	14.8	8.5	6.6	5.7	7.4	3.4	5.2	10.9	2.3	8.5	5.3	4.5	1.4	6.9
		IV	8.4	9.8	7.4	2.9	6.8	6.7	7.1	7.9	3.9	3.8	1.7	2.3	3.0	6.9
	2001	I	11.2	8.1	6.7	7.2	8.2	-0.7	6.0	5.5	3.3	4.9	1.3	1.5	0.6	6.9
		II	9.8	12.0	11.2	8.1	7.2	-14.9	2.1	5.9	3.5	0.7	1.1	1.5	0.6	7.1
		III	11.4	8.5	11.9	6.3	6.7	-3.0	5.4	6.2	6.7	-5.0	-0.7	-0.6	-0.1	7.2
		IV	21.2	16.1	21.1	12.6	10.0	-1.7	5.5	5.0	7.5	-1.4	3.8	2.9	0.5	7.6
	2002	I	10.3	14.4	18.1	7.6	6.0	-9.7	4.6	5.4	7.0	9.2	5.8	6.3	3.1	7.8
		II	7.1	6.4	9.4	4.3	4.5	-4.4	2.2	8.8	8.1	10.6	3.8	4.8	3.6	7.6
		III	14.4	8.7	9.0	7.5	5.9	-3.2	1.9	9.7	8.7	4.9	2.7	3.1	3.5	7.6
		IV	6.5	4.9	4.9	2.8	2.4	-4.2	1.1	10.4	8.0	6.1	1.6	1.9	3.2	7.6
	2003	I	1.2	0.7	2.4	3.5	0.5	-0.1	3.2	7.3	7.2	10.2	2.0	2.3	2.2	7.4
		II	8.6	3.7	5.0	6.7	4.2	-0.6	0.4	6.5	6.8	-2.7	-0.7	-0.7	0.4	7.7
		III	22.3	13.9	14.9	7.0	7.1	-8.0	-	9.7	9.7	4.6	1.1	1.6	0.4	7.9
		IV													3.7	7.5
Last three months			4.9	5.6	7.4	3.4	5.0	-14.2	0.2	8.3	10.5			1.5	3.7	7.4
Monthly rates	2002	D	-0.2	-0.5	-0.2	-0.5	-0.6	-0.7	-	0.7	0.4			0.2	0.3	7.5
	2003	J	0.8	0.5	0.7	1.0	0.6	0.3	0.3	0.4	0.9			0.4	-	7.4
		F	-0.3	-0.1	-0.1	0.1	-0.2	0.2	0.5	0.7	0.5			0.2	0.4	7.4
		M	-0.3	-0.1	-	0.4	0.1	0.4	0.4	0.3	0.2			-0.1	0.1	7.3
		A	0.7	0.2	0.3	0.4	0.3	-0.3	-0.2	0.6	0.7			-0.3	-0.1	7.5
		M	1.5	0.7	0.8	1.1	0.8	-0.3	-0.2	0.5	0.8			0.1	-0.1	7.8
		J	1.9	1.2	1.3	0.5	0.5	0.1	0.1	0.5	0.4			-	0.3	7.7
		J	3.2	1.8	1.8	0.8	0.7	-0.7	-	1.6	0.9			0.5	-0.1	7.8
		A	0.3	0.7	0.8	0.3	0.4	-1.0	0.1	0.2	0.8			-0.8	-0.1	8.0
		S	-0.4	-0.1	0.2	0.1	0.2	-1.9	-0.1	0.5	1.0			1.1	0.3	8.0
		O	-0.2	0.1	0.2	-0.5	-0.1	-0.6	0.2	0.9	0.8			0.2	0.4	7.6
		N	1.3	0.9	0.9			-1.7	0.1						0.3	7.5
		D													0.3	7.4

A2 (Continued)

Capacity utilization rate		Prices and costs				Wage settlements		Bank of Canada commodity price index (unadjusted)		Securities mid-market yield			Year, quarter, and month
Total industrial	Manufacturing industries	CPI	Core CPI*	GDP chain price index	Unit labour costs	Public sector	Private sector	Total	Non-energy	Treasury bills 3-month	Canada 10-year benchmark bonds	Canada 30-year Real Return Bonds	
(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	
78.3	74.2	5.6	2.8	2.9		3.4	4.3	-11.2	-11.8	7.43	8.32	4.45	1991
78.2	76.4	1.5	1.8	1.3		2.0	2.6	-0.3	0.6	7.01	7.86	4.62	1992
80.0	79.9	1.8	2.1	1.4		0.6	0.8	0.5	3.0	3.87	6.57	3.78	1993
82.4	83.5	0.2	1.8	1.1		-	1.2	3.3	7.5	7.14	9.07	4.92	1994
81.6	83.9	2.2	2.3	2.3		0.7	1.4	8.3	11.1	5.54	7.11	4.42	1995
81.2	82.8	1.6	1.7	1.6		0.5	1.8	3.8	-1.2	2.85	6.37	4.09	1996
82.5	83.6	1.6	1.9	1.2		1.1	1.9	-3.7	-4.3	3.99	5.61	4.14	1997
83.3	84.3	0.9	1.3	-0.5	1.0	1.6	1.7	-15.3	-12.6	4.66	4.89	4.11	1998
84.4	85.9	1.7	1.4	1.7	0.1	1.9	2.7	6.7	1.5	4.85	6.18	4.01	1999
84.9	86.1	2.7	1.3	4.0	3.0	2.5	2.4	18.4	3.5	5.49	5.35	3.42	2000
82.3	81.9	2.6	2.1	1.1	2.7	3.3	3.0	-5.2	-6.9	1.95	5.44	3.76	2001
82.5	83.6	2.2	2.3	0.9	1.4	2.9	2.6	-5.9	-6.6	2.63	4.88	3.33	2002
								20.1	8.8	2.57	4.66	2.79	2003
85.4	86.6	2.4	0.9	1.2	1.3	2.3	3.8	14.5	1.4	4.85	6.18	4.01	1999 IV
85.2	86.1	2.8	0.6	5.2	3.6	2.4	3.0	30.1	20.0	5.27	6.03	3.80	2000 I
84.7	85.6	1.7	1.3	6.3	8.5	2.5	2.7	4.7	-4.9	5.53	5.93	3.77	II
84.8	86.2	4.0	1.8	3.1	0.8	2.6	1.9	5.8	-17.6	5.56	5.75	3.60	III
84.9	86.3	4.2	2.5	2.3	2.6	3.1	2.3	17.0	-7.6	5.49	5.35	3.42	IV
83.5	83.6	1.4	1.7	3.4	4.1	3.9	2.5	11.6	-5.5	4.58	5.41	3.45	2001 I
83.4	83.0	4.7	2.9	-0.4	0.4	3.0	3.0	-16.0	23.0	4.30	5.73	3.53	II
81.6	81.0	0.3	2.1	-4.4	2.8	3.7	3.2	-38.1	-22.2	3.05	5.32	3.68	III
80.6	79.8	-1.8	0.7	-5.2	1.7	3.0	2.4	-41.3	-30.8	1.95	5.44	3.76	IV
81.5	81.9	3.4	2.9	3.1	1.1	3.1	2.1	15.9	12.3	2.30	5.79	3.68	2002 I
82.5	83.6	3.6	3.0	6.6	-0.9	2.7	2.5	40.0	-1.8	2.70	5.37	3.42	II
83.1	84.6	4.3	2.8	2.3	2.2	3.2	2.4	2.8	-1.5	2.83	4.92	3.25	III
82.7	84.1	4.0	2.3	4.5	4.7	3.3	3.5	20.4	-4.0	2.63	4.88	3.33	IV
82.7	83.9	5.7	4.1	7.9	0.7	2.9	2.4	82.0	14.1	3.14	5.13	3.08	2003 I
81.3	82.5	-2.4	-0.7	-2.1	1.2	3.2	0.7	-17.4	14.8	3.07	4.37	2.99	II
81.2	82.2	1.5	1.0	3.3	1.1	3.3	2.4	0.6	20.8	2.58	4.64	3.08	III
								17.6	19.5	2.57	4.66	2.79	IV
		2.1	3.0		1.1			17.6	19.5	2.57	4.66	2.79	
		-0.1	-0.2		0.2			6.7	0.8	2.63	4.88	3.33	2002 D
		1.1	0.8		-0.1			6.1	0.8	2.83	5.02	3.22	2003 J
		0.4	0.2		-			13.5	3.4	2.88	4.93	3.06	F
		-0.1	-		-			-8.4	-0.4	3.14	5.13	3.08	M
		-0.7	-0.5		0.3			-6.1	0.5	3.19	4.90	3.13	A
		-0.1	0.4		-			3.3	1.8	3.16	4.50	3.00	M
		0.1	-0.1		0.1			3.2	2.6	3.07	4.37	2.99	J
		0.1	-		-			-3.4	-0.2	2.81	4.78	3.15	J
		0.3	0.1		0.5			1.6	2.2	2.71	4.96	3.15	A
		0.2	0.3		-0.6			-1.8	3.6	2.58	4.64	3.08	S
		-	0.3					1.1	-0.8	2.64	4.85	3.00	O
		0.3	0.4					1.3	2.5	2.67	4.79	2.91	N
								8.5	1.7	2.57	4.66	2.79	D

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

A2 (Continued)

	Year, quarter, and month	Government surplus or deficit (-) on a national accounts basis (as a percentage of GDP)		Balance of payments (as a percentage of GDP)		U.S. dollar, in Canadian dollars, average noon spot rate
		Government of Canada	Total, all levels of government	Merchandise trade	Current account	
		(28)	(29)	(30)	(31)	(32)
	1991	-5.4	-8.4	1.0	-3.7	1.1458
	1992	-5.1	-9.1	1.3	-3.6	1.2083
	1993	-5.5	-8.7	1.8	-3.9	1.2898
	1994	-4.6	-6.7	2.6	-2.3	1.3659
	1995	-3.9	-5.3	4.4	-0.8	1.3726
	1996	-2.0	-2.8	5.1	0.5	1.3636
	1997	0.7	0.2	2.9	-1.3	1.3844
	1998	0.8	0.1	2.6	-1.2	1.4831
	1999	0.9	1.6	4.3	0.3	1.4858
	2000	1.8	3.0	6.3	2.9	1.4852
	2001	1.2	1.4	6.4	2.4	1.5484
	2002	1.0	0.8	5.0	2.0	1.5704
	2003					1.4015
Annual rates	1999 IV	1.8	2.1	4.4	0.5	1.4726
	2000 I	1.8	2.2	5.6	2.6	1.4538
	II	1.3	3.2	6.0	2.6	1.4808
	III	2.3	3.5	6.4	2.9	1.4822
	IV	1.9	3.1	7.2	3.3	1.5258
	2001 I	1.6	2.4	8.2	4.3	1.5280
	II	1.8	2.3	6.9	3.2	1.5409
	III	1.1	0.9	5.3	1.1	1.5453
	IV	0.2	-	5.3	1.0	1.5803
	2002 I	0.5	0.4	5.5	2.4	1.5946
	II	0.9	0.5	5.0	2.2	1.5549
	III	1.1	0.8	5.0	1.8	1.5628
	IV	1.5	1.4	4.6	1.7	1.5698
	2003 I	1.1	1.5	5.3	2.3	1.5102
	II	-0.3	0.7	4.6	1.7	1.3984
	III	1.0	1.0	5.1	2.4	1.3799
	IV					1.3160
Last three months						1.3160
Monthly rates	2002 D					1.5593
	2003 J					1.5410
	F					1.5124
	M					1.4759
	A					1.4585
	M					1.3845
	J					1.3523
	J					1.3815
	A					1.3957
	S					1.3632
	O					1.3218
	N					1.3126
	D					1.3128

Notes to the Tables

Symbols used in the tables

R Revised

– Value is zero or rounded to zero.

Note:

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

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

A1

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A2

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

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

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

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

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

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

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

(7) Total business credit (Table E2)

(8) Consumer credit (Table E2)

(9) Residential mortgage credit (Table E2)

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

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

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

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

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

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

(17) Consumer price index (Table H8)

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

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

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

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

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

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

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

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

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

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

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