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To: Members of the Executive Board

From: The Secretary

Subject: **Canada—Selected Issues**

This paper provides background information to the staff report on the 2000 Article IV consultation discussions with Canada, which was circulated as SM/99/314 on December 29, 1999.

Mr. Dunaway (ext. 37343) and Mr. Leidy (ext. 38435) are available to answer technical or factual questions relating to this paper prior to the Board discussion.

Unless the Documents Section (ext. 36760) is otherwise notified, the document will be transmitted, in accordance with the procedures approved by the Executive Board and with the appropriate deletions, to the WTO Secretariat on Thursday, January 20, 2000; and to the United Nations Economic Commission for Latin America and the Caribbean, the Food and Agriculture Organization, the Inter-American Development Bank, the Organisation for Economic Cooperation and Development, and the World Food Programme, following its consideration by the Executive Board.

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CANADA

Selected Issues

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Approved by the Western Hemisphere Department

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I. PRODUCTIVITY TRENDS IN CANADA[1]

1.   The issue of productivity growth in Canada has received considerable attention reflecting its marked slowdown since the early 1970s and concerns about its implications for Canadian competitiveness, especially in light of the increased integration of the Canadian and U.S. economies as a result of the free trade agreements. Total factor productivity (TFP) growth in Canada, measured using the traditional growth-accounting approach, averaged a 2¼ percent annual growth rate during the 1960s, but following the first oil price shock in 1973, the average annual growth rate dropped to about ½ percent through 1988. Subsequently, TFP growth has picked up modestly to ¾ percent per year through 1997 (Table 1).[2] However, over this period, Canada's position relative to the United States has improved slightly, as Canada's TFP growth has outpaced that in the United States by a small margin since 1985.[3]

2.   To better understand productivity developments in Canada, it is useful to decompose TFP into investment-specific productivity change (ISP) and technologically neutral productivity change (TNP).[4] ISP accounts for improvements in the quality of capital, as it captures technological change embodied in new machinery and equipment. TNP largely captures changes in productivity associated with the organization of capital and labor in productive activities.[5]

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[1] Prepared by Martin Cerisola, Jorge Chan-Lau, and Anders Matzen.

[2] The data for TFP in Canada, which cover the business sector, were published by Statistics Canada in March 1999. The data reflect revisions to national account figures that led to an upward revision of output growth and a downward revision to the capital stock.

[3] Moreover, the differences in Canadian and U.S. TFP growth are relatively small and may be largely explained by measurement issues. The data for total factor productivity in the United States are compiled on the basis of 1987 as the base period for the capital stock and do not reflect the revisions to the national income and product accounts statistics released in November 1999. In computing TFP, the United States and Canada follow different methodologies, particularly regarding quality adjustments to the labor force. While both measures are based on the net capital stock, a different approach is used in deriving them. The depreciation rate used in the United States is lower than the one used in Canada, while the U.S. figures include land in the measure of capital.

[4] This study deals exclusively with TFP growth in Canada and the United States. TFP data for other advanced economies are not available due to the difficulties in maintaining consistent time series owing to revisions in national accounts figures in several countries.

[5] Improvements in the quality of labor would also be captured in TNP to the extent that measures of labor input do not adequately capture changes in labor quality.

3.   In trying to assess the role of improvements in the quality of capital in Canada, it is very important to consider two salient features: the trend decline in the relative price of equipment and the increasing share of investment in equipment in total GDP. Between 1961 and mid-1999, the relative price of equipment declined by roughly 3½ percent on an annual basis, while the share of investment in equipment in GDP rose from less than 2 percent to about 9 percent (Figure 1). This negative correlation between the price and quantity of investment in equipment can be interpreted as evidence of significant technological changes.

4.   Following Greenwood, Hercowitz, and Krusell (1997), a general equilibrium model, which explicitly decomposes TFP into ISP and TNP, was calibrated for the Canadian economy (Annexes I and II). In this model, ISP captures improvements in technology stemming from new equipment and machinery. Advances in technology tend to be embodied in the latest vintages of capital equipment, and hence, new machines are more productive than the ones they replace. The price of a new unit of capital can be thought of as being q times the price of an old unit of capital, or each unit of investment can be thought of as increasing the capital stock by q units, if measured in units of the previous vintage of equipment. Therefore, the growth in ISP can be tracked by the movement in the relative price series q. This series represents the relative price of capital in terms of consumption goods, and can be approximated by the ratio of the implicit price deflator for personal consumption expenditures on nondurable goods and services (excluding housing) and the implicit price deflator for equipment and machinery.

5.   Results from the model suggest that ISP growth accelerated sharply during the 1980s relative to the growth experienced in the 1960s and 1970s, but it slowed somewhat in the 1990s (Figure 2). In contrast, after experiencing strong growth during the 1960s and 1970s, TNP growth has been negative since 1980. However, in more recent years, it has tended to decline only slightly.

6.   These results also suggest that the growth in TFP since 1980 was more than accounted for by ISP, as TNP growth declined. To some extent, it is not surprising that faster growth in ISP has been accompanied by declines in TNP growth. This divergent trend is consistent with the view that, historically, the efficient utilization of new technology has been preceded by a period of adoption and learning during which TNP may decrease as the organizational structure adapts to the new technology. The recent leveling off in TNP growth perhaps suggests that the negative effects stemming from ISP growth could be close to an end and may begin to show some signs of recovery given the sound macroeconomic environment in place in Canada.

7.   A study by Jorgenson and Yip (1999) provides an alternative way of adjusting for improvements in the quality of capital and labor over time.[6] They find that "quality-adjusted"

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[6] The authors calculate constant-quality indices for capital and labor inputs based on a disaggregation of the capital stock and labor force weighted by rental prices and wages, respectively. These weights are expected to capture the impact of the differential effects of

TFP growth in Canada has declined sharply since 1973, and was negative between 1989 and 1995. Jorgenson and Yip note, however, that negative TFP growth was also observed in four other advanced economies during this period, where a marked improvement in the quality of labor and capital was experienced like in Canada.[7] Jorgenson and Yip explain that the decline in "quality-adjusted" TFP growth since 1960 may reflect the diminished importance of the role played by investment and research and development in generating "positive externalities" and stimulating growth, as outlined in the models of Lucas (1988) and Romer (1986). Nevertheless, these results should be interpreted with some caution given the difficulties in measuring accurately and objectively improvements in capital and labor quality within and across countries.[8]

8.   In comparing ISP and TNP growth between Canada and the United States, the results from the model show that, between 1988 and 1997, ISP grew faster and TNP declined faster in Canada than in the United States (Figures 3 and 4). ISP growth averaged about 4½ percent in Canada, compared with 3½ percent in the United States, while TNP growth was negative in both countries, averaging 1 percent and 0.1 percent, respectively. However, in the past few years, productivity growth in the United States has been stronger than in Canada. Since 1996, ISP in the United States has grown by 5 percent per year, in contrast to an average growth rate of 3¾ percent in Canada, while U.S. TNP growth has slightly exceeded that in Canada. TNP growth rates, however, have converged markedly since 1996 (-¼ percent per year in Canada compared with –0.1 percent in the United States). Given the high integration between both countries, the recent buoyant ISP growth in the United States could help accelerate the diffusion of new technologies, and therefore stimulate ISP and TNP growth in Canada in the period ahead.

9.   TFP growth at the industry level has varied significantly between the two countries. In particular, TFP growth in U.S. manufacturing has significantly outpaced that in Canada over the last decade and a half. Between 1961 and 1985, TFP growth in the manufacturing sectors in Canada and the United States was similar, averaging about 1¼ percent per year.

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investment in tangible and human capital. The quality of capital is calculated as the ratio of capital input to the capital stock, while the quality of labor is the ratio of the labor input index to total hours worked.

[7] These countries are United Kingdom, Germany, Italy, and France. Only the United States and Japan experienced positive quality-adjusted TFP growth. According to the authors, Canada experienced the second strongest improvement in quality among the G-7 economies.

[8] Jorgenson and Yip's results for TFP growth—unadjusted for quality improvements—show an annual growth rate of 0.2 percent on average for the period 1989 to 1995, which is not significantly different from those by Statistics Canada, which show annual TFP growth of 0.3 percent over the same period.

However, between 1986 and 1996, TFP growth in U.S. manufacturing averaged about 1½ percent per year compared with 0.6 percent in Canada.

10.   The gap in manufacturing productivity growth between Canada and the United States originates mostly in the strong performance of specific industries, such as electrical products and commercial and industrial machinery—which include computers and computer parts—where U.S. total productivity growth has significantly outperformed that of similar Canadian firms. Such a difference in performance, together with the fact that these industries have a larger share in manufacturing output in the United States, largely account for the differential productivity growth in manufacturing between the two countries. In fact, when comparing the performance of other Canadian manufacturing industries vis-à-vis the United States during 1990–95 (Figure 5), the differences are significantly smaller, or even show that TFP growth in certain Canadian industries—such as pulp and paper, transportation, and chemicals—has outstripped that in the same industries in the United States.

11.   A recent study by Gu and Ho (1999), which follows the methodology used by Jorgenson and Yip, compared the performance between 33 industries in Canada and the United States. Their results show that "quality-adjusted" TFP growth in Canadian industries outpaced on average that in the United States between 1961 and 1988, but since then, "quality-adjusted' TFP growth in Canadian industries has grown at a slower rate than in the United States. In this recent period, however, about half of the Canadian industries experienced faster "quality-adjusted" TFP growth than in the United States. In particular, Canadian industries, such as chemicals, petroleum, and communications, had better productivity growth than their U.S. counterparts. In contrast, TFP growth in U.S. industries, such as machinery industry and mining, and textiles, was greater than in these industries in Canada.

12.   Judging by the sound macroeconomic framework in place, the structural reforms undertaken in the 1990s, and the current productivity boom in the United States, the results suggest that Canada appears poised for sustaining robust productivity growth in the period ahead. Even though TNP growth has stabilized, the fact that it has still been lagging suggests that there could be a "catch up" in productivity once the diffusion of new technologies is complete. However, the potential benefits for Canadian productivity stemming from the U.S. productivity boom could be significantly less if the strong productivity growth in the United States is narrowly concentrated in machinery, which is less important in Canada.

Annex I: The Model

The model presented in Greenwood, Hercowitz, and Krusell (1997) is a standard real business cycle model which distinguishes between equipment and structures and allows for the production of capital goods (equipment) to be increasingly efficient with the passage of time. The equations characterizing the balanced growth path for the model are the following:

$$\gamma_q = (\beta / g)[(1 - \tau_k)\alpha_e y / k_e + (1 - \delta_e)] \qquad (1)$$

$$1 = (\beta / g)[(1 - \tau_k)\alpha_s y / k_s + (1 - \delta_s)] \qquad (2)$$

$$i_e / y = (k_e / y)[g\gamma_q - (1 - \delta_e)] \qquad (3)$$

$$i_s / y = (k_s / y)[g - (1 - \delta_s)] \qquad (4)$$

$$(1 - \tau_l)(1 - \alpha_e - \alpha_s)\frac{\theta(1 - l)}{(1 - \theta)\left(\frac{c}{y}\right)} = l \qquad (5)$$

$$\frac{c}{y} + \frac{i_e}{y} + \frac{i_s}{y} = 1 \qquad (6)$$

where β is the time-preference parameter in the household's utility function; g is the GDP per hour rate; τ_k and τ_l are the effective tax rate on gross capital income and marginal tax on labor, respectively; γ_q is the average annual rate of decline in the relative price of equipment q; $\alpha_{e,s}$ denotes the shares for equipment and structures in production; $\delta_{e,s}$ denotes the depreciation rates for capital; and θ denotes the share of consumption in the utility function. The first two equations are the Euler equations for equipment and structures. Equations (3) and (4) define the investment-to-output ratios for equipment and structures, respectively. Equation (5) is the efficiency condition for labor, while the final equation is the resource constraint for the economy. In addition, values for g, l, α_e, α_s, β/g, i_e/y, and i_s/y are obtained from the long-run restrictions imposed by the Canadian data (Table 2). Therefore, a system with 12 equations and 12 unknowns is obtained and solved, with parameter values for θ, α_e, α_s, τ_k and β, also presented in Table 2.

Annex II: Data Definitions and Sources

The parameters used in the model which are presented in Table 2 were calibrated using both the Canadian National Income Accounts and estimates for the United States broadly in line with those in Greenwood et al. In particular, the parameters which were calibrated using Canadian data are the averages for the period between 1961 and the second quarter of 1999.

The variables (Annex I) are defined as follows:

Output (y): average growth for real gross domestic product expenditure net of gross housing product (measured by gross inputted rents (D15328) and gross paid rents (D15329)), based on 1992 prices.

Labor Input (l): measured by an index of person-hours worked for the total economy (based on 1992=100) (I609001).

Capital Input (k_e and k_s): data for the net capital stock is based on Statistics Canada (D99333). Values for the net capital stock for equipment and structures were constructed by iterating on the law of motion for the capital stock for equipment, which added to the initial capital stock the annual investment in equipment adjusted for q after subtracting the total depreciation. The starting value for k_e was set at its balanced growth level, given the values of output, q, and i_e at the beginning of the sample. The series for structures was estimated by following the same procedure.

Consumption (c): personal consumption expenditures (PCE) for nondurable (D14845) and semidurable goods (D14844) and services (D14846) net of housing (D15328 and D15329) (based on 1992 prices).

Investment in producer durable equipment (i_e): real business investment in nonresidential machinery and equipment, (D14855).

Investment in structures (i_s): business investment in nonresidential structures, (D14854).

Investment specific technological change (q): defined as the growth in the ratio of the implicit price deflator for personal consumption expenditures (PCE) on nondurable consumption goods and services (excluding housing) and the implicit price deflator for producer durable equipment. The implicit price deflator for expenditures on nondurable goods and services was constructed as the ratio of nominal PCE on nondurable goods and services (excluding housing) to constant PCE (base 1992) on nondurable goods and services. A similar procedure was used for producer durable equipment.

Table 1. Canada: Total Factor Productivity Growth

	1966–73	1973–79	1979–88	1988–97
	(Percent change at annual rates)			
Canada				
Business sector	2.1	0.6	0.5	0.7
Goods	2.3	0.4	0.8	0.9
Services	1.9	0.8	0.3	0.3
United States				
Business sector	1.7	0.8	0.1	0.4

Sources: Statistics Canada.

Table 2. Canada: Model Calibration for the Canadian and U.S. Economies

	Canada	United States
Preferences		
β	0.9523	0.9752
θ	0.4178	0.4023
Technology		
α_e	0.1169	0.1852
α_s	0.2164	0.1148
δ_e	0.1240	0.1240
δ_s	0.0560	0.0560
γ_q	3.44	2.44
Tax rates		
τ_k	0.5849	0.5854
τ_l	0.40	0.40
Other		
g	1.90	3.50
l	0.24	0.24
I_e/y	0.0375	0.0673
i_s/y	0.0535	0.0376
r_k	0.070	0.070

Figure 1. Canada: Trends in Equipment Cost and Investment
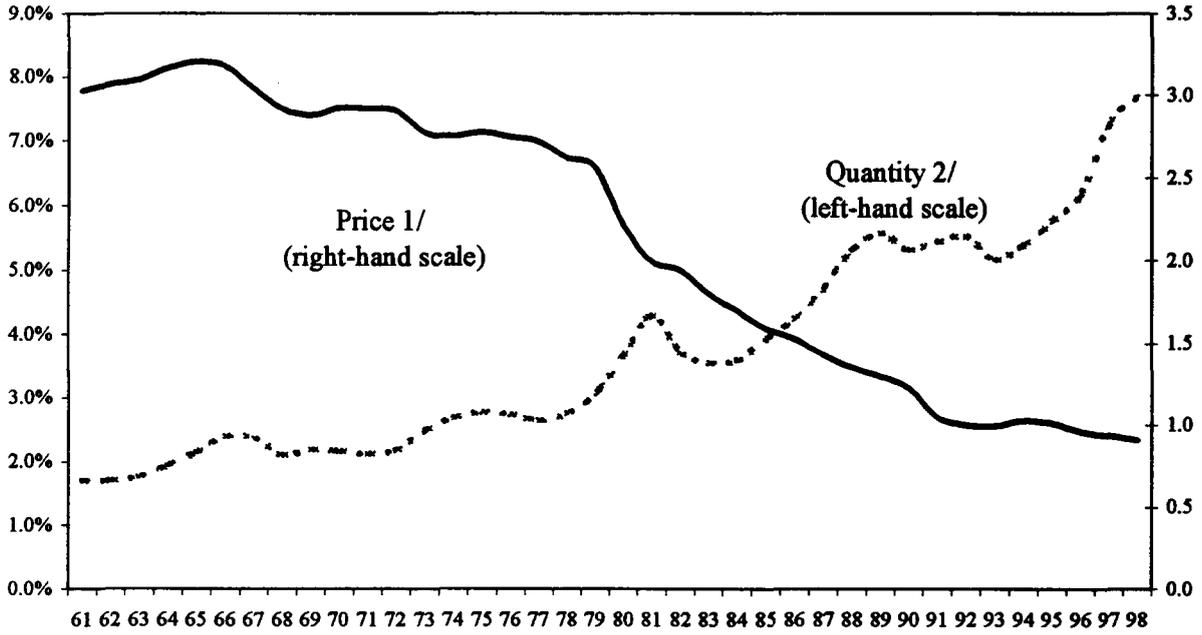
1/ Defined as the ratio of the price deflator for equipment and machinery to the personal consumption expenditures.
2/ Defined as the ratio of nonresidential investment in machinery and equipment to GDP.

Figure 2. Canada: Technologically Neutral and Investment-Specific Productivity Change
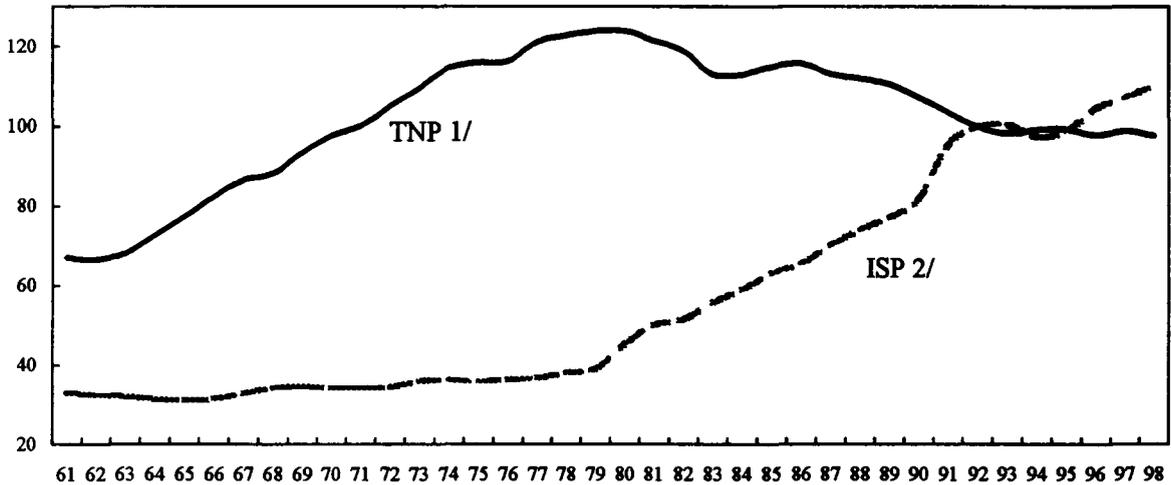
1/ TNP is technologically neutral productivity change, which is defined as the difference between output growth (excluding housing) and ISP.
2/ ISP is investment-specific technological change, which is defined as the ratio of the implicit price deflator for personal consumption expenditures on nondurable goods and services (excluding housing) and the implicit price deflator for equipment and machinery.
Both variables are indices based on 1992=100 and do not represent levels.

Figure 3. Canada: Investment-Specific Productivity Change,
Canada vs. the United States (1992=100)
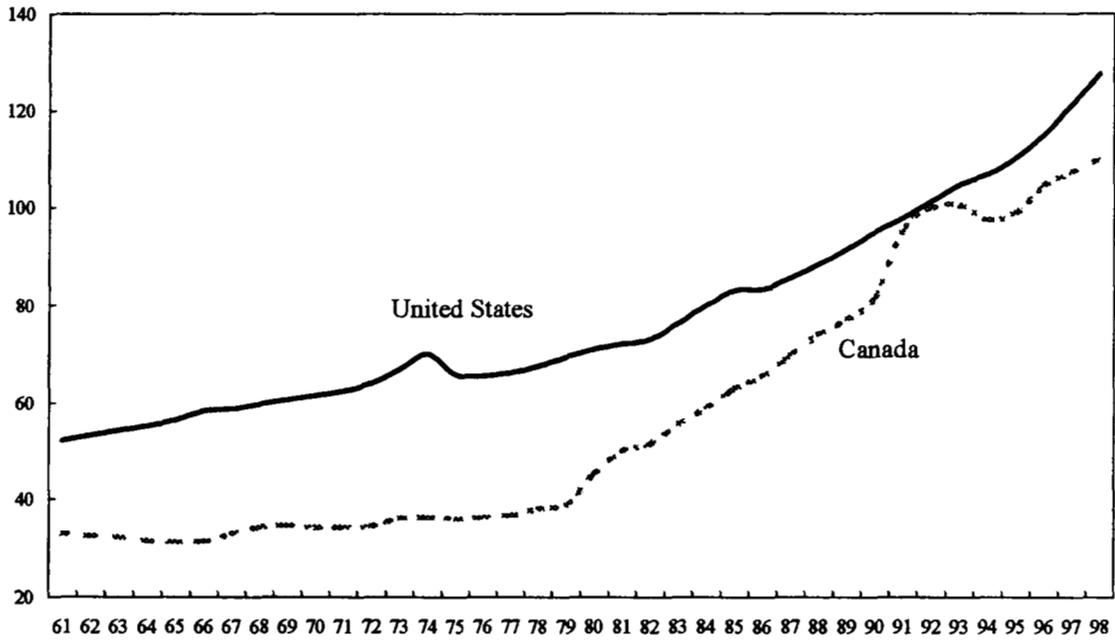
Figure 4. Canada: Technologically Neutral Productivity Change,
Canada vs. the United States, (1992=100)
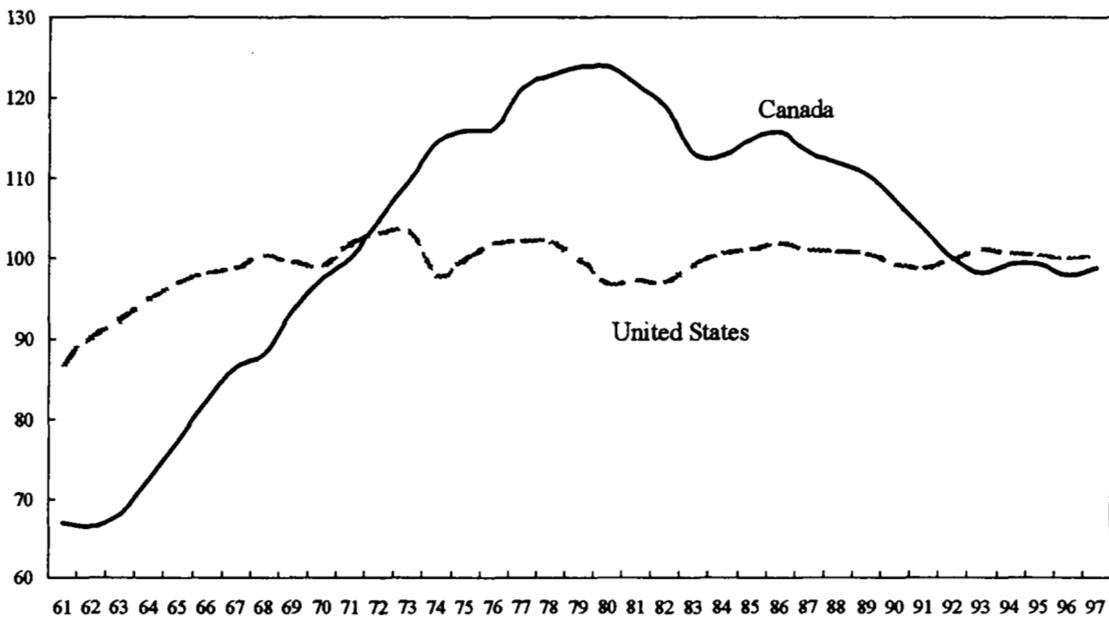
Figure 5. Canada: Total Factor Productivity in Manufacturing Industries, Canada vs. the United States (Annual percentage growth 1990-95)
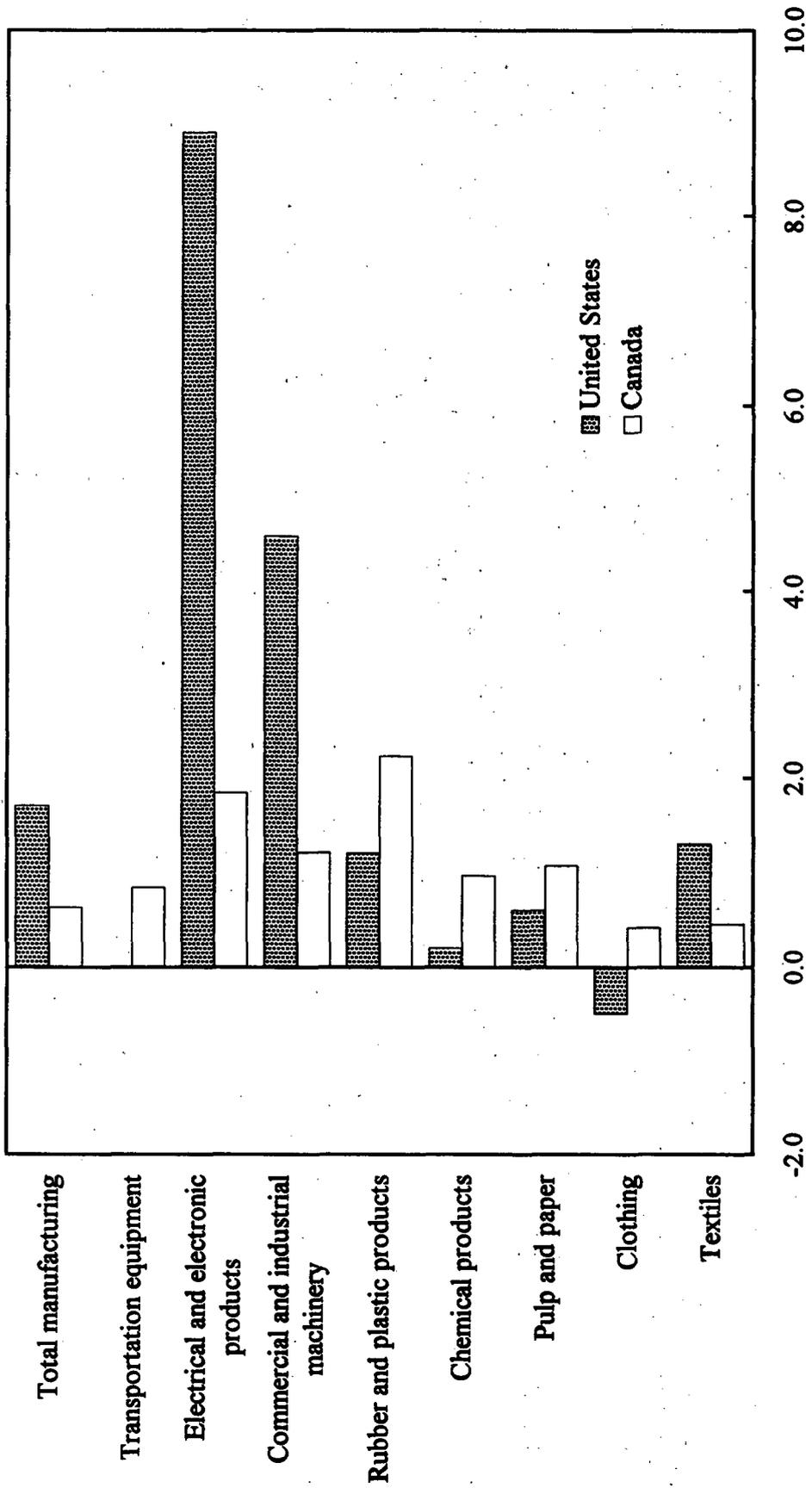
Sources: Statistics Canada; and U.S. Bureau of Labor Statistics.

List of References

Greenwood, J., Hercowitz Z., and Krusell, P., 1997, "Long-Run Implications of Investment-Specific Technological Change," *American Economic Review* 87, pp. 342–362.

Gu, W. and Ho, M., 1999, "A Preliminary Comparison of Industrial Productivity Growth in Canada and the United States," Industry Canada, unpublished preliminary draft.

Chan Lau, J., 1999, "Productivity Trends in the United States," International Monetary Fund, SM/97/186.

Jorgenson, D. and Yip, E., 1999, "Whatever Happened to Productivity Growth?" unpublished draft, forthcoming.

Lucas, R., 1988, "On the Mechanics of Economic Development," *Journal of Monetary Economics* 22, pp. 3–42.

Romer, P., 1986, "Increasing Returns and Long-Run Growth," *Journal of Political Economy*, 92, pp. 1002–1037.

Statistics Canada, "Productivity Growth in Canada and the United States," Canadian Economic Observer, Statistics Canada, September 1999.

II. EXPLAINING THE DIFFERENCE BETWEEN CANADIAN AND U.S. UNEMPLOYMENT RATES[1]

1.   Until the early 1980s, unemployment rates in Canada and the United States had been roughly similar for most of the postwar period. Over the period 1982–89, however, the Canadian unemployment rate was on average 2½ percentage points higher than in the United States, and this differential increased to about 4 percentage points in the 1990s (Figure 1). Initially, the differential was attributed to the deeper recession in Canada. However, its persistence over the last two decades in part reflects significant deviations in the structures of the two labor markets. Empirical evidence suggests that a key structural difference in the 1980s was Canada's relatively more generous unemployment insurance system. In contrast, the widening of the differential in the 1990s appears to be largely attributable to relatively weaker growth in Canadian aggregate demand, which appears to have more than offset a decline in structural unemployment arising from the reforms of the employment insurance system.

2.   Various studies suggest that the Canadian labor market appears to lie somewhere between the relatively rigid labor markets of Europe, and the more flexible labor market of the United States.[2] Union density, the number of collective bargaining agreements, minimum wages in relation to average earnings, and the generosity of unemployment insurance and welfare benefits in Canada are all higher than in the United States, but are considerably lower than in Europe. Since the 1960s, the level of unemployment in Canada increased by more than in the United States, but by less than in Europe. Similarly, Canadian long-term unemployment has risen by slightly more than in the United States, but significantly less than in Europe.

3.   Canada's labor market, however, has demonstrated strong job creation. Employment in Canada expanded at an average annual rate of 3½ percent in the 1970s and at a 2 percent average annual rate in the 1980s before slowing to 1 percent per year in the 1990s (Table 1). The Canadian employment-to-population ratio also increased over the same period, but it has edged down in the 1990s (Figure 2). In contrast, job creation in Europe has remained sluggish, with employment rising only by about half of a percent annually in the 1980s and contracting slightly in the 1990s. Compared to the United States, employment growth in Canada rose faster in the 1960 and 1970s, but at a roughly similar rate in the 1980s, and slower in the 1990s.

4.   Methodological differences in measuring the labor force, and hence unemployment, is one possible explanation for the differential in the Canadian and U.S. unemployment rates.

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[1] Prepared by Paula R. De Masi.

[2] For a more detailed discussion comparing the Canadian, U.S., and European labor markets, see Riddell (1999).

Although both Canada and the United States adhere to international guidelines for measuring unemployment, there are some discrepancies that affect the comparability of unemployment rates. Most significant is the distinction between passive and active job search. Passive job seekers, (i.e., persons who respond to unemployment surveys as "looking at job ads in newspapers" as their only means of seeking employment) are classified in Canada as part of the labor force and hence unemployed; whereas in the United States, they are classified as out of the labor force, since the U.S. definition requires active job search. Sunter (1998) modifies the Canadian unemployment rate to reflect U.S. concepts and definitions, and finds that these adjustments reduce the unemployment differential by an average of 0.3 percentage point (or 15 percent of the differential) in the 1980s, and 0.7 percentage point (or 18 percent of the differential) in the 1990s (Figure 3). These results suggest that measurement issues play a role, but explain a relatively small portion of the unemployment differential.

5.   The primary explanation for the emergence of the unemployment differential appears to reflect a change in how Canadian workers behaved when not employed compared to their U.S. counterparts. Riddell (1999) and Card and Riddell (1995) decompose movements in the rate of unemployment into changes in: labor force attachment of the nonemployed (i.e., the probability that a person who is not employed will be included in the labor force), non-employment, and labor force participation.[3] In comparison to the 1970s, nonemployed Canadians during the 1980s were more likely to be included in the labor force and be classified as unemployed, whereas Americans were more likely to be classified as out of the labor force. This change in behavior accounts for 80–90 percent of the 2 percentage point unemployment differential.[4] The remaining 10–20 percent of the differential is attributable to changes in labor force participation and employment rates. The relative rise in labor force

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[3]This decomposition is derived by considering the unemployment rate as the probability of unemployment conditional on being in the labor force, or,

$$P(U|LF) = P(U|N) * P(N) / P(LF)$$

where P(LF) is the probability of being in the labor force (labor force participation rate), P(N) is the probability of nonemployment (one minus the employment rate), and P(U|N) is the probability of unemployment conditional on being nonemployed (the labor force attachment of the nonemployed). Taking logs:

$$\ln P(U|LF) = \ln P(N) + \ln P(U|N) - \ln P(LF).$$

Therefore, changes in the unemployment rate can be decomposed into changes in labor force participation, in nonemployment, and in the labor force attachment of the nonemployed.

[4] Using data on gross labor flows between employment, unemployment, and out of the labor force, Jones and Riddell (1998) also find evidence of an increase in labor force attachment of the unemployed during the 1980s.

attachment was particularly important for women, explaining 99 percent of the unemployment differential for the group.

6.   For the 1990s, this analysis reveals a very different picture. In the early 1990s, Canada experienced a longer and deeper recession than did the United States. Most of the further widening of the unemployment differential in the 1990s was related to the different cyclical positions of the two economies. The increase in the unemployment differential is attributable to the relative decline in employment and labor force participation in Canada, rather than to a widening in the differential in labor force attachment of the nonemployed as was the case in the 1980s.[5]

7.   Although it is generally agreed that the growing generosity of Canada's employment insurance system was a major factor in explaining the increase in the labor force attachment of the nonemployed during the 1980s, there are differing views on the mechanism and timing of how the changes in benefits affected Canadian structural unemployment. One view points to the reforms in the Canadian unemployment insurance system in 1971 which dramatically increased the generosity of the system relative to the United States.[6] The sharp increase in the Disincentive Index—which quantifies the level of disincentives created by the unemployment insurance system—illustrates the magnitude of these changes in the system (Figure 4).[7] As a result, structural unemployment increased, but strong employment growth in the 1970s masked this development. When growth slowed in the 1980s, the increase in structural unemployment (in particular, relative to the United States) became visible. Moreover, there can be long lags between changes in the unemployment insurance system and their ultimate impact on the labor market, especially during the expansionary phase of a business cycle. Only when activity slows and workers are laid off do they learn about the changes in unemployment benefits and adapt their work behavior accordingly.[8]

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[5]Without correcting for these cyclical differences, Riddell finds that just over half of the widening of the unemployment differential can be explained by the relative increase in nonemployment (37 percent); and the relative change in labor force participation (17 percent). The differential in labor force attachment of the nonemployed, however, remained the single most important factor, accounting for about 45 percent of the increase in the unemployment differential.

[6] Keil and Symons (1990).

[7] Disincentives introduced by the unemployment insurance system are quantified in the Disincentive Index which reflects a variety of system parameters including the replacement rate, the minimum and maximum weeks of benefit, the number of weeks required to qualify for benefits, and the waiting period. See Sargent (1996).

[8] Coark (1993).

8.   An alternative view focuses attention on developments during the 1980s to explain the increase in structural unemployment. Generally, Canada has had a higher ratio of benefit recipients to unemployed than the United States, reflecting differences in the benefit structure of the two systems. In Canada, a larger share of workers who lose their jobs have been eligible for unemployment benefits; more Canadian workers have received benefits while in training, sickness, or on maternity leave; and the duration of Canadian unemployment benefits has been longer.[9] During the 1980s, these differences widened as the number of workers receiving benefits increased in Canada but it decreased in the United States. The ratio of benefit recipients to unemployed in Canada increased over the 1980s from 80 percent to about 100 percent, whereas in the United States, the ratio declined from about 35 percent to about 29 percent. As a result, in the early 1980s the probability of an unemployed Canadian worker receiving benefits was about twice as great as in the United States, and by the end of the 1980s the probability in Canada was about 3.5 times as great.[10]

9.   During the 1990s, comprehensive reforms in Canada replaced the old Unemployment Insurance program with a new Employment Insurance system.[11] These reforms are likely to have contributed to a decline in benefit recipiency relative to the United States. Initially, however, their effect on relative unemployment was more than offset by the relative decline in Canadian employment (owing to the longer and deeper recession) and participation rates, leading to a widening in the differential. More recently, sustained growth in Canada has resulted in a sharp decline in the unemployment rate, and a narrowing of the differential to under 4 percentage points at the end of 1999.

10.   Alternatively, there have been numerous attempts to explain the unemployment differential between Canada and the United States in terms of differences in labor market flexibility or other characteristics of the labor market (such as unionization, changes in payroll taxes, income taxation, and immigration). Overall, these studies have yielded at best mixed results. With regard to labor market flexibility, empirical evidence suggests that relative labor force adjustment costs and speed of adjustment are quite similar in the two countries.[12] Evidence on the degree of wage flexibility is more mixed, with some studies

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[9] For example, Card and Riddell (1995) illustrate that based on data from the late 1980s, the eligibility rate for unemployment insurance was 53 percent in Canada versus 43 percent in the United States. Riddell (1999) reports that over the 1980s, the mean per capita weeks of unemployment in Canada declined from 16.8 weeks to 15.6 weeks, and in the United States from 13 weeks to 10.6 weeks.

[10] Riddell (1999).

[11] For a summary of reforms, see Canada—Selected Issues Paper, SM/96/69, Chapter VI. Unemployment Insurance Reforms.

[12] Amano and Macklem (1998).

(Prasad and Thomas (1998), Budd (1996), and Storer and Van Audenrode (1998)) finding no evidence that wage responsiveness has contributed to the unemployment differential, while others (Kuhn and Robb(1998)) find smaller relative wage declines for the low skilled in Canada, and hence higher unemployment rates. Other empirical studies focussing on various other labor market characteristics typically used to explain labor market performance (e.g., unionization, immigration, payroll taxes, and income taxes) have generally found that these factors have not played a major role in explaining the unemployment differential.

Table 1. Canada, the United States, and Europe: Labor Market Trends

	Employment Growth 1/	Unemploy- ment Rate	Employment- Population Ratio	Labor Force Participation Rate
Canada				
1960-69	2.9	4.8	54.0	56.7
1970-79	3.5	6.7	56.8	60.7
1980-89	1.9	9.4	59.7	65.8
1990-98	1.1	9.8	59.2	65.6
United States				
1960-69	1.9	4.8	56.4	59.2
1970-79	2.6	6.2	57.7	61.5
1980-89	1.9	7.3	60.1	64.8
1990-98	1.3	5.9	62.7	66.6
Europe 2/				
1960-69	0.2	2.0	56.6	41.3
1970-79	0.3	3.9	53.6	41.7
1980-89	0.4	7.6	50.9	43.8
1990-98	-0.2	9.1	50.9	45.0

Source: U.S. Department of Labor, Bureau of Labor Statistics, "Comparative Civilian Labor Force Statistics, Ten Countries, 1959-1998"; www.bls.gov/pub/special.requests/ForeignLabor/flslforc.txt.

1/ Average annual percentage change. Data for Europe are 1991-98.
2/ Average of Germany, France, Italy, and the United Kingdom, weighted by population.

Figure 1. Canada, the United States, and Europe: Unemployment Rates
(Percent)
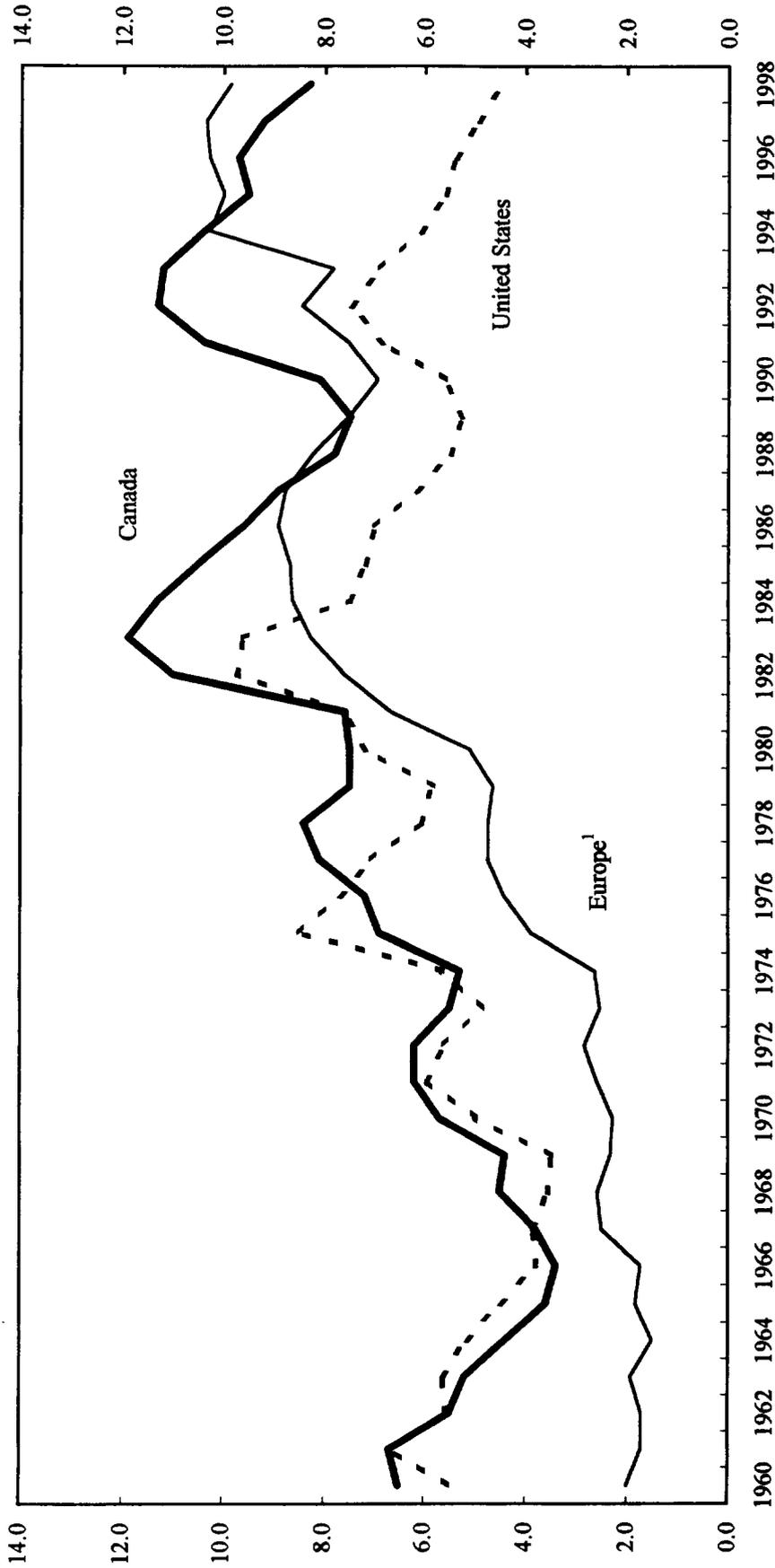
Sources: U.S. Department of Labor, Bureau of Labor Statistics, "Comparative Civilian Labor Force Statistics, Ten Countries, 1959-1998";
www.bls.gov/pub/special.requests/ForeignLabor/flslforc.txt.

[1] Average of Germany, France, Italy, and the United Kingdom weighted by population.

Figure 2. Canada, the United Statess, and Europe: Employment-Population Ratios
(Percent)

[1] Average of Germany, France, Italy, and the United Kingdom weighted by population.

Figure 3. Canada and the United States: Official and
Modified Unemployment Differential[1]
(Percentage points)
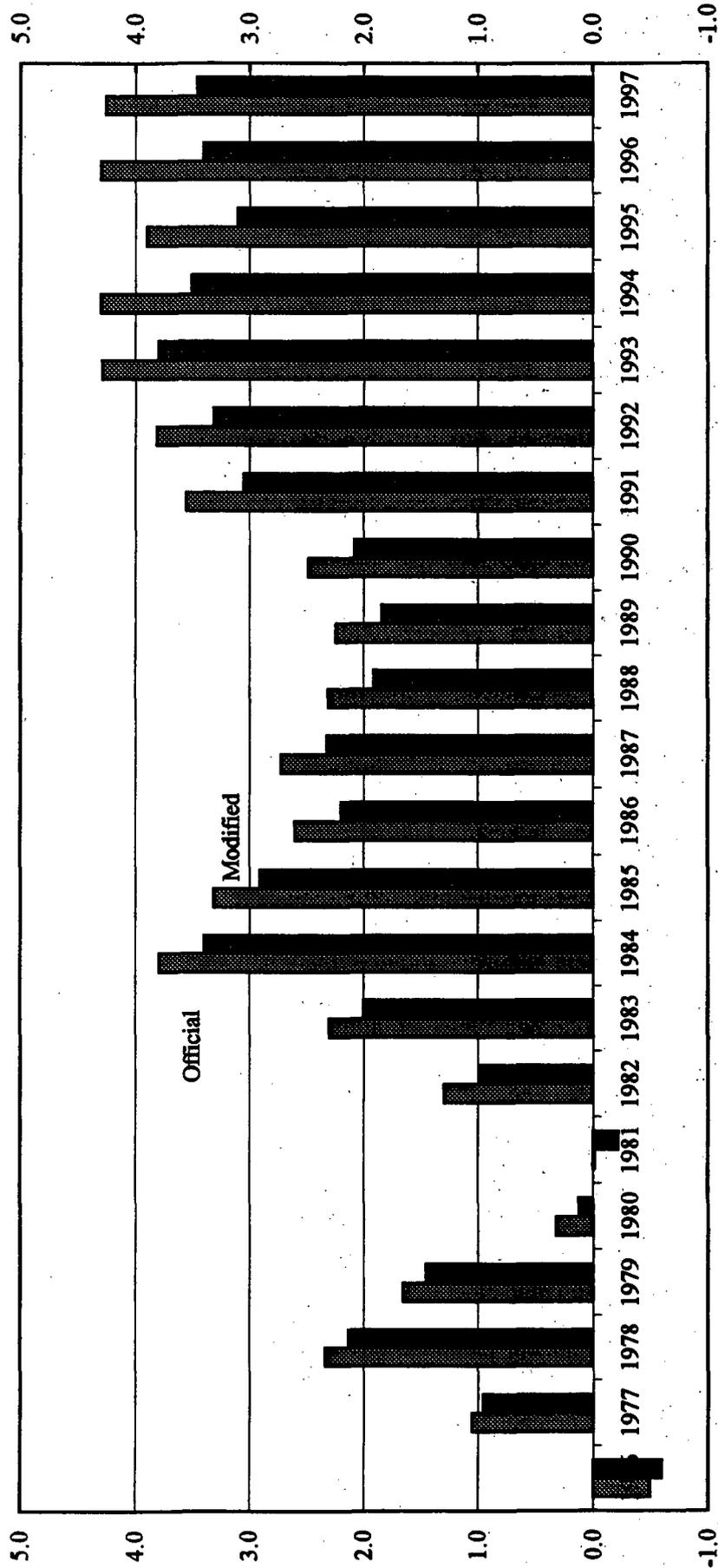
Source: D. Sunter, 1999, "Canada-U.S. Labour Market," *Canadian Economic Observer*, December.

[1]Canadian unemployment data modified to be equivalent to U.S. data; adjustments include removal from Canadian data of 15 year olds, passive job searchers, and persons unavailable because of personal responsibilities, and the addition of full-time students looking for full-time work.

Figure 4. Canada: Disincentive Index and Unemployment Rate
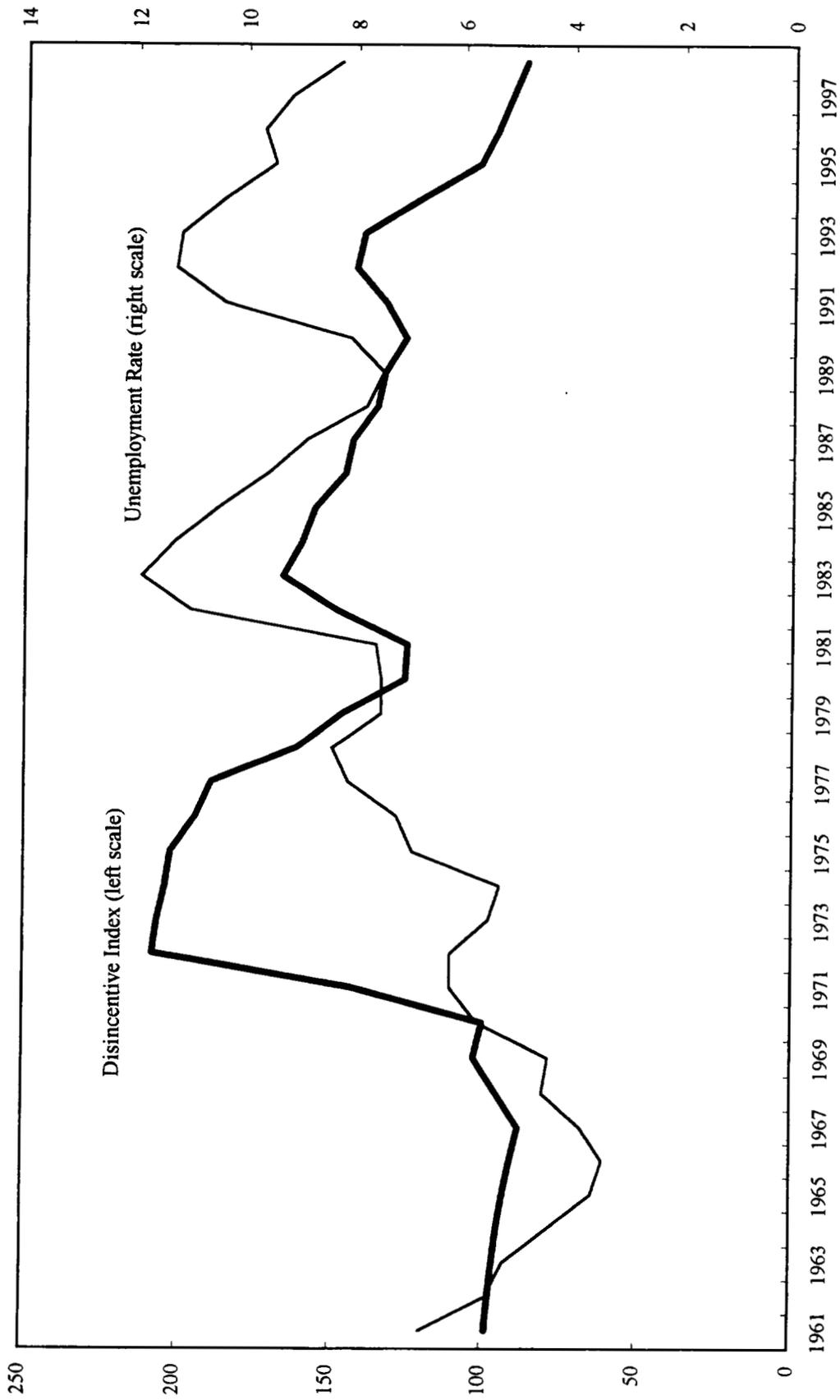
Sources: Department of Finance; and Statistics Canada.

List of References

Amano, R., and R.T. Macklem, 1998, "Unemployment Persistence and Costly Adjustment of Labor," *Canadian Public Policy*, Vol. 24, February, pp. S138–S152.

Budd, J., 1996, "Union Wage Determination in Canadian and U.S. Manufacturing, 1964–1990: A Comparative Analysis," Industrial and Labor Relations Review, Vol. 49, July, pp. 673–89.

Card, D., and W.C. Riddell, 1995, "Unemployment in Canada and the United States: A Further Analysis," Working Paper No. 352, Industrial Relations Section, Princeton University, November.

Corak, M., "Is Unemployment Insurance Additive? Evidence from the Benefit Duration and Repeat Users," *Industrial and Labor Relations Review*, Vol. 47, October, pp. 62–72.

Jones, S., and W.C. Riddell, 1998, "Gross Flows of Labour in Canada and the United States," *Canadian Public Policy*, Vol. 24, February, pp. S103–S120.

Keil, M. and J. Symons, 1990, "An Analysis of Canadian Unemployment," Canadian Public Policy, Vol. 16, pp. 1–16.

Kuhn, P. and L. Robb, 1998, "Shifting Skill Demand and the Canada-U.S. Unemployment Rate Gap: Evidence from Prime-Age Men," *Canadian Public Policy*, Vol. 24, February, pp. S170–S191.

Prasad, E. and A. Thomas, 1998, "Labour Market Adjustment in Canada and the United States, *Canadian Public Policy*, Vol. 24, February, pp. S121–S137.

Riddell, W.C., 1999, "Canadian Labour Market Performance in International Perspective," University of British Columbia, and Canadian Institute for Advanced Research, unpublished paper, August.

Riddell, W.C. and A. Sharpe, 1998, "The Canada-U.S. Unemployment Rate Gap: An Introduction and Overview," *Canadian Public Policy*, Vol. 24, February.

Sargent, T. C., 1996, "An Index of Unemployment Insurance Disincentives," mimeo, Economic Studies and Policy Analysis Division, Department of Finance, September.

Storer, P., and M.Van Audenrode, 1998, "Exploring the Links Between Wage Inequality and Unemployment: A Comparison of Canada and the United States," *Canadian Public Policy*, Vol. 24, February, pp. S233–S253.

Sunter, D., 1998, "Canada-U.S. Labor Market Comparison," *Canadian Economic Observer*, December.

III. EXPERIENCE RATING OF EMPLOYMENT INSURANCE PREMIUMS[1]

1.   The high rate of unemployment in Canada in the 1990s drew considerable attention to the role played by unemployment insurance in contributing to the level and persistence of unemployment. While much has been done to reform unemployment insurance in Canada, with a concomitant decline in structural unemployment, some significant disincentives remain. In particular, the Employment Insurance (EI) system relies on uniform contributions from employers which are not linked to the costs they may impose on the program. The result is cross subsidization of industries that are more prone to generating unemployment by those with more stable employment.[2] The introduction of experience rating (whereby EI premiums paid by firms are set on the basis of the use of the system by their employees) would improve economic efficiency and work to lowering unemployment and raising output. It would introduce a new element of complexity in the system, but developments in the United States suggest that any increase in the cost of administering the system would not be prohibitive. The current practice of experience-rating premiums in provincial workers' compensation programs in Canada also would support this conclusion. Moreover, the financial condition of the EI system at present provides a unique opportunity to introduce experience rating without imposing additional costs on those firms that currently are being heavily subsidized, by simply basing prospective EI premium reductions on each firm's use of the system.

A. Some Theoretical Aspects of Unemployment Insurance

2.   By its very nature, an unemployment insurance system financed out of general government revenues or through a uniform payroll tax introduces distortions into the labor market, as it affects the allocation of resources across sectors and creates undesirable incentives for employers and employees. Nevertheless, it also provides a safety net which serves an important social welfare function. In designing an unemployment insurance scheme, a key criteria is to minimize the distortions that it creates, while maximizing its social welfare benefits. Under a system financed with a uniform tax on employers, labor costs rise proportionately across industries, resulting in a partial shift of the costs of laying off workers from those with less stable employment patterns to those with more stable ones.[3] By bearing part of these costs, the stable employment sectors contract relative to the unstable sectors, distorting the efficient allocation of resources, and raising the average instability of

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[1] Prepared by Martin Cerisola and Paula De Masi.

[2] The comprehensive reform of the system enacted in 1996 introduced some limited "experience" rating through an intensity rule which reduces benefits for workers who repeatedly use the system.

[3] For a more comprehensive discussion, see Brechling and Laurence (1995).

the economy. In addition, this type of system creates adverse incentives for employees and employers. Unemployed workers may postpone the acceptance of a new job due to the low costs of remaining unemployed, while employers have no incentives to offer workers less employment volatility in return for lower wages since workers are guaranteed earnings stability. Moreover, it can lead to collusion on the part of employees and employers to maximize unemployment benefits paid to the employees.

3.   In contrast, an unemployment insurance system based on experience rating tends to increase efficiency and welfare by internalizing the costs for firms with less stable employment patterns. Under experience rating, the costs of labor fluctuations are allocated efficiently because they are imputed to those who can effectively control the rate of layoffs or transfers of workers between firms: the system ties a firm's premium structure to its layoff experience.[4] Two important implications are that such a system provides some insurance to the employer (by smoothing tax payments over time) as well as the employee (by smoothing the income stream), and it eliminates any direct link between the degree of experience rating in the tax structure and the income smoothing provided to the unemployed. Full experience rating ensures that the relative marginal cost of labor does not change across industries, so that unstable sectors would not expand at the expense of stable sectors. In addition, experience rating provides better incentives to employers for minimizing temporary layoffs so as to reduce taxes paid. In sum, the objectives of incorporating experience rating into an unemployment insurance scheme are to create an incentive for employers to stabilize employment and minimize temporary layoffs; to appropriately and fairly allocate the costs of unemployment insurance across firms and industries; and to encourage employers to participate in monitoring how the unemployment insurance program is administered.[5]

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[4] The degree of experience rating could vary from zero (similar to a uniform payroll tax) to partial, to full (the tax rate is established according to employer's risk class), or to complete (total payment by employer of its own employees claims). Partial experience rating arises when payroll taxes paid by the employer have a minimum and maximum rate, so that beyond a certain point, additional layoffs do not result in an increase in the employer's payroll tax rate. Other factors that contribute to partial experience rating are when benefits are not charged to an employer's account under certain conditions or in case of bankruptcy.

[5] Contrary to the standard arguments made against experience rating, in terms of not inducing employers to change their layoff patterns and of unfairly penalizing volatile industries, Brechling and Laurence (1995) note that with market-determined prices and wages, it is unlikely that a single employer would be successful in avoiding the incidence of the tax by shifting its burden through higher prices or lower wages. They also note that evidence shows that employers do reduce the number of layoffs in response to a higher marginal tax costs of layoffs.

B. Experience Rating in the United States

4. The United States is the only country to finance its unemployment insurance system with a firm-based experience-rated payroll tax, and has done so since the inception of the system in the 1930s. The unemployment insurance system in the United States is governed by both federal and state laws.[6] The Federal Unemployment Tax Act (FUTA) requires that payroll taxes are experience rated, but places no restrictions on how states implement experience rating. As a result, a variety of different methods have been adopted. The most commonly used is the reserve-ratio method in which each employer has an account where tax payments are deposited and benefits are withdrawn. The reserve ratio is the ratio of reserves in the employer's account to the average taxable payroll of the employer over the last three to five years. Therefore, a high (low) reserve ratio reflects a firm that has paid in significantly more (less) in taxes than it has withdrawn in benefits. Accordingly, the payroll tax rate that an employer pays is negatively related to its reserve ratio (Figure 1). For firms with reserve ratios along the sloped part of the tax schedule, an additional layoff means an increase in the payroll tax rate. Once the maximum tax rate is reached, any additional layoffs will not result in a higher tax rate.

5. Experience rating in the United States tends to be partial, in that taxes contributed by employers do not completely reflect expected benefits to be received by employees. Partial experience rating does not completely eliminate adverse incentives for employers and employees, resulting in higher temporary layoffs. A pattern of long-term employment attachment between employers and employees—e.g., like in the construction industry—can benefit both parties if the employer repeatedly lays off employees on a temporary basis. Given these implicit incentives, partial experience rating results in employers using temporary layoffs to take advantage of this subsidy, particularly during periods of low demand. A number of empirical studies suggest that if the United States had full experience rating, 20 to 50 percent of temporary layoffs could be eliminated.

6. Partial experience rating in the United States also means that some level of cross-subsidization among firms and industries remains. Employers in the highly cyclical industries pay less in payroll taxes than the benefits paid to their workers. As a result, other industries are subsidizing these benefit payments. A number of studies have consistently found that the construction industry—highly prone to layoffs—receives a subsidy because it generates more in unemployment benefits than paid in taxes. Anderson and Meyer (1993) estimated that over the period 1980–91 the average annual net subsidy to the construction industry arising from partial experience rating amounted to about $1.2 billion, or 0.6 percent of the industry's output.

7. Some countries have experimented with experience rating and abandoned it (Sweden in the late 1950s and early 1960s), others have incorporated limited features (the

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[6] For a more detailed discussion, see Levine (1997) and Vroman (1996).

Netherlands), or are considering its implementation (recently, Poland).[7] The absence of experience rating on a wider scale may reflect a tendency in many countries to blur the distinction between unemployment insurance and social assistance. In the United States the unemployment system is more focussed on insurance aspects, and a separate system of social assistance programs exists to provide income support.

C. Employment Insurance in Canada and the Potential Impact of Experience Rating

8.   Currently, Canada's EI system is administered at the federal level, and it is financed through a uniform payroll tax applied to employers and employees.[8] The level of total benefits paid to employees differs across employers and industries, depending on how cyclical and seasonal employment patterns are across employers, and also depending on the performance of the industry.[9] Regional disparities in benefit/premium ratios are particularly important in Canada, with the Atlantic provinces being the largest net beneficiaries (Table 1). This pattern reflects the economic structure of these provinces, where largely seasonal resource-based industries account for most of provincial economic activity and unemployment is high. Forestry, fishing and trapping, agriculture, and construction have been the main beneficiaries of the EI system. Moreover, the Canadian labor market, like that of the United States, is characterized by significant employment turnover; outflows from the labor force are particularly high compared to other advanced economies outside North America (Table 2). High labor market turnover, together with inefficiencies stemming from the current EI system, suggest that Canada would benefit considerably from introducing partial or full experience rating.

9.   Beausejour, Sheikh, and Williams (1998) note that the current system has induced substantial variation in benefits received by firms within the same industry, and has possibly affected the participation rate of certain age groups, as youth have received a large share of EI net benefits. They emphasized that the distribution of net benefits across industries has

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[7] In the Netherlands, unemployment insurance premiums are differentiated at the sectoral rather than at the firm level. Although the behavior of individual firms is not affected, cross-subsidization between sectors is reduced. Experience rating is further limited because sectoral insurance schemes cover the first 26 weeks of unemployment, with the federal government providing extended benefits beyond this time period.

[8] As of January 1, 2000, the premium rate for employees is $2.40 per $100 of insurable earnings up to the maximum of $39,000. The employers' premium rate is 1.4 times the employee rate.

[9] In addition, benefits are also provided for training and self-employment assistance, as well as for sickness, and maternity and parental leave.

been highly skewed toward a minority of industries, with those representing only roughly 40 percent of employment having received net benefits. Other studies have noted that the uniform unemployment insurance tax has resulted in significant subsidies between industries, and between provinces (Corak and Pyper, 1995). Vroman (1996) compared the level of inter-industry subsides in Canada and the United States, and found that the pattern of subsidies was similar, but that the level of subsidies was 50 percent larger in Canada, mainly reflecting the presence of experience rating in the United States. Construction, followed by agriculture, forestry, and fisheries, were the main beneficiaries of the EI system. Services and transportation were the sectors most adversely affected by the system.

10.   Beausejour, Sheikh, and Williams (1998) provide estimates of the allocative impact of a firm-based fully experience-rated EI system in Canada from a general equilibrium perspective. Based on a 95-sector model, which allows for firms to optimize employment decisions, introducing experience rating would reduce unemployment by about 2.2 percentage points—representing 45 percent of temporary unemployment and 23 percent of total employment—and would increase Canadian GDP by 2.2 percentage points.

11.   Notwithstanding these benefits, the authors acknowledge that the analysis does not take into consideration the initial administrative complexities and costs of implementing such a system. Workers' compensation programs in the provinces are experience rated. These programs are financed through employers' contributions which vary across industries (and industry subsectors) in line with differences in the average accident experience. Individual rates are adjusted in relation to the amount by which an employer's accident experience is above or below the average for its sector. This would suggest that the administrative complexities and costs of implementing experience rating in the EI system should not be insurmountably large.

12.   In recent years, EI contribution rates have been declining, as EI receipts have exceeded payments by a sizable margin, and there is an expectation that rates will be reduced further over the next few years. The Report of the Technical Committee on Business Taxation (1998), along with other groups, has argued that Canada would have the opportunity to introduce some degree of experience rating without increasing the contribution rate of any single employer. Contribution rates for firms with stable employment patterns could be reduced by more than those with less stable patterns. Issues to be resolved include the measurement of experience, the number of rates, exemptions, and how employer contribution rates would vary with experience. The Committee acknowledged that the proposed system would increase administrative costs, but emphasized that these would be likely outweighed by the expected benefits of lower unemployment.

Table 1. Canada: Employment Insurance Benefits/Premiums by Industry 1/

Industry	Industry Share of Wages and Salaries	EI Benefits to Total Contribution	Net Subsidy or Tax 2/
Agriculture	0.7	3.19	-8.1
Fishing and trapping	0.2	4.26	-16.9
Forestry	0.5	4.96	-13.4
Mining	1.2	1.18	-0.6
Construction	6.1	2.94	-5.9
Oil and gas	1.2	0.74	0.8
Manufacturing	18.5	1.06	-0.2
Transportation	3.9	0.90	0.4
Communications	1.8	0.37	2.3
Storage	0.2	0.79	0.8
Electric power, gas, and water utilities	1.5	0.35	2.4
Wholesale trade	7.2	0.77	0.9
Retail trade	7.9	0.99	0.0
Deposit accepting institutions	2.3	0.38	2.6
Other finance	5.8	0.55	1.4
Public administration and defense	11.9	0.53	1.7
Commercial services	13.1	1.17	-0.6
Noncommercial services	14.1	0.43	2.3
Unclassified	2.4	3.65	-8.8
All industries	100.0	1.00	0.0

Source: The Report of the Technical Committee on Business Taxation (1998).

1/ Based on 1989-90 average.
2/ In percent of labor costs.

Table 2. Canada: Indicators of Employment Turnover 1/

	Inflows		Outflows	
	1983	1994	1983	1994
	(In percent of population)		(In percent of unemployed)	
Canada	2.5	2.3	25.5	27.5
United States	2.6	1.7	34.7	37.6
Japan	0.4	0.4	23.1	14.4
Germany 2/	0.2	0.6	...	9.0
United Kingdom 2/	0.5	0.7	...	9.3
France	0.3	0.4	4.8	3.0
Italy 2/	0.2	0.4	...	9.5

Source: OECD (1996).

1/ Measured as monthly flows into and out of unemployment. Inflows refer to those unemployed for less than one month. The number of outflows is estimated as the difference between the average monthly level of inflows and the monthly average change in unemployment over one year.

2/ Data before 1991 are not available due to changes in the definition introduced in the 1992 European Community Labor Force Survey.

Figure 1. Canada: Experience-Rated Payroll Tax Schedule
(Reserve-Ratio Method)
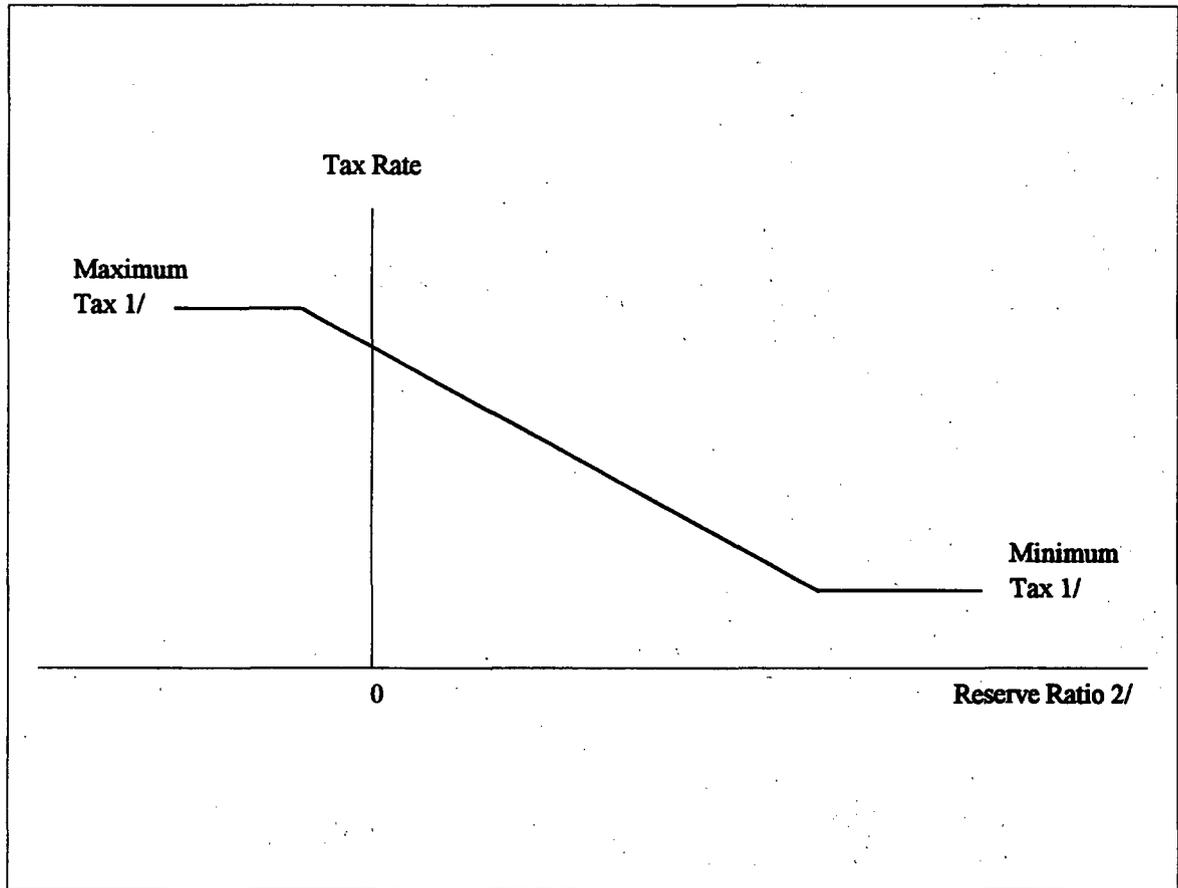
1/ Tax rates across states vary considerably. Maximum tax rates in 1999 range from 5.4 to 10 percent, and minimum tax rates range from 0 to 2.8 percent.

2/ Equals ratio of reserves in employer's account to average taxable payroll over the last three to five years.

List of References

Anderson, P., and B. Meyers, 1993, "The Unemployment Insurance Payroll Tax and Interindustry and Interfirm Subsidies," in *Tax Policy and the Economy*, James Poterba, ed., Vol. 7, pp. 111–144.

Beausejour, L, M. Sheikh, B. Williams, 1998, "Experience Rating Employment Contributions," *Canadian Public Policy*, Vol. 24, No. 3, pp. 388–393.

Brechling, Frank and Louise Laurence, 1995, *Permanent Job Loss and the U.S. System of Financing Unemployment Insurance*, Kalamazoo, Michigan, W.E. Upjohn Institute for Employment Research.

Corak, M. and W. Pyper, 1995, "Workers, Firms, and Unemployment Insurance," Catalogue No. 73-505-XPE, Statistics Canada.

Levine, P., 1997, "Financing Benefit Payments," in *Unemployment Insurance in the United States: Analysis of Policy Issues*, eds. C. O'Leary and S. Wandner, Kalamazoo, Michigan, W.E. Upjohn Institute for Employment Research.

OECD, 1996, *OECD Economies at Glance: Structural Indicators*, Paris, OECD.

Report of the Technical Committee on Business Taxation, Submitted to the Honourable Paul Martin, Minister of Finance, December 1997.

Unemployment Insurance in the United States: Analysis of Policy Issues, 1997, eds. C. O'Leary and S. Wandner, Kalamazoo, Michigan, W.E. Upjohn Institute for Employment Research.

Vroman, Wayne, 1996, "An Analysis of Unemployment Insurance Experience Rating: Draft Report," Urban Institute, unpublished paper, December.

IV. OPTIONS FOR INCOME TAX REFORM IN CANADA[1]

1.   The relatively high marginal and average personal income tax rates in Canada (federal and provincial combined) create disincentives to work and save. At the same time, the combined federal and provincial corporate income tax rate on general business income is generally higher than comparable rates in Canada's major trading partners. In addition, there is relatively high variation in corporate tax rates across provinces and across industries, creating economic inefficiencies and increased compliance costs. This paper briefly reviews the current personal and corporate income tax systems in Canada, identifies priorities for reform, and presents estimates of the fiscal costs of illustrative reform packages that are feasible given prospective fiscal resources.

A. An Overview of Income Taxes in Canada

Personal income taxes

2.   Personal income is taxed at both the federal and provincial levels. The federal income tax system comprises three progressive marginal rates (17, 26, and 29 percent), a set of refundable tax credits, including the GST tax credit and the National Child Benefit (NCB),[2] and a high-income surtax.[3] Since 1986, the system has been indexed to inflation only for that amount exceeding 3 percent, implying a de facto absence of any indexing since the early 1990s. With the exception of Québec, provincial income taxes are calculated as a percentage of the federal tax obligation plus any applicable surtaxes.

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[1] Prepared by Vivek Arora and Michael Leidy.

[2] The GST credit was introduced in 1991 to ease the burden of the newly introduced goods and services tax on low-income Canadians. The GST credit is gradually reduced until it is eliminated once family incomes reach $50,000. The NCB is a joint initiative of the federal and provincial governments that includes the Canada Child Tax Benefit (CCTB) and the National Child Benefit Supplement (NCBS). The CCTB is a tax-free monthly payment to eligible families with children. The NCBS is a monthly benefit to low-income families with children. The CCTB basic benefit begins being withdrawn if family net income exceeds $29,590 (raised from $25,921 in the 1999/00 Budget) and is fully withdrawn when family income exceeds $70,000 for the first child. The NCBS begins being withdrawn when net family income exceeds $20,921.

[3] Individuals who owe basic federal tax of $12,500 or more (roughly corresponding to incomes of $65,000 or more) are subject to a 5 percent surtax. A 3 percent surtax, which previously applied to all taxpayers, was reduced in coverage in July 1998 and eliminated in February 1999.

3.   While the ratio of total tax revenue to GDP in Canada is broadly in line with other G-7 countries, the ratio of personal income tax to GDP is relatively high (Figure 1). In part, this reflects the greater reliance of the tax system in Canada on personal income taxes relative to other taxes (Table 1). The high ratio also reflects the steep progressivity of personal income taxation in Canada. In comparison to the United States, which also relies substantially on personal income taxes, the statutory marginal tax rates in Canada (federal and provincial combined) are significantly higher and apply at far lower income levels (tabulation below). In comparison with other G-7 countries as well, the top statutory rate in Canada starts to apply at a relatively low-income threshold, both in absolute terms and in relation to average income (Table 2).

Statutory Marginal Tax Rates

Income (Thousands of Canadian dollars)	Canada 1/ (Percent)	United States 2/ (Percent)	Difference (Percent)
7-30	25	17	8
30-60	39	26	13
60-100	50	32	18
100-200	50	35	15
200-420	50	40	10
Over 420	50	45	5

Source: Tax Policy Branch, Department of Finance Canada.

1/ Includes average provincial income tax rates.
2/ Includes average state income tax rates.

4.   The income tax burden is especially high on middle-income taxpayers, with the middle federal statutory tax rate (26 percent) starting to apply at a relatively low income threshold ($29,590). In addition, the jump in the federal and provincial marginal income tax rate between the low and middle brackets (14.5 percentage points)[4] is the largest among G-7

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[4] This is the difference between the marginal tax rates applicable at 66 percent and 100 percent of the average production wage.

countries. Taking into account the clawback of the GST tax credit and the NCB as family incomes increase, the effective marginal tax rates facing low- and middle-income households are significantly higher than the statutory rates. For a single taxpayer with two children residing in Ontario, for example, the effective marginal income tax rate (based on all income-related taxes, including federal and provincial income taxes combined, the Employment Insurance premium, the Canada Pension Plan premium, and all refundable tax credits) is estimated to rise to about 60 percent for incomes around $30,000, before falling back to about 40 percent for incomes around $40,000 (Mintz and Poschmann, 1999).

5.   The partial, rather than full, indexation of the income tax system to inflation has resulted in a steady decline in the real-income thresholds at which successive statutory marginal tax rates apply ("bracket creep") and in the real value of the basic personal credit.[5] During the period since 1988, partial indexation has resulted in a cumulative 7½ percent increase in nominal tax parameters, compared with a 36 percent increase that would have occurred if instead the system were fully indexed. The Government adopted measures in 1997–99 to partially offset the rising tax burden owing to partial indexation. Nevertheless, the tax thresholds remain significantly out of line with what they would have been under full indexation (tabulation below).[6] As a result, many individuals (28 percent of the estimated 15½ million Canadians who will have tax obligations in 2000) either have become taxable or have moved into a higher tax bracket because of less-than-full indexation (Table 3), including 1½ million individuals in the 17 percent marginal tax bracket who would have had a zero marginal tax rate under full indexation.

Impact of Partial Indexation on Federal Personal Income Tax Rate Thresholds 1988–2000

Rate Thresholds (Percent)	If Full Indexation Since 1988 (Canadian dollars)	Current in Year 2000 Canadian dollars)
17 (basic personal credit)	8,176	7,131
26	37,471	29,590
29	74,942	59,180

Source: Tax Policy Branch, Department of Finance Canada.

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[5] Following the move from full to partial indexation in 1986, a major tax reform reduced the number of tax brackets from ten to three and cut the top federal marginal tax rate from 34 percent to 29 percent.

[6] The 1998 and 1999 Budgets, for example, raised the personal exemption by $675 so that the tax-free amount in 2000 will be $7,131. But this is still insufficient to offset the effects of inflation on the personal exemption since 1988 (tabulation).

Corporate income taxes

6.   Corporate income tax rates in Canada vary depending on a firm's size, activity, and its provincial location.[7] The federal corporate statutory income tax rate is set at 28 percent for general business income, and a reduction from the general rate is provided to manufacturing and processing operations (21 percent) and to small businesses (12 percent).[8] The provinces also frequently grant reductions in provincial corporate income tax rates for small businesses and, in some cases, for manufacturing and processing activities. This leaves the services sectors facing the highest corporate income tax rates. When both federal and provincial rates are considered, there is significant variation in the tax rates on corporate income across Canada (Table 4).

7.   Canada's average combined (federal and provincial) statutory tax rate for general business income (43 percent) is high relative to that in the United States (39 percent), the United Kingdom (31 percent), and Mexico (34 percent), for example, but is lower than in Germany, Italy, and Japan, where rates exceed 50 percent.[9] Although the overall corporate income tax burden is close to the OECD average as a share of GDP (Figure 2), rates on nonmanufacturing, nonprocessing activities are relatively high, and raise the concern that these tend to discourage business operations and new investments in Canada's service sectors. Moreover, the relatively high variation in corporate tax rates across provinces and across industries tends to exacerbate economic inefficiencies (by distorting investment decisions) and increase compliance costs (by adding complexity).

B.   Priorities for Income Tax Reform

8.   The principal distortion in the personal income tax system is attributable to the high effective marginal tax rates, particularly on middle-income taxpayers. Reform of the personal income tax system should focus on correcting this problem by increasing the income thresholds at which progressive statutory marginal tax rates apply, cutting the high effective marginal tax rates applied at middle-income levels (through cuts in statutory rates and by reducing the rate of clawback of tax credits as incomes rise), and by indexing the system fully to inflation. The first two of these approaches would directly reduce the marginal tax rates facing middle-income taxpayers, while full indexation would stabilize the real

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[7] Cole and Leidy (1997) present an analytical overview of Canada's business tax system.

[8] In addition, a federal surtax is imposed raising the general business rate to 29.12 percent, the manufacturing and processing rate to 22.12 percent, and the general small business rate to 13.12 percent.

[9] Report of the Technical Committee on Business Taxation (1998).

parameters of the system to prevent inflation from eroding the real value of successive tax thresholds (bracket creep), tax credits, and the personal exemption.

9.   In dealing with the erosion of the real value of tax parameters, there are two polar options: (i) formally index the system fully in legislation so that tax-parameter adjustments are automatic; or (ii) adopt discretionary measures periodically to correct (fully or partially) for the effects of inflation. International experience suggests a range of practices—featuring full, partial, and no indexation—and suggests that political and other noneconomic considerations play a large role in determining whether governments choose formal indexation, or choose to leave tax-parameter adjustments open to discretionary actions.[10] A factor sometimes weighing against formal indexation is that a nonindexed system can provide a politically convenient way of raising revenue. Some countries, including the United States and the United Kingdom in the 1980s, introduced indexation as part of a general move toward lower taxes. Others, including Germany, Spain, and, until recently, Italy and Sweden, chose not to adopt indexation. In addition to foregone revenues, it was argued that indexation may make for easier public acceptance of inflation and lead to higher inflationary expectations. In a few countries, indexation has been used to meet distributional objectives. In France, for example, frequently only the top tax bracket has been indexed. Overall, experience among OECD countries in the late 1970s (when inflation was relatively high) suggests that the amount by which fiscal drag was offset in countries with formal indexation was roughly the same as in countries that relied on periodic discretionary measures (OECD, 1986).

10.   Nevertheless, formal ex ante indexation has the virtue of being automatic and transparent, thereby reducing uncertainty and facilitating better longer-term planning. The ad hoc approach, on the other hand, could be more susceptible to ongoing political influence. The restoration of full indexation would ensure that, once measures to improve the efficiency of the income tax system were adopted, maintaining these improvements would not require legislative action.

11.   With regard to the corporate income tax, the priorities should be on reducing the statutory tax rate on general business income in order to move closer to the average U.S. rate and to narrow the preferences for manufacturing/processing and small businesses. This would help to level the playing field for Canadian firms that compete internationally while also reducing the distortions associated with existing preferential tax rates. After sufficient time to provide a reasonable interval for business planning, there also is scope for broadening the tax base along the lines of the measures recommended in the 1998 Report of the Technical Committee on Business Taxation. These might include, for example, the elimination or reduction of certain preferences (e.g., reductions in the research and development tax incentives, which the Technical Committee judged to be among the most generous in the world), credits (e.g., replacing the Atlantic Investment Tax Credit with a more cost-effective and broad-based nontax program), and deductions (e.g., a general review of capital cost

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[10] See Messere (1998), Chapter 1, for a summary of international practice.

allowances to ensure that rates are closer to economic depreciation). The Committee also made a number of recommendations for reducing compliance costs and improving tax enforcement including harmonizing federal and provincial taxes on capital, establishing new mechanisms to settle disputes and collect assessed taxes, and adopting provisions to expand civil penalties on tax advisors whose advice is deemed to be grossly negligent.

C. The Fiscal Cost of Alternative Income Tax Measures

12.   The fiscal costs of several illustrative tax packages are presented in Table 5. Package 1 includes full inflation indexation, a 1 percentage point cut in the 26 percent statutory marginal rate, an increase in the income threshold at which the middle marginal rate applies of $1,000, a reduction in the phase-out rate for the National Child Benefit as incomes rise, and a cut in the basic tax rate on corporate income of 1 percentage point. Package 2 is somewhat more ambitious than package 1, in that it cuts the middle marginal tax rate by 2 percentage points over two years, raises the income threshold for the middle tax rate by $2,000, increases the threshold for the top tax rate by $2,000, and cuts the basic corporate income tax by 2 percentage points over two years, in addition to the other measures in package 1. Package 3 includes the measures in package 2 as well as an additional 1 percentage point cut in the middle personal income tax rate (to 23 percent) in year three.

13.   The fiscal costs of all three packages over the five-year period through 2004/05 would be less than the annual planning surpluses over this period presented in the Fall 1999 Economic and Fiscal Update. Adoption of any of these packages would still provide sufficient resources to continue to bring down the debt-to-GDP ratio and to increase spending in priority areas such as health care and education.

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Table 1. Canada: International Comparisons of the Tax Structure 1/

(Shares in total tax revenue, in percent)

	Personal Income Tax	Corporate Income Tax	Social Security	Property Tax	Taxes on Goods and Services	Other	Total
Canada	37.6	8.3	16.6	10.5	25.4	1.7	100.0
United States	36.4	9.3	25.0	11.4	17.9	0.0	100.0
Japan	21.6	15.5	36.0	11.7	15.2	0.0	100.0
Germany	26.3	3.1	39.7	2.8	28.1	0.0	100.0
France	14.1	3.8	43.3	5.1	27.2	6.5	100.0
United Kingdom	27.1	9.3	17.5	10.5	35.3	0.3	100.0
Italy	25.7	9.0	32.3	5.5	27.1	0.5	100.0
G-7	26.3	7.9	30.7	7.8	25.8	1.5	100.0
OECD	27.7	8.0	26.1	5.1	31.7	1.3	100.0

Sources: IMF; and OECD data.

1/ Average 1994-96.

Table 2. Selected Countries: Personal Income Tax, 1985-97

| | Rates on Earned Income (Federal Government) | | | | | | | | | | |
| | Top Rate | | Income Threshold for Top Rate (U.S. dollars) 1/ | Per-Capita GDP (U.S. dollars)1/ | Lowest Positive Rate | | Number of Brackets | | Indexation of Rate Schedule | State and Local Income Tax | |
	1985	1997			1985	1997	1985	1987		Yes/No	Features
Canada	34	29	42,742	21,005	6	17	10	3	Partial 2/	Yes	54 percent (average) of basic federal tax
United States	50	40	271,050	30,270	11	15	14	5	Yes	Yes	About 25 percent (average) of federal tax
Germany	56	53	149,934	33,315	22	26	n.a 3/	n.a. 3/	No	No	Except trade tax on business income
Japan	70	50	247,954	25,874	10	10	9	5	No	Yes	5-15 percent of taxable income
France	65	54	49,360	24,037	5	11	13	6	Yes	No	n.a.
United Kingdom	60	40	42,744	22,355	30	20	6	3	Yes 4/	No	n.a.
Italy	62	51	176,149	20,491	18	10	15	7	No 5/	Yes	16 percent of taxable income

Source: Coopers and Lybrand (1998), Messere (1998), staff calculations.

1/ Converted to U.S. dollars at average 1997 exchange rate.
2/ Fully indexed before 1986. Subsequently, partial indexation: for the excess of inflation over 3 percent.
3/ Germany's tax schedule is based on a formula and does not have brackets. Individuals pay taxes according to an arithmetic progression at rates between 26 percent and 53 percent.
4/ Subject to Parliamentary approval each year.
5/ Rate schedule indexed during 1990-92.

Table 3. Canada: Effect of Partial Indexation From 1988–2000
on the Distribution of Tax Filers by Tax Bracket

Number of Filers Under Current System of Partial Indexation (Thousands)		Filers by Tax Bracket Under Fully Indexed System from 1988					
		Non-taxable	17 Percent Bracket	26 Percent Bracket	29 Percent Bracket Only	29 Percent and High-Income Surtax	Total
Nontaxable	6,297	6,297	—	—	—	—	6,297
17 percent bracket	8,354	*1,473*	6,881	—	—	—	8,354
26 percent bracket	5,587	*13*	*2,220*	3,354	—	—	5,587
29 percent bracket only	461	—	—	*441*	20	—	461
29 percent and high-income surtax	1,202	—	—	*243*	*10*	950	1,202
Total	21,901	7,783	9,101	4,038	29	950	21,901

Source: Tax Policy Branch, Department of Finance Canada.

Table 4. Canada: Federal and Provincial Corporate Income Tax Rates, 1998

	General Business	Manufacturing and Processing	General Small Business
Federal 1/	29.1	22.1	13.1
Newfoundland	14.0	5.0	5.0
Prince Edward Island	16.0	7.5	7.5
Nova Scotia	16.0	16.0	5.0
New Brunswick	17.0	17.0	7.0
Quebec	9.2	9.2	5.9
Ontario	15.5	13.5	9.5
Manitoba	17.0	17.0	9.0
Saskatchewan	17.0	10.0	8.0
Alberta	15.5	14.5	6.0
British Columbia	16.5	16.5	9.0
Yukon	15.0	2.5	6.0
Northwest Territories	14.0	14.0	5.0
Average combined federal-provincial	**43**	**35**	**21**

Source: Report of the Technical Committee on Business Taxation (1998).

1/ Includes the federal surtax of 1.12 percent.

Table 5. Canada: Fiscal Costs of Alternative Tax Reform Packages

(Millions of dollars)

Fiscal Years	2000-01	2001-02	2002-03	2003-04	2004-05
Fiscal surplus for planning purposes 1/ (current policies)	5,500	8,500	12,500	17,500	23,000
(percent of GDP)	0.6	0.8	1.2	1.5	1.9
Package 1 (modest reform)					
$1,000 increase in 26 percent bracket threshold ($29,590 to $30,590)	600	600	600	600	600
Restore full indexation of tax parameters 1/	900	1,800	2,700	3,600	4,500
Middle PIT rate cut from 26 percent to 25 percent	1,050	1,050	1,050	1,050	1,050
Reduce the 2.5 percent and 5 percent CCTB base phase-out rates to 1.25 percent and 2.5 percent 2/	1,200	1,200	1,200	1,200	1,200
Cut general rate of corporate income tax (CIT) by 1 point and broaden base beginning in year 3	270	270	135	0	0
Total cost package 1	3,750	4,650	5,550	6,450	7,350
(percent of GDP)	0.4	0.4	0.5	0.6	0.6
Package 2 (more ambitious reform)					
$2,000 increase in 26 percent bracket threshold ($29,590 to $31,590) 3/	1200	1200	1200	1200	1200
$2,000 increase in 29 percent threshold ($59,180 to $61,180)	90	90	90	90	90
Restore full indexation of nominal tax parameters 2/	900	1800	2700	3600	4500
Middle PIT rate cut from 26 percent to 24 percent over two years	1050	2100	2100	2100	2100
Reduce 2.5 percent and 5 percent CCTB base phase-out rates to 1.25 percent and 2.5 percent	1200	1200	1200	1200	1200
Cut corporate income tax by 1 point in year one and by another point in year 2 and broaden base beginning in year 3	4710	6930	7695	8460	9360

Table 5. Canada: Fiscal Costs of Alternative Tax Reform Packages (Concluded)

(Millions of dollars)

Fiscal Years	2000-01	2001-02	2002-03	2003-04	2004-05
Total cost package 2	4710	6930	7695	8460	9360
(percent of GDP)	0.5	0.7	0.7	0.7	0.8
Package 3					
Cost of package 2	4710	6930	7695	8460	9360
Middle PIT rate cut from 24 percent to 23 percent in year 3 (added cost)	0	0	1050	1050	1050
Total cost of package 3	4710	6930	8745	9510	10410
(percent of GDP)	0.5	0.7	0.8	0.8	0.9

Source: Staff calculations based on data provided by the Department of Finance.

1/ This is the ex ante fiscal surplus under current policies less the contingency reserve and the economic prudence.
2/ Assumes 1.5 percent inflation.
3/ The base benefit of the Canada Child Tax Benefit is currently phased out for family net incomes over $29,590 at a rate of 2.5 percent for a one-child family and 5 percent for families with two or more children.
4/ assumes the additional $1,000 increase costs the same as the first $1,000.

Figure 1. Selected Countries: Tax Revenues

General Government Total Tax Rrevenues
(As a percent of GDP, average 1995-98)

¹ Average 1994-96.

Personal Income Tax
(Percent of GDP, 1998 or most recent year available)
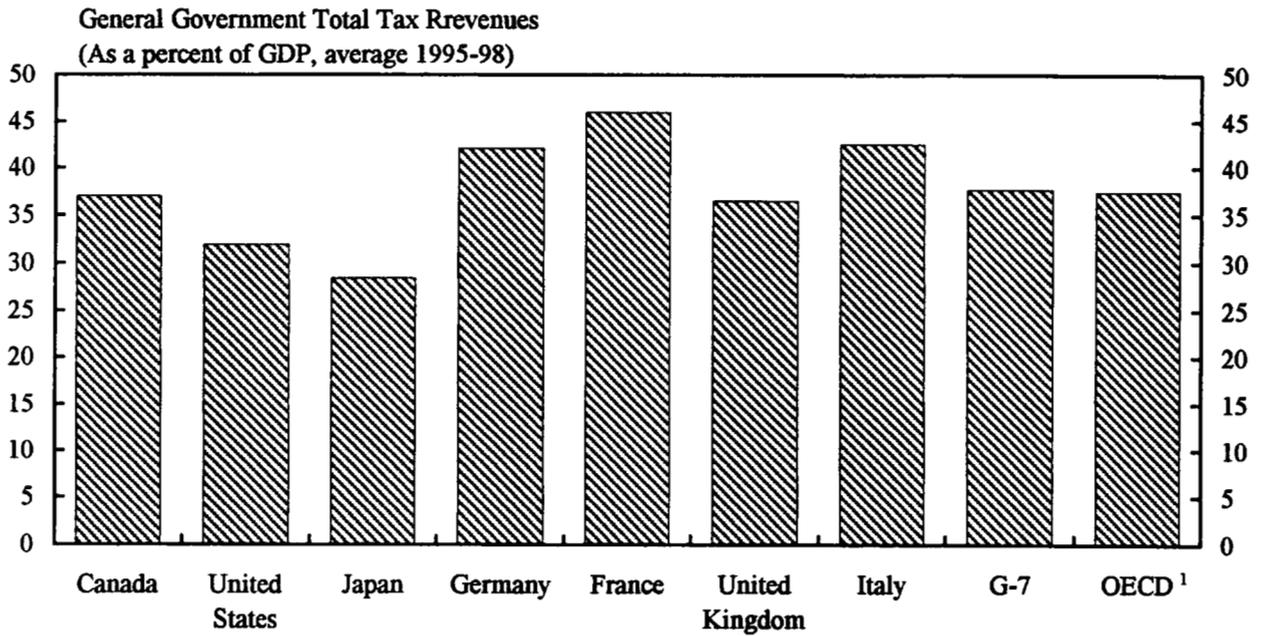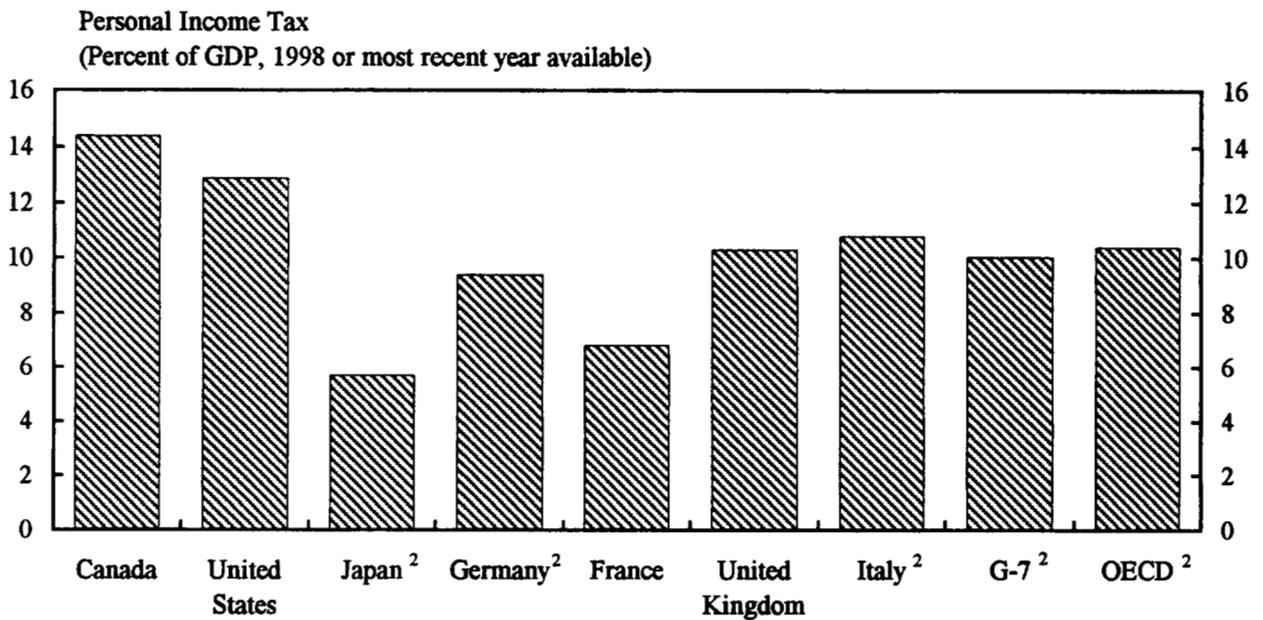

² 1996.

Sources: IMF Government Financial Statistics; and OECD Revenue Statistics.

Figure 2. Selected Countries: Corporate Income Tax
(Percent of GDP, 1998 or most recent year available)
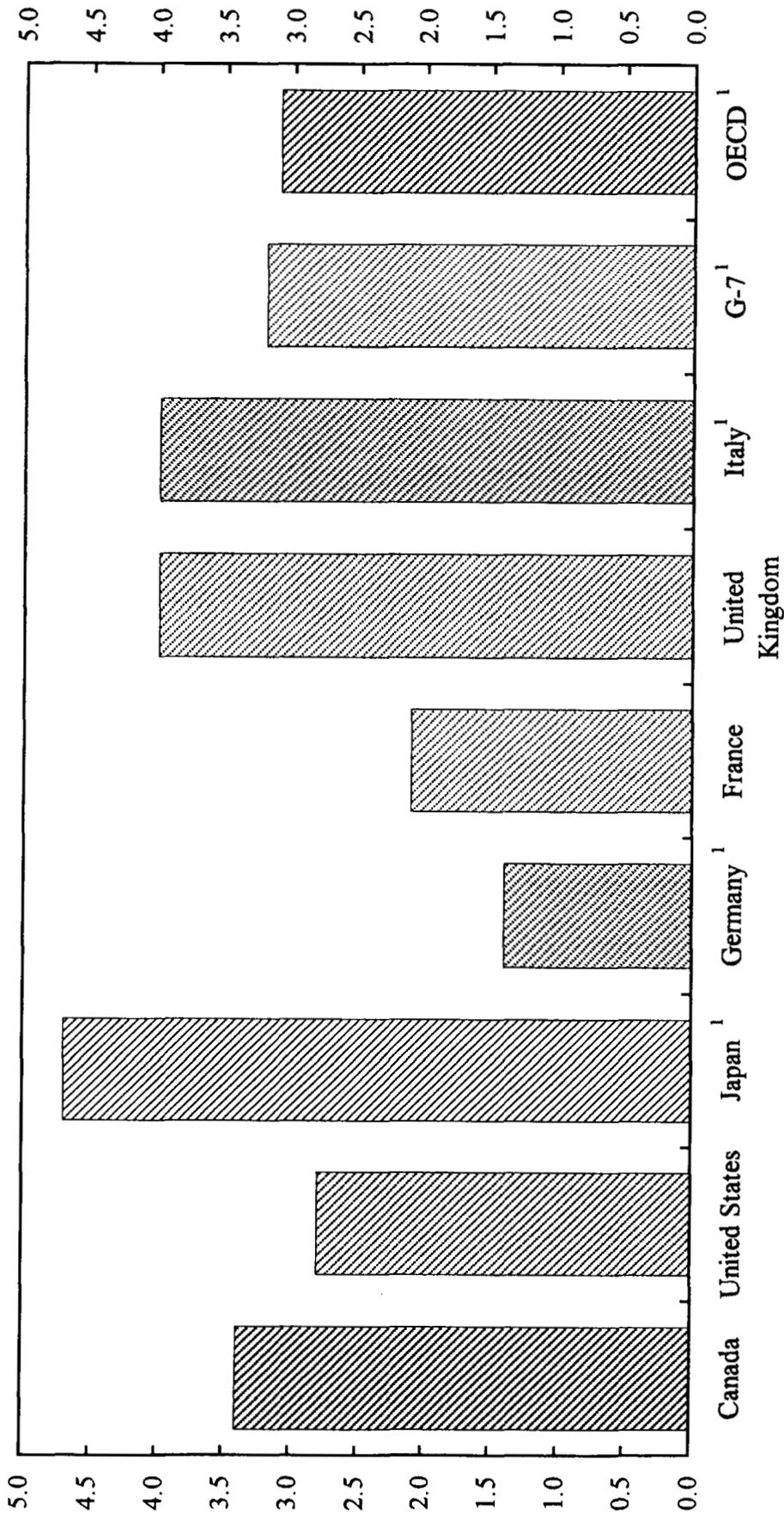
Sources: IMF Government Financial Statistics; and OECD Revenue Statistics.

[1] 1996.

List of References

Bird, Richard, David Perry, and Thomas Wilson, 1998, "Canada," in *The Tax System in Industrialized Countries*, edited by Ken Messere, (New York: Oxford University Press).

Cole, Jeffrey and Michael Leidy, 1997, "Business Taxation in Canada," *Canada—Selected Issues*, IMF Staff Country Reports No. 97/20.

Coopers and Lybrand Global Tax Network, *1998 International Tax Summaries: A Guide for Planning and Decisions*, (New York: John Wiley and Sons).

Duclos, Jean-Yves and Julie Gingras, 1999, "Mixing It Up: Directions for Federal Tax Reform," (Toronto: C.D. Howe Institute).

Department of Finance, Canada, 1999, *The Economic and Fiscal Update*.

Messere, Ken (editor), 1998, *The Tax System in Industrialized Countries*, (New York: Oxford University Press).

Mintz, Jack and Finn Poschmann, 1999, "Tax Reform, Tax Reduction: The Missing Framework," (Toronto: C.D. Howe Institute).

Organisation for Economic Co-operation and Development, 1999, *1998–1999 Annual Review: Canada* (draft), (Paris: OECD).

Organisation for Economic Co-operation and Development, 1999, *Revenue Statistics, 1965–98*, (Paris: OECD).

Organisation for Economic Co-operation and Development, 1993, *Taxation in OECD Countries*, (Paris: OECD).

Organisation for Economic Co-operation and Development, 1986, *Personal Income Tax Systems under Changing Economic Conditions*, (Paris: OECD).

V. DEBT REDUCTION AND FISCAL POLICY ALTERNATIVES IN CANADA[1]

1.   Having tackled its fiscal deficit and with substantial surpluses in prospect on the basis of unchanged tax and spending policies, the federal government in Canada faces a critical decision on how to set its long-term fiscal objectives. The ratio of government debt to GDP in Canada remains high, particularly in relation to most other industrial countries (Figure 1). Further debt reduction should clearly be an important objective, but how much and how rapidly debt should be reduced are important unanswered questions. The experiences of other countries with debt targets, as well as economic theory, do not provide much guidance on answering these questions. For those countries adopting targets for public debt, a great deal of judgement, reflecting the country's circumstances, was used in setting these targets. In the economic literature, specific conclusions about optimal public debt levels have to be derived from hard-to-quantify economic tradeoffs and alternative criteria for evaluating social welfare, with results varying widely depending on the approach adopted and the parameters assumed in the models. More pragmatic approaches, based on model simulations of alternative debt paths and analysis of the economic tradeoffs between them, suggest for Canada that it would be useful to bring the debt-to-GDP ratio down to 20–30 percent in the early part of the twenty-first century, which is a target easily within the government's grasp.

A. International Experience with Government Debt Targets

2.   In recent years, several industrialized countries have started to include targets for public debt in their fiscal policy objectives. New Zealand and the countries of the European Union are the most prominent examples. The adoption of specific debt targets has been motivated by several considerations, including concerns about increasing public expenditures as a result of aging populations.

3.   In New Zealand, one of the legislated principles of fiscal management under the Fiscal Responsibility Act of 1994 is that public debt should be reduced to "prudent levels" in order to provide "a buffer against future adverse events." In principle, the government should achieve debt reduction by running operating surpluses and, once the debt has been reduced to prudent levels, it should maintain an operating balance on average over the business cycle.[2] The Act provides the government with scope for flexibility in setting the debt target and in deciding how to achieve it. The Act leaves it to the government to interpret many of the key

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[1] Prepared by Vivek Arora and Anders Matzen.

[2] By focusing on operating surpluses, debt reduction could not be achieved simply through the sale of government assets. By looking at the average budget balance over the business cycle, there would be some flexibility to operate counter-cyclical fiscal policy while still ensuring that the government does not borrow on an extended basis (see New Zealand Treasury, 1995a).

terms, including the level of debt that is "prudent."[3] The government is not legally bound to observe the debt target at all times, but it is required to explain any departures from the legislated principles (including debt reduction), as well as how and when it plans to reverse such departures. In practice, the debt target in New Zealand has been derived as a residual based on the target for projected expenditures (which in part reflects demographics) and the desired level of taxation. With rapid progress being achieved in debt reduction in recent years, the government has steadily reduced its debt target. The initial target, following passage of the Act, was to reduce net public debt to below 30 percent of GDP by 1996/97. With this target well in hand and continued rapid progress in debt reduction (debt was 24 percent of GDP in 1997/98), the target was revised down to below 15 percent of GDP in 1998.

4.   The debt target for European Union countries is part of the convergence criteria in the Maastricht Treaty. As such, the debt target functions as a reference value: specifically, governments are required to aim at keeping the gross debt of the general government below 60 percent of GDP. The target is intended to be consistent with a sustainable fiscal position in the member states. The reference value of 60 percent happens to coincide with the average level of general government gross debt in the European Union countries at the time that the Maastricht Treaty was drafted in 1991. Although the actual debt target was chosen with a large measure of judgement, it has subsequently been pointed out that the target is consistent with a steady state for the level of debt when the general government deficit is 3 percent of GDP and nominal output growth is 5 percent (e.g., Buiter et al., 1993). In turn, such a level for the general government fiscal deficit would be consistent with the Maastricht Treaty requirement of deficits at no more than 3 percent of GDP, which is equal to the average rate of public sector investment for the EU countries in the period 1974 to 1991. Hence, it can be argued that the deficit target for the EU countries has been established on the basis of a golden-rule principle of public finance.[4] This principle suggests that the accumulation of public sector debt should mirror the accumulation of physical capital by the public sector, which is assumed to increase the productive potential of the economy. However, the

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[3] In fact, it is recognized that no single level of the debt is likely to be considered prudent at all times, since such a determination would depend on factors that change over time, including the structure of the economy, its vulnerability to shocks, demographic pressures, and the costs of debt servicing.

[4] Such a "golden rule" is explicitly a part of the fiscal strategy in the United Kingdom. The main purpose of the rule is to ensure that public sector investment does not get squeezed out in situations where the budget is in overall deficit. Containing the level of government debt is ensured by the second element of the U.K.'s fiscal strategy, the debt sustainability rule, which requires public sector net debt to remain below 40 percent of GDP.

European Union has never officially referred to the golden rule when justifying the public sector deficit target.[5]

B. Economic Literature on Optimum Debt-to-GDP Ratios

5.   Conclusions in the economic literature regarding the optimum quantity of government debt vary widely based on the kind of approach that is taken. At one extreme are the models characterized by Ricardian equivalence, in which the size of the debt is of no consequence for the allocation of resources, provided that the debt does not grow at an unsustainable pace. The theoretical assumptions to reach such a conclusion are, however, restrictive. Under more plausible assumptions—such as the presence of liquidity constraints and/or distortionary taxation—Ricardian equivalence breaks down and there is in fact a tradeoff between financial spending through debt or taxes. Considerations then arise regarding an optimum time-path for the debt. Empirically, Ricardian equivalence has rarely been observed in its strong form, and most empirical research has focussed on determining how large the departures from Ricardian equivalence actually are. It is thus appropriate to focus on approaches in which there is some meaningful tradeoff between debt and other forms of financing government expenditures.

6.   The literature in this area has focused mainly on optimum fiscal positions, and thus indirectly shed light on the appropriate size of government debt (since in an accounting sense the steady-state level of the debt is determined by the budget balance and the growth rate of the economy). There are two main approaches to assessing optimum fiscal balances. In one approach, it is argued that the government should seek to minimize tax distortions over time by keeping tax rates relatively constant (e.g., Kydland and Prescott, 1980). Government debt then functions as a means for minimizing tax distortions over time ("tax smoothing"). For example, if large unfunded government liabilities are envisaged in the future, then debt reduction in the near term would be appropriate. By reducing debt-servicing costs, the government would free up resources with which to meet its liabilities without resorting to sharply higher tax rates in the future. In the other approach, the government seeks to maximize intergenerational fairness. When Ricardian equivalence does not hold, debt places a burden on the capital stock of future generations, and the level of the debt should be carefully chosen in such a way as to distribute the burden evenly across generations. A key parameter in such an optimization is the rate of time preference, which represents the

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[5] The golden rule principle of public sector finance is mentioned in Wyplosz (1991). Two qualifications would apply to the golden rule argument however. First, the public sector deficit is compiled on the basis of nominal interest expenditures. Hence an inflation rate higher than zero would imply that the "real" deficit was lower than public sector investment. Second, consideration needs to be given to the depreciation of public capital, as well as the quality of public sector investment.

importance placed by the current generation on its lifetime consumption and welfare relative to the consumption and welfare of future generations.

7.   Another part of the literature has focused directly on the optimum quantity of government debt, and tried to determine the optimum quantity based on the tradeoff between the benefits and costs of government debt (e.g., Aiyagari and McGrattan, 1998). The benefits of government debt include the role that it plays in enhancing the liquidity of households by providing an additional means of smoothing consumption and by loosening borrowing constraints. The costs include the adverse wealth distribution and incentive effects of the taxes needed to repay the debt, as well as the crowding out of capital through higher interest rates and the lowering of private consumption. The optimum quantity of debt depends positively on the effectiveness of debt in smoothing out private consumption, negatively on the extent to which debt crowds out private capital, and negatively on the extent of the disincentive effects of distortionary taxes.

8.   None of the above theoretical approaches lead to strong conclusions about how large the government debt should be. The government is assumed to try and maximize social welfare, with the social welfare function usually involving a tradeoff between equity and efficiency and both an intra- and an intertemporal dimension. Optimization involves several unobservable parameters—such as the weights that are placed on competing objectives, the rate of time preference, and the elasticity of labor supply with respect to tax rates—and the results can vary significantly depending on the assumptions about these parameters. In addition, in the optimum debt calculations derived by Aiyagari and McGrattan (1988), the welfare function calibrated for the U.S. economy is found to be relatively flat. Thus, the welfare cost of having a government debt equivalent to 60 percent of GDP (which is found to be the optimal level) is estimated to be less than 0.1 percent of total consumption.[6] If government debt were to increase to 100 percent of GDP, only a marginal (0.02 percent of consumption) additional loss in welfare would result. The small welfare losses incurred by deviations from the optimal debt level suggest that undue importance should not be attached to the specific value of the debt ratio that emerges from this analysis.

C. Alternative Debt-Reduction Paths and Tradeoffs

9.   While acknowledging the lack of clear conclusions from economic theory, a recent empirical analysis of Canadian federal government finances, which takes a relatively pragmatic approach, provides some target ranges for the debt ratio over the longer term. Scarth and Jackson (1997) note that considerations of economic efficiency do not lead to any specific conclusion about the size of the debt. However, considerations of intergenerational equity (i.e., ensuring that the present value of living standards for future generations are

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[6] In 1998, the ratio of U.S. government debt to GDP was 44 percent, compared to the estimated "optimum" level of 60 percent.

equal to the living standards of the current generation) would call for reducing federal government debt to 20–25 percent of GDP. In their analysis, debt reduction raises living standards of future generations by allowing for lower future taxes and by reducing foreign debt-service obligations.[7] The positive effect of debt reduction on living standards are judged to offset what otherwise would be a negative effect arising from the projected aging of the Canadian population.

10.   Using a simple calibrated model for the Canadian economy, Robson and Scarth (1999) demonstrate the importance of how a particular debt target is achieved, given uncertainties about future economic outcomes and about the structure of the economy. A large number of simulations were run based on two broad budget approaches that have the objective of reducing the debt-to-GDP ratio to 30 percent over the next 15–20 years and maintaining it at that level, which the authors suggest would aim to accommodate foresee-able fiscal pressures associated with the aging of the population.[8] The first approach is described as "drifting," under which the government is assumed to target budget balance when the economy is strong and a budget deficit when the economy is weak. The second approach involves the government following an explicit debt-reduction objective. Within the latter approach, the government is given the choice between paths for the annual budget that emphasize debt reduction in the early years (i.e., target budget surpluses) or aim for budget balance. Within each of the two debt-reduction approaches the government faces two further choices: whether to maintain the budget target unchanged in the face of the business cycle ("rigid") or to alter it ("flexible").[9]

11.   To capture the potential effects of uncertainties, Robson and Scarth incorporate in each simulation its own set of random economic disturbances, designed to mimic economic cycles and temporary shocks, and its own set of values for key parameters in the model. The estimates reported in Table 1 are the median values derived from the multiple scenarios. The

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[7] The model treats labor supply as exogenous and does not allow for the possibility that lower taxes may increase labor supply and national income, nor does it allow for the gains (such as the positive effects on output and consumption) arising from the lower interest rates associated with debt reduction. While endogenizing the labor supply response would raise living standards, the authors argue that lower interest rates would spur output but may discourage private saving, so that the long-run benefits for living standards may be questionable.

[8] The authors suggest that achievement of such a debt target over this timeframe would be sufficient to meet the budgetary implications of population aging as estimated in a recent report by the Canadian Auditor General.

[9] Specifically, the government is assumed in the "flexible" case to increase or decrease the budget target by 0.4 percentage points of GDP for each percentage point by which output is above or below potential, respectively.

results suggest that the debt-reduction approaches deliver substantially greater benefits—i.e., lower levels of government debt, higher budgetary payoffs to be used for tax cuts or increased government spending, and a greater increase in per capita consumption—than the "drifting" approach. Within the debt-reduction approaches, the approach that targets surpluses delivers larger benefits than the one that targets budget balance. In addition, the debt-reduction aproaches on average result in debt-to-GDP ratios lower than 30 percent, which would leave more room in latter years for the budget deficit to expand to meet unforeseen costs associated with population aging.

12.   The Government's Fall 1999 Economic and Fiscal Update provides a framework for analyzing alternative debt-reduction paths.[10] The five-year projections in the Update are status quo estimates based on current tax policies and an assumption that program spending will rise in line with inflation and population growth. Built into the spending projections is a $3 billion contingency reserve and an explicit allowance for economic prudence. To look at the longer-term consequences of alternative debt paths, these status quo projections were extended through 2014/15.[11] If all of the status quo surpluses after 1999/2000 were used for debt reduction, net federal government debt would be eliminated by 2011/12, and the government would accumulate net assets equivalent to 20 percent of GDP by 2014/15 (Figure 2). If instead the government continued to target ex ante budget balance (including a $3 billion contingency reserve) and, ex post, used the contingency reserve to pay down debt, in the absence of significant adverse economic shocks, the budget would tend to be in surplus each year by $3 billion (roughly ¼ percent of GDP). On this basis, the debt-to-GDP ratio would fall to around 29 percent by 2014/15. Alternatively, if more ambitious surpluses of ½ percent or 1 percent of GDP were pursued, then the debt ratio would drop to around 24 and 20 percent of GDP, respectively, by 2014/15.

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[10] The alternative debt paths discussed here are static projections in that they are all based on the same set of economic assumptions and do not factor in the effects of debt reduction on the economy. The debt ratios are, however, of the same order of magnitude as suggested by the staff's earlier work, which examined a similar set of scenarios and was based on a dynamic analysis which took into account the positive effects of debt reduction on output (see Swagel et. al. (1998)).

[11] In extending the projections, it is assumed that the output gap (potential output minus actual) will rise from around zero at the end of 2005 to 1 percent in 2009 and remain at that level thereafter. This assumption is made to effectively simulate the effects on the budget estimates of "normal" business cycles.

Table 1. Canada: Alternative Approaches to Debt Reduction

(In percent, unless otherwise noted)

| | "Drifting"1/ Approach | Debt Reduction Approaches | | | |
| | | Target Budget Surplus 2/ | | Target Budget Balance 3/ | |
		Rigid	Flexible	Rigid	Flexible
After 15 years					
Debt/GDP ratio	32.9	24.1	23.0	31.3	30.4
Budget payoff (percent of GDP)	2.4	2.8	2.9	2.3	2.4
Rise in real per-capita consumption	12.3	13.3	13.2	12.6	12.6
After 20 years					
Debt/GDP ratio	30.9	23.0	22.0	28.8	28.0
Budget payoff (percent of GDP)	3.8	4.2	4.2	3.8	3.8
Rise in real per-capita consumption	16.8	17.7	17.7	17.2	17.2

Source: Based on Robson and Scarth (1999).

1/ When output is equal to or above potential, the government is assumed to target a balanced budget; when output is below potential, the government is assumed to target a deficit of 0.4 percentage point of GDP for each percentage point of the output gap. After 15 years, demographic pressures are assumed to move the budget in five equal annual steps to a deficit of 1¼ percent of GDP, which would be consistent with a debt-to-GDP ratio of 30 percent, provided annual nominal GDP growth over the period averages a bit over 4 percent.

2/ The government targets annual budget surpluses of 1 percent of GDP over the period 2000/01 to 2005/06, with the surpluses then gradually declining and the budget being in balance by 2015. The budget would move in equal steps over the subsequent five years to a deficit of 1¼ percent of GDP, which would be consistent with maintaining a debt-to-GDP ratio of 30 percent indefinitely.

3/ The government targets budget balance in 2000/01 to 2015/16, then shifts (like in the other alternative budget paths) over a five-year period into a deficit 1¼ percent of GDP, which would be consistent with maintaining a debt-to-GDP ratio of 30 percent.

Figure 1. Selected Countries: Government Debt, 1998
(Percent of GDP)[1]
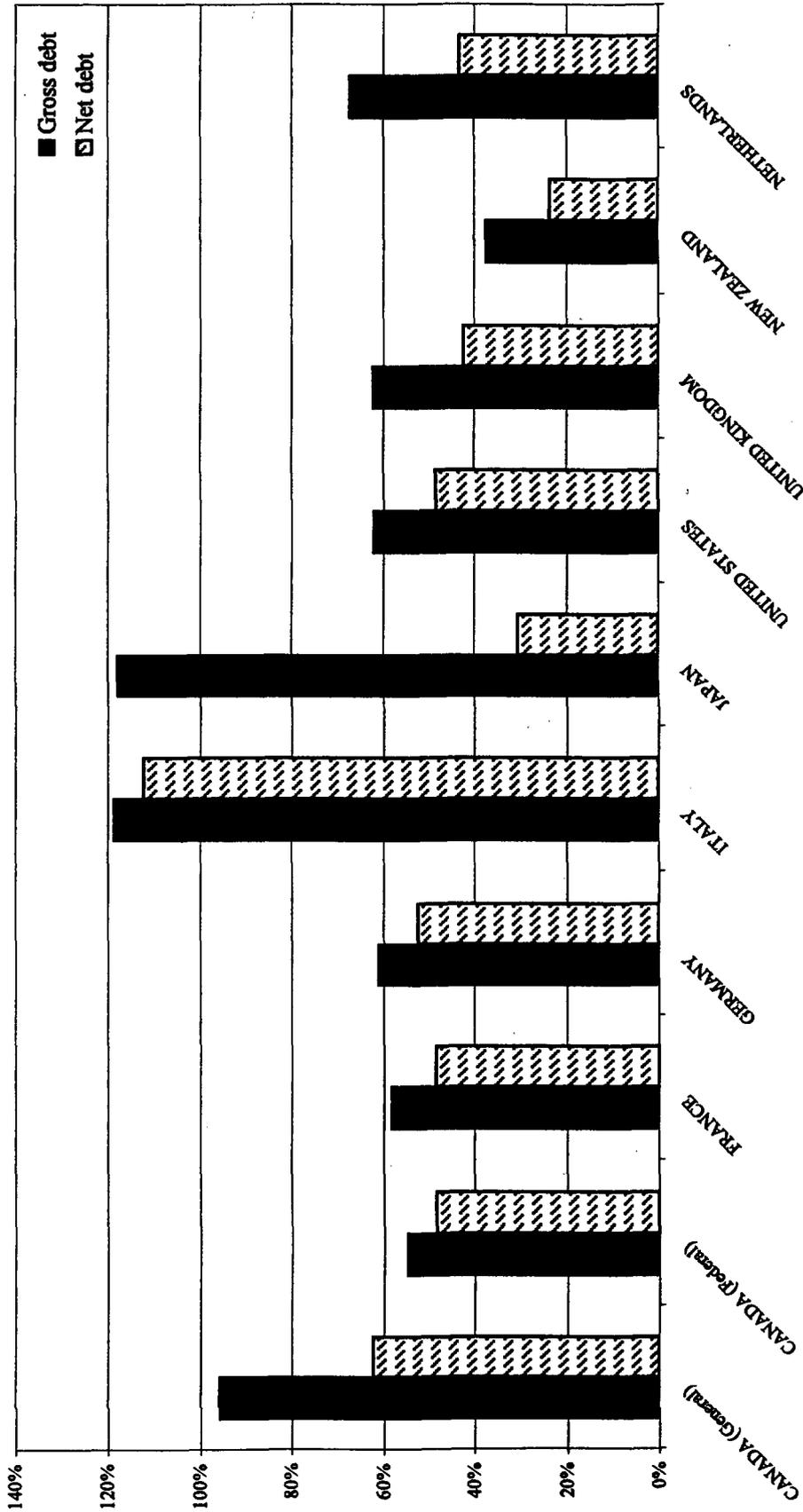
Sources: WEO September 1999; and IMF *Government Financial Statistics*.

[1]Figures for both federal and general government are provided for Canada; general government debt figures are shown for all other countries.

Figure 2. Canada: Federal Government Net Debt Under Alternative Fiscal Scenarios, 1998-2015

(In percent of GDP)

1998/99 1999/00 2000/01 2001/02 2002/03 2003/04 2004/05 2005/06 2006/07 2007/08 2008/09 2009/10 2010/11 2011/12 2012/13 2013/14 2014/15

——■—— Status quo   · · ◆ · · Surplus at 1/4 % of GDP   ——●—— Surplus at 1/2 % of GDP   – ✱ – Surplus at 1 % of GDP
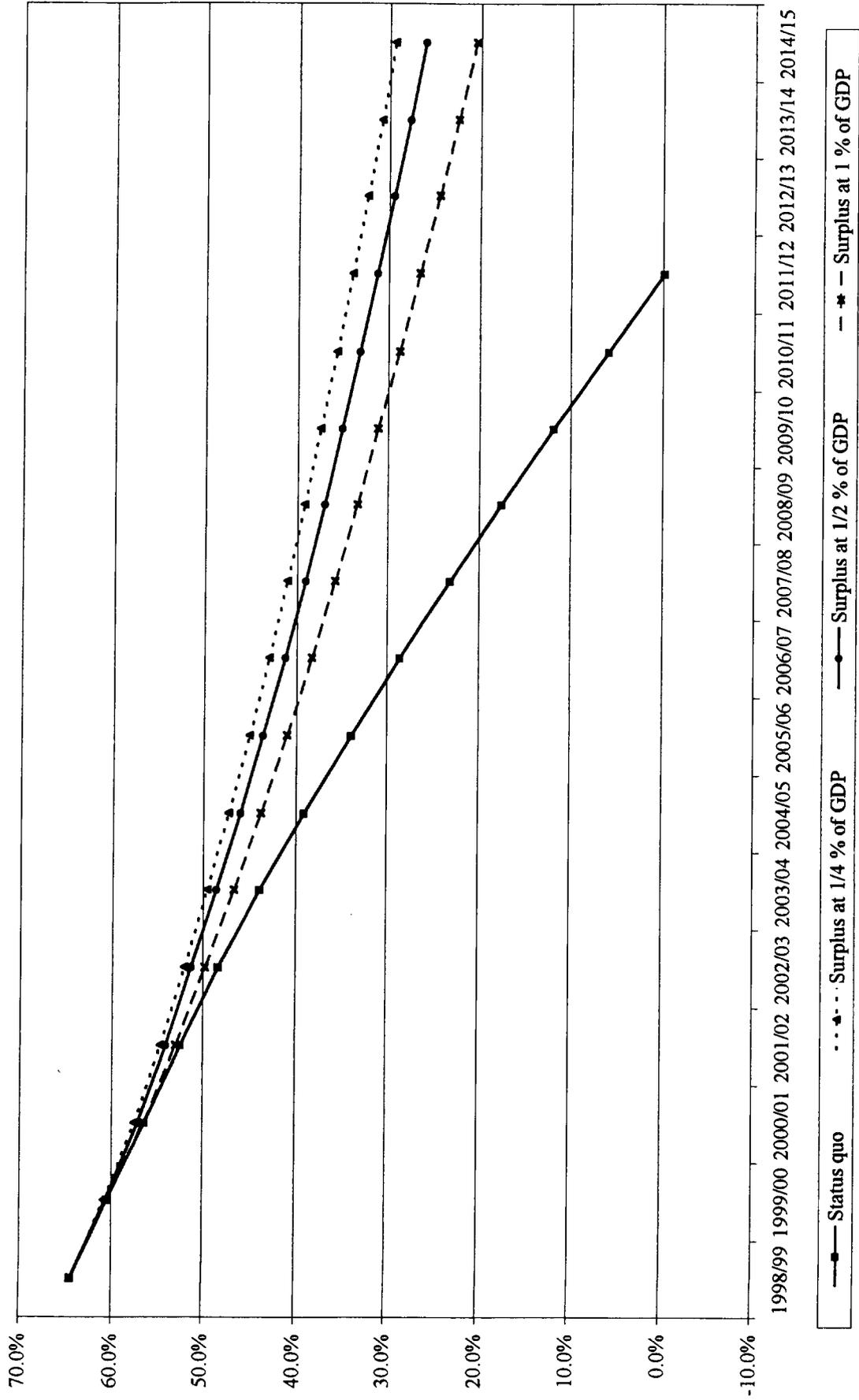
List of References

Aiyagari, S. Rao and Ellen McGrattan, 1998, "The Optimum Quantity of Debt," in *Journal of Monetary Economics*, Vol. 42, pp. 447–469 (Amsterdam: Elsevier Science Publishers).

Auditor General of Canada, 1998, *Report of the Auditor General of Canada—April 1998*, Chapter 6, "Population Aging and Information for Parliament: Understanding the Choices," (Ottawa: Office of the Auditor General of Canada).

Barro, Robert, 1979, "On the Determination of the Public Debt," in *Journal of Political Economy*, Vol. 87, No. 5, Part 1, pp. 940–971, (Chicago: University of Chicago Press).

Buiter, Willem, Giancarlo Corsetti, and Nouriel Roubini, 1993, "Maastricht's Fiscal Rules," in *Economic Policy*, April, pp. 56–100, (Cambridge: Cambridge University Press).

Kydland, Finn and Edward Prescott, 1980, "A Competitive Theory of Fluctuations and the Feasibility and Desirability of Stabilization Policy," in Stanley Fischer (editor), *Rational Expectations and Economic Policy*, (Chicago: University of Chicago Press).

New Zealand Treasury, 1999, "New Zealand Economic and Financial Overview 1999," (New Zealand Treasury).

New Zealand Treasury, 1995a, "Fiscal Responsibility Act 1994: An Explanation," (New Zealand Treasury).

New Zealand Treasury, 1995b, "New Zealand Economic and Financial Overview 1995," (New Zealand Treasury).

Organisation for Economic Co-operation and Development, 1999, "Canada: Annual Review, 1998–1999," (Paris: OECD).

Robson, William and William Scarth, 1999, "Accident Proof Budgeting: Debt-Reduction Payoffs, Fiscal Credibility, and Economic Stabilization," (Toronto: C.D. Howe Institute).

Scarth, William and Harriet Jackson, 1997, "The Target Debt-to-GDP Ratio: How Big Should It Be? And How Quickly Should We Approach It?" in Thomas J. Courchene and Thomas A. Wilson (editors), *Fiscal Targets and Economic Growth*, (Kingston, Ontario: John Deutsch Institute for the Study of Economic Policy).

Swagel, Phillip, Brenda Gonzalez-Hermosillo, and Yutong Li, 1998, "Macroeconomic Effects of Government Debt in Canada," Chapter V, Canada: Selected Issues, IMF Staff Country Report 98/55.

Wyplosz, Charles, 1991, "Monetary union and fiscal policy discipline" in *European Economy – special edition No. 1*, (Brussels, Belgium: Commission of the European Communities).